Proceedings of International Conference on Research in Education & Science

ICRES 2021

April 1-4, 2021   Antalya/TURKEY

EDITORS
DR. MACK SHELLEY
DR. I-TSUN CHIANG
DR. O. TAYFUR OZTURK

istes
Organization

www.istes.org

	Proceedings of International Conference on
	Research in Education and Science
www.istes.org	www.icres.net

www.icres.net

Volume 1, Pages 1-240

Proceedings of International Conference on Research in Education and Science

Editors: Mack Shelley, I-Tsun Chiang, & O. Tayfur Ozturk

Articles: 1-20

Conference: International Conference on Research in Education and Science (ICRES)

Dates: April 1-4, 2021

Location: Antalya, TURKEY

Conference Chair(s):

Dr. Mack Shelley, Iowa State University, United States

Dr. Wilfried Admiraal, Leiden University, The Netherlands

Dr. I-Tsun Chiang, National Taiwan Normal University, Taiwan

Dr. Wenxia Wu, George Washington University, United States

CONFERENCE PRESIDENTS
Dr. Mack SHELLEY - Iowa State University, United States
Dr. Wilfried ADMIRAAL - Leiden University, the Netherlands
Dr. I-Tsun CHIANG - National Taiwan Normal University, Taiwan
Dr. Wenxia WU **-** George Washington University, United States

SCIENTIFIC BOARD
Allan TARP - MATHeCADEMY, Denmark
Altay FIRAT - European University of Lefke, Cyprus
Andrea DEBELJUH - University Juraj Dobrila of Pula, Croatia
Ali Korkut ULUDAG - Ataturk University, Turkey
Brahim FERDI - Bechar University, Algeria
Branislav POPOVIĆ - University of Kragujevac, Serbia
Chalavadi SULOCHANA - Gulbarga University, India
Dariga NURKESHEVA - Nazarbayev University, Kazakhstan
Elizabeth ADAMSON - Edinburgh Napier University, United Kingdom
Farhad BALASH - Kharazmi University, Iran
Farouq ALMEQDADI - Emirates College for Advanced Education (ECAE), U.A.E.
Gordana SAVIC - University of Belgrade, Serbia
Haydar YUKSEK - Kafkas University, Turkey
Henry David KATNIYON - Federal College of Education, Pankshin, Plateau state, Nigeria
Hsin-Chih WU - National Taiwan Normal University, Taiwan
Jessie BUSTILLOS - London Metropolitan University, United Kingdom
Mesut AYDIN - Inonu University, Turkey
Milica PAVKOV HRVOJEVIĆ - University of Novi Sad, Serbia
Mohammad SARWAR - Scialert, Dubai, United Arab Emirates
Morteza BARIN - Farhangiyan University of Iran, Iran
Muteb ALQAHTANI - Rutgers University, United States
Nurten SARGIN - Necmettin Erbakan University, Turkey
Ognyan B. MANOLOV - European Polytechnic University, Bulgaria
Sanaa AL-DELAIMY - Mosul University, Iraq
Shynar BAIMAGANBETOVA - Nazarbayev University, Kazakhstan
Summer MOUALLEM - University of Central Lancashire, United Kingdom
Tamer USTUNER - Kahramanmaras Sutcu Imam University, Turkey
Tri Marhaeni PUDJI ASTUTI - Semarang State University, Indonesia
Yi-Teng HSU - National Taiwan Normal University, Taiwan

ORGANIZING COMMITTEE
Aliya MUSTAFINA - Nazarbayev University, Kazakhstan
Ann D. THOMPSON - Iowa State University, United States
Ersin KARADEMİR - Eskisehir Osmangazi University, Turkey
Halil SNOPCE - South East European University, Macedonia
Hakan AKCAY - Yildiz Technical University, Turkey
Jacqueline T. MCDONNOUGH - Virginia Commonwealth University, United States
Mariusz JAWORSKI - Medical University of Warsaw, Poland
Mary M. CAPRARO - Texas A&M University, United States
Muhammad ZAYYAD - Al-Qasemi Academic College of Education, Israel
Murat BEYTUR - Kafkas University, Turkey
Mustafa PEHLIVAN - Necmettin Erbakan University, Turkey
Natela DOGHONADZE - International Black Sea University, Georgia
Natalija ACESKA - Ministry of Education and Science, Macedonia
Ossi AUTIO - University of Helsinki, Finland
O. Tayfur OZTURK - Necmettin Erbakan University, Turkey
Silvia MORARU - National High School Bucharest, Romania
Silviya KOSTOVA - The D.A. Tsenov Academy of Economics, Bulgaria

Table of Contents

Exploring Middle School Students' Interest and Their Perceptions of the Effect of STEM Education on Their Future Careers

Derar Serhan

Arizona State University, USA,   https://orcid.org/0000-0003-3767-1046

Farouq Almeqdadi

Farouq ALMEQDADI - Emirates College for Advanced Education (ECAE), U.A.E.,

https://orcid.org/0000-0002-6753-5670

Abstract: This study investigated middle school students' interests and perceptions of the importance of developing their knowledge and skills in Science, Technology, Engineering and Mathematics (STEM) in the United Arab Emirates (UAE). In addition, the study also investigated the effect of gender on students' interests and perceptions. One hundred fifty-four students participated in the study. Data were collected using a survey consisting of 48 questions divided into four major categories: demographics, students' knowledge about the job market in relation to STEM, students' interest in STEM subjects, and students' perceptions of the importance of a solid knowledge of STEM on their future careers. The results indicated that all students believed that having good scientific knowledge and skills are important to get a decent job in today's market. In addition, the results of the study showed that gender was not a significant factor on students' interests in STEM; female students were more interested in learning Chemistry and Biology, while male students were more interested in learning Mathematics.

Keywords: STEM education, Students' perceptions, Gender differences

Introduction

Science, Technology, Engineering and Mathematics (STEM) education is an integral part of learning in today's economy. It incorporates educational activities across all grade levels as part of an interdisciplinary and hands-on approach to real-world applications of learning. The main goal of STEM education is to encourage students to take an interest in STEM subjects at an early age to prepare them for the job market, and in turn, benefit the greater economy (Batdi, Talan, & Semerci, 2019; Gonzalez & Kuenzi, 2012; Marick Group, 2016; Rodger, 2010). Some studies that have focused on STEM education investigated the role of gender on students' choices of STEM careers and the interest of female students in these careers (Aswad et al., 2011; Beede et al., 2011; Christensen et al., 2014; Dickson, 2010; Forgasz et al., 2014; Gnilka & Novakovic, 2017; Hebebci, 2019; Pasha

-Zaidi & Afari, 2016; Rainey et al., 2018; Riegle-Crumb & King, 2010; Vu et al., 2019).

The Program of International Student Assessment (PISA) which provides education stakeholders in the UAE with comprehensive data about teaching and learning in Science, Mathematics and Reading for 15-year-old students, found that UAE students ranked 37th in mathematics and 35th in science among 70 participating nations. The UAE was the highest performing country among Arab countries. The PISA (2015) data showed that UAE female students outperformed male students in all domains. These data allow policymakers and educators to track educational progress and growth while providing them with the information necessary to improve the performance of students, teachers and school leaders.

The UAE Government policy (2015) recognized the importance of innovation and the primary role it plays in economic progress. This is also reflected in the UAE's Vision 2021 that highlights the importance of science, technology and innovation and their role in moving the UAE towards a knowledge-based economy:

> *"Innovation, research, science and technology will form the pillars of a knowledge-based, highly productive and competitive economy, driven by entrepreneurs in a business-friendly environment where public and private sectors form effective partnerships" UAE Vision 2021*

The UAE's National Agenda 2021 set many goals to support this vision. The goals include becoming one of the top ten countries in the world in the Global Innovation Index, increasing research and development expenditure three folds by 2021, seeking to increase the share of knowledge workers to 40% of total workforce, and advancing the rank of students in mathematics, science and reading to become among the 20 highest ranked countries. STEM education in UAE was introduced by Abu Dhabi Education Council (ADEC– www.adec.ac.ae) when it revealed major changes to Abu Dhabi Schools' curriculum in March 2015 (Pennington, 2015). Consequently, these changes were implemented to fulfill the country's labor market demands.

In 2019, Soomro wrote a paper about the progress of STEM-based education in UAE. In addition to discussing needs of STEM based education, an implementation framework was proposed. He stated that "STEM should be supported by stakeholders and these are proposed as 4Ps, which includes parents, patrons, practitioners and partners." *p*. 159. He suggested the following framework:

> *students are supposed to be self-motivated; they work in collaboration with other students under teacher supervision. Student engages themselves in all sorts of discussion and inquiries and solves real world problems.*

> *teachers are interdisciplinary facilitators rather than lecturers and mentoring students throughout to solve real world problems.*

> *Parents here supposed to be closed to students and teachers and should be having regular interaction with teachers regarding performance of students. They must be very much interested in and fully*

involved with STEM activities performed at schools.

Patrons here mean the owners / CEOs of schools; they initiate STEM education and provide financial support to school. Patrons can be any Government Entity, which directly or indirectly support STEM activities at schools.

Practitioners are school teachers; academicians; STEM researchers; and STEM curriculum developers. They design curriculum in such a way so that students feel comfortable and involved in STEM related activities.

Partners are main sponsors of STEM education. They may be public or private entities, ready to cooperate and support STEM activities at schools.

In their study, Makhmasi et al. (2012) investigated 9-12 grade students' interests in STEM. One thousand 9-12 grade students participated in the study; 626 STEM-track students and 374 non-STEM track students enrolled in public and private schools across the country. The participants also included a group of university students. A questionnaire that consisted of twenty-five questions was administered. The questions were divided into six major categories: Usefulness and value of STEM for students; Effective motivation of students for STEM majors; Students' views on STEM related careers and salaries; External influences on students to pursue a STEM related major; Language in which STEM courses are being taught; and Females and their role in STEM majors and careers. The findings indicated that the participants found that STEM education was useful for real life, lead to high rewarding careers For STEM majors, and that STEM fields are suitable for females.

John & Varghese (2018) conducted a study in the STEM schools of Dubai, UAE to determine the interest of students in pursuing STEM education and STEM careers. An online survey which consisted of five set of questions was conducted for students. A total of 313 students participated in the survey. The data were analyzed by using both descriptive and inferential methods including mean, standard deviation, and chi-square test. The researchers concluded that STEM students in Dubai schools have a sincere interest in STEM subjects and that the schools provided a suitable environment for STEM education.

Vu et al. (2019) examined the popularity of STEM majors among talented/gifted students and how that affected their major choices. Data from 109 students with perfect SAT and/or ACT scores in Nebraska, USA between 2011 and 2016 were collected. The researchers found that the majority of gifted students (71%) chose a STEM major when they entered colleges. Also, they found that among the four factors (school type, living location, gender, and race), gender was the only variable that contributed to gifted high school students' choices of college majors in STEM.

In their study, Gnilka and Novakovic (2017) argued that females still have less ability to choose STEM careers. To remove the barriers around STEM careers for female students, educators, parents and the broader community must collaborate to change the status-quo so more females can pursue STEM careers.

Pasha-Zaidi & Afari (2016) argued that females in UAE showed less interest in STEM subjects especially in math and science. The UAE is encouraging both genders to enter the STEM field because of the need for local engineers from both genders to fill the career vacancies in the oil industry.

This study focused on students' interests in STEM subjects and their knowledge about the impact of these subjects on their future careers. The study also focused on the role that gender plays in students' perceptions.

Purpose of the Study

The purpose of the study was to investigate students' interests in STEM subjects and their knowledge about the impact of these subjects on their future careers. The study was designed to answer the following questions:

1. How much knowledge do students' have about the job market related to STEM?
2. To what extent are students interested in STEM school subjects?
3. What are students' perceptions of the impact of having a good knowledge of STEM subjects on their future careers?
4. Is there any difference between students' interests and knowledge based on gender?

Method

The students who participated in this study were middle school students in the United Arab Emirates. One hundred fifty-four students participated in this study. Seventy-six of these students were male students and seventy-eight were female students. The majority of these students (92.2%) were 14-15 years old. Most of them (74%) indicated that they have a family member who has a STEM career. To provide answers to the research questions, data were collected using a survey that consisted of three major parts: students' knowledge about the job market related to STEM; students' interest in STEM subjects; and students' perceptions of the impact of having a good knowledge of STEM subjects on their future careers.

Results and Discussion

The first part of the study investigated students' knowledge of the job market in relation to STEM. Students were asked to respond to the question "How informed are you about these topics?" by choosing from the following answers: "not informed at all", "not well informed", "fairly informed" to "very well informed". This part was divided into four categories, each one covered a different STEM subject. The following table (Table 1) provides the percentages for the "fairly informed" and "very well-informed" responses, and will be referred to as "informed" during the discussion. As seen in the table, 60.4% of the students indicated that they were informed about science-related careers that were available in the job market in relation to Mathematics (56.5%), Engineering (59.1%) and Technology (53.3%); 57.3% of all participants indicated that they were informed of

STEM-related careers. Students indicated that among STEM subjects, the subject that they were the least informed in terms of career and employer search was Mathematics, the one they were most informed about was Engineering.

Table 1. Students' Knowledge about STEM-related Careers

Subject/Item	Very well informed	Fairly informed	Total
Science			
1. Science-related careers that are available in the job market	7.8	52.6	60.4
2. Where to find science-related careers	17.5	36.4	53.9
3. The steps students need to take if they want a science-related career	21.4	40.3	61.7
4. Employers or companies that hire people to work in science-related careers	9.1	34.4	43.5
Mathematics			
1. Mathematics-related careers that are available in the job market	20.1	36.4	56.5
2. Where to find mathematics -related careers	7.8	40.9	48.7
3. The steps students need to take if they want a mathematics -related career	11	33.8	44.8
4. Employers or companies that hire people to work in mathematics -related careers	5.8	33.8	39.6
Engineering			
1. Engineering-related careers that are available in the job market	16.9	42.2	59.1
2.Where to find engineering -related careers	14.9	41.6	56.5
3.The steps students need to take if they want an engineering-related career	14.9	41.6	56.5
4.Employers or companies that hire people to work in engineering-related careers	13	46.8	59.8
Technology			
1.Technology-related careers that are available in the job market	13	40.3	53.3
2.Where to find technology -related careers	14.3	41.6	55.9
3.The steps students need to take if they want a technology-related career	14.3	32.5	46.8
4.Employers or companies that hire people to work in technology-related careers	14.3	33.8	48.1

Table 2 provides the means for the responses provided in Table 1 for each one of the four items. The majority of students (57.3%) indicated that they were informed about STEM-related careers, only 47.8% indicated that they were informed of employers or companies that were hiring in STEM-related careers.

Table 2. Means of Students' Knowledge about STEM-related careers

	Means of Table 1 percentages
STEM-related careers that are available in the job market	57.3
Where to find STEM -related careers	53.8
The steps students need to take if they want a STEM-related career	52.5
Employers or companies that hire people to work in STEM-related careers	47.8

The second part of the study investigated students' interest in STEM subjects. Participants responded to the question "To what extent are you interested in the following school subjects?" by choosing their answer from the following "I never had this subject"," not interested"," less interested", "interested" to "highly interested" (on a scale from 1 to 5). Students who indicated that they interested and highly interested in STEM subjects ranged from 57.8%-71.5% which means that students have an interest in taking STEM classes. Students showed the most interest in Biology followed by Mathematics. They showed the least interest in Space Science and Physics (see Table 3).

Table 3. Students Interest in School Subjects

School Subject	Highly interested	Interested	Total
Mathematics	18.2	50.6	68.8
Earth Science or Geology	20.1	44.8	64.9
Chemistry	22.7	39.6	62.3
Biology	37.7	33.8	71.5
Space science or Astronomy	29.9	27.9	57.8
Physics	22.1	35.7	57.8
Applied Science or Technology	21.4	40.9	62.3

The third part of the study investigated students' perceptions of the impact of having a good knowledge of STEM on their future careers. In their responses to "How much do you agree with the following statements?" students chose from the following responses "strongly disagree", "disagree"," agree" to "strongly agree" (on a scale from 1-4).The majority of students' "agreed" or "strongly agreed" that having a good knowledge and skills in Science, Mathematics and Engineering is needed to get a good job in today's world. The percentages ranged between 80.6%-97.4% based on the subject. Students also "agreed" or "strongly agreed" that most jobs nowadays require scientific, mathematical or engineering with percentages ranging from 81.2- 87.7 based on the subject (see Table 4).

Table 4. Students' Perception of STEM Subjects knowledge on their Future Carriers

Subject	Strongly agree	Agree	Total
Science			
It is important to have good scientific knowledge and skills in order to get any good job in today's world.	59.7	37.7	97.4
Employers generally appreciate strong scientific knowledge and skills among their employees.	37	52.6	89.6
Most jobs today require some scientific knowledge and skills.	44.2	43.5	87.7
Mathematics			
It is advantage in the job market to have good mathematics knowledge and skills.	46.1	46.1	92.2
It is important to have good mathematics knowledge and skills in order to get any good job in today's world.	35.7	50.6	86.3
Employers generally appreciate strong mathematics knowledge and skills among their employees.	26	55.2	81.2
Engineering			
Most jobs today require some engineering knowledge and skills.	31.2	49.4	80.6
It is advantage in the job market to have good engineering knowledge and skills.	31.8	54.5	86.3
It is important to have good engineering knowledge and skills in order to get any good job in today's world.	31.2	50	81.2
Future Interest in STEM Subjects			
I would like to study science after secondary school	44.2	31.2	
I would like to study mathematics after secondary school	22.1	34.4	
I would like to study engineering after secondary school	26.5	32.5	

In regards to the effect of gender on students' perceptions of the impact of having a good knowledge of STEM subjects on their future careers, the means of students' responses for Table 4 were calculated. The means for male students ranged from 2.93 – 3.47, while the means for female students ranged from 2.42- 3.62. Student' means were very close for most items. It is interesting to notice that the lowest mean score for both groups was for the same item "I would like to study mathematics after secondary school" which was 2.93 for males and 2.42 for females. This finding indicates that there is more interest among male students to continue mathematical learning in the future. In addition, the highest mean score for both groups was for the same item; "It is important to have good scientific knowledge and skills in order to get any good job in today's world." The mean was 3.47 for male students and 3.62 for female students. This indicates that, regardless of gender, students believed that having a good scientific knowledge and skills is important to get any good job in today's world.

	International Conference on		
ICRES	Research in Education and Science		**istes** Organization
www.icres.net	April 1-4, 2021	Antalya, TURKEY	www.istes.org

In regards to students' interests in STEM subjects, it can be seen from the Table 5, there was only a small variation between male and female students' interests in STEM subjects. Male students indicated more interest in Mathematics (a mean of 3.88 for males compared to 3.62 for females). Male students were more interested in Technology (a mean of 3.71 for males compared to 3.29 for females). Female students were more interested in Chemistry (a mean of 3.87 compared to 3.61 for males), Biology (a mean of 3.95 compared to 3.89 for males) and Physics (a mean of 3.72 compared to 3.59 for males). There was not much of a difference between students' interest in STEM subjects based on gender.

Table 5. Students' Interest in STEM Subjects Based on Gender

	Male		Female	
	Mean	SD	Mean	SD
Mathematics	3.88	.993	3.62	.871
Earth Science or Geology	3.67	1.320	3.5	1.125
Chemistry	3.61	1.108	3.87	.812
Biology	3.89	1.206	3.95	1.104
Space science or Astronomy	3.53	1.483	3.37	1.451
Physics	3.59	1.073	3.72	.966
Applied Science or Technology	3.71	1.273	3.29	1.32

Conclusion

The purpose of the study was to investigate students' interests in STEM subjects and their knowledge about the impact of these subjects on their future careers. The study was designed to investigate students' perceptions of the impact of having a good knowledge of STEM subjects on their future careers and to investigate whether gender has any effect on students' interests and knowledge about STEM subjects. Participants in this study showed interest in learning STEM subjects in the future. In particular, they showed interest in learning mathematics and science. They also indicated that it was important to have good scientific knowledge to get a good job. The findings of this study indicated that students are interested in STEM subjects. This finding can provide insight to educators and stakeholders. It is very important for stakeholders including educators and administrators to build on the findings of this study and to improve the STEM school curriculum to enhance students' knowledge and prepare them for today's careers.

References

Aswad, N.G., Vidican, G., & Samulewicz, D. (2011). Assessing the impact of socio-economic inequities on college enrolment: emerging differences in the United Arab Emirates, *Journal of Higher Education Policy and Management*, *33*, *5*, 459-471. Retrieved from DOI: 10.1080/1360080X.2011.605221

Batdi, V., Talan, T., & Semerci, C. (2019). Meta-Analytic and Meta-Thematic Analysis of STEM Education.

International Journal of Education in Mathematics, Science and Technology (IJEMST), 7(4), 382-399.

Beede, D. N., Julian, T. A., Langdon, D., McKittrick, G., Khan, B., & Doms, M. E. (2011, August 1). Women in STEM: A Gender Gap to Innovation. *Economics and Statistics Administration Issue Brief,* 04-*11.* Retrieved from https://ssrn.com/abstract=1964782 or http://dx.doi.org/10.2139/ssrn.1964782

Christensen, R., Knezek, G., & Tyler-Wood, T. (2014). Student perceptions of science, technology, engineering, and mathematics (STEM) content and careers. *Computers in Human Behavior, 34*, 173–186.

Dickson, L. (2010). Race and Gender Differences in College Major Choice. *The ANNALS of the American Academy of Political and Social Science*, *627* (1), 108–124. Retrieved from https://doi.org/10.1177/0002716209348747

Forgasz, H. J., Leder, G. C., & Tan, H. (2014). Public views on the gendering of mathematics and related careers: International comparisons. *Educational Studies in Mathematics, 87*(3), 369–388.

Gnilka, P.B., & Novakovic, A. (2017), Gender Differences in STEM Students' Perfectionism, Career Search Self-Efficacy, and Perception of Career Barriers. *Journal of Counseling & Development, 95*, 56-66.

Gonzalez, H.B., & Kuenzi J. J. (2012). Science, technology, engineering, and mathematics (STEM) education: a primer. Congressional Research Service 7-5700, Washington, DC. Retrieved from http://www.stemedcoalition.org/wp-content/uploads/2010/05/STEM-Education-Primer.pdf

Hebebci, M. T. (2019). The impacts of science, technology,engineering and mathematics applications on middle school students' academic achievement, scientific creativity and attitudes. (Unpublished doctoral thesis). Necmettin Erbakan University, Konya, Turkey.

John, V., & Varghese, M. (2018), STEM: A Study in the Schools of Dubai. Proceedings of *8th International Conference on Education and eLearning* (EeL 2018), (pp. 36-42). Singapore: Global Science and Technology Forum. Retrieved from https://pdfs.semanticscholar.org/3b51/4c9e3769a3b1f9aa27676fa76f195a547f79.pdf?_ga=2.117715277. 557974186.1573227141-215345704.1573227141

Makhmasi, S., Zaki,R., Barada, H. & Al-Hammadi. Y. (2012). Students' interest in STEM Education A survey from the UAE, Proceedings of *the IEEE Global Engineering Education Conference* (EDUCON). Retrieved from https://ieeexplore.ieee.org/document/6201144

Marick Group. (2016). A Look At The History Of STEM (And Why We Love It), Marick Group. Retrieved from https://www.marickgroup.com/a-look-at-the-history-of-stem-and-why-we-love-it/

Pasha-Zaidi, N., & Afari, E. (2016). Gender in STEM Education: an Exploratory Study of Student Perceptions of Math and Science Instructors in the United Arab Emirates. *International Journal of Science and Mathematics Education, 14* (7),1215-1231.

PISA (2015). Performance of 15-year-olds in the UAE: A First-Rate Education for the Future Workforce, United Arab Emirates Ministry of Education. Retrieved from https://www.moe.gov.ae/Arabic/Docs/Assessment2014/PISA/PISA2015%20Media%20Report.pdf

Rainey, K., Dancy, M., Mickelson, R., Stearns, E., & Moller, S. (2018). Race and gender differences in how sense of belonging influences decisions to major in STEM. *International Journal of STEM Education, 5*, (10). Retrieved from https://doi.org/10.1186/s40594-018-0115-6

Riegle- Crumb, C., King, B. (2010). Questioning a white male advantage in STEM: Examining disparities in

college major by gender and race/ethnicity. *Educational Researcher, 39*(9), 656–664. Retrieved from https://doi.org/10.3102/0013189X10391657

Rodger W, B. (2010). What is STEM Education?. *Science 27*, 329, Issue 5995, pp 996. Retrieved from https://science.sciencemag.org/content/329/5995/996

Soomro, T.R. (2019). STEM Education: United Arab Emirates Perspective. Proceedings of *the 8th International Conference on Educational and Information Technology* (ICEIT), (pp. 157-160). Retrieved from https://dl.acm.org/citation.cfm?doid=3318396.3318414

UAE Government (2015). Science, Technology & Innovation Policy in the United Arab Emirates, 1st Edition. Retrieved from https://www.moei.gov.ae/en/innovation/innovation-science-technology-and-innovation-policy.aspx

Vu, P., Harshbarger, D., Crow, S., & Henderson, S. (2019). Why STEM? Factors that influence gifted students' choice of college majors. *International Journal of Technology in Education and Science (IJTES), 3*(2), 63-71.

Analysis and Implementation of VR in the Biomedical Area Used by Preservice Secondary Science Teacher Involved in the Practicum Experience

María Aguilar García

University of Málaga, Spain,   https://orcid.org/0000-0003-3652-743X

Noela Rodríguez Losada

The University of Málaga, Spain,   https://orcid.org/0000-0003-3629-4883

Abstract: Nowadays, Augmented and VR in teaching disciplines such as Human Anatomy has made it feasible to promote learning through a gamification process that allows the development of teaching-learning proposals that improve students' motivation significant learning and not merely memoirist. This new practice moves away from the traditional methods used in Human Anatomy subjects. This work shows the result of implementing a methodology based on Augmented and Virtual Reality (VR) in high school students within the subject of human anatomy. Specifically, this implementation was developed in students (n = 16), all of them belonging to a public education center. Moreover, they were involved in nursing care, primary nursing techniques. The results, derived from the analysis of the instrument used to assess their level of acceptance and their level of learning, showed a significant increase in both motivations for learning and the acquisition of knowledge in the area (significance * p <0.001, ANOVA). Our study concludes that the use of Augmented and VR improves the learning and motivation of students in daily practice.

Keywords: Virtual reality, Human anatomy, Secondary high school

Introduction

The current technological development, and the adaptation of the generations of young people who have grown up and developed between screens, video consoles, tablets, etc., have made it possible to involve this technology in the curricular plan (Torres Santomé, 2015). The technological impact allows transforming educational instruments into others much closer to the current reality (Aguilar, 2012). Education has the responsibility of articulating social changes adapting to technological progress (Minguélez-Juan, 2018 and Minguélez -Juan, Núñez, and Mañas-Viniegra, 2019). Furthermore, this fact has become decisive due to the confinement situation caused by the COVID-19 Pandemic.

Presently, the interest of students both in child age, as adolescents or teenagers, is very receptive to the use and application of novel technologies that arise from education. These new technologies are a source of captivating experiences, which allow sharing in a natural, active, and participatory way their knowledge, skills, and practices. All this is with a network approach to online learning. That is why the Android and iOS settings offer free applications that can improve students' teaching and learning processes (Moreno-Martínez, Leiva Olivencia & Matas, 2016; Olivencia 2013). Furthermore, the diversity of media and multimedia elements that contain the internet (high quality 4K images, animations, etc.) joined with the flexibility of communication and information offered an increase in the motivation for the classes since they obtain a reinforcement immediate (Ortiz 2011).

In addition, one of the fundamental aspects of the medical sciences' Human Anatomy is the criticisms based on the little clinical relevant aspects (Frenk et al., 2011). Being in macroscopic Anatomy is a traditional transmissive rote teaching method. Learning has been understood as a generative process whose evaluation focuses on measurement. This method demands a pedagogical transformation that allows deep, comprehensive, and application-integrated learning and considers the learning process (Brunstein, 2014). Analyzing the history of medicine, centred on the anatomic study, the anatomist Andres Vesalio (1514-1564) was one of the founders of modern Anatomy and known for his great rigorous exposition. He was an innovator in teaching this subject, who experienced a Plague Pandemic that affected Padua (Italy), which permitted him to work with dissected corpses. This practice provided Vesalius with the dissection technique as a central activity of his classes and developed an anatomical-forensic update. At present, the teaching of Human Anatomy is carried out from the dissection completed with the observation of diagnostic images.

On the other hand, information and communications technology (ICT) has been used in the teaching-learning process, and they allow the visualization of different anatomical structures in their three-dimensional state. This procedure avoids using dissected corpses, which lowers cost and time. However, there are retractors of this technology's use, where it does not allow showing the complex reality of the human body (Rovetto, 2008). There are currently projects such as "Visible Human Project" developed in 1996 by the National Library of Medicine USA; complete and detailed anatomical three-dimensional illustrations of the human body (male, female) are found. This project provides cross-sections of the human body, obtained through computerized axial tomographic images and magnetic resonance imaging (National Library Medicine, 2019). Likewise, some universities work on simulators for the teaching of Human Anatomy, such as the so-called "Center for Human Simulation" at University of Colorado (Spitzer & Ackerman, 2008).

That is why there is a growing interest in modeling anatomical structures that allow different teaching-learning proposals in anatomy. That allows the improvement of understanding and learning, tiny and difficult to visualize structures. For authors such as Boza, Toscano, and Méndex (2009), the use of ITCs offers greater motivation in students, especially those with anatomical content (Salazar, 2011; Leiva and Mora, 2014). Furthermore, the teaching-learning practice improves with gamification that motivates and stimulates the student (Contreras & Eguia, 2016); both learning based on games (serious game) and augmented reality (Barma et al, 2015; Brown et al, 2020).

The epistemological perspective of augmented and virtual reality (VR) systems

It refers to the direct or indirect visualization of elements of the real world combined or augmented, linked with virtual elements generated on a computer, and from this fusion, mixed reality is offered (Cobo and Moravez, 2011: 105). From an educational perspective, authors such as Moreno-Martínez et al. 2016 and Philippe et al. 2020, define it as an emerging reality that allows the creation of mixed teaching-learning environments where virtual and real elements are combined. A wide number of works show how augmented reality reinforces learning and increases motivation to learn. Therefore, improving learning and discovery, providing the student with information that is easy to obtain that would otherwise be very difficult to obtain (Barr & Tagg, 1995; Reinoso, 2012; Hutson & Olsen, 2021; King & Smith, 2018; Kurilovas, 2014).

Augmented and VR provides immediacy and intuitive interactivity in student learning, which implies that the realization of teaching-learning activities becomes entirely practical activities. Thus, it eliminates the teacher's role, who is a proper transmitter at the same time, it eliminates the magisterial explanation and the mnemonic activity of the student without prior understanding. Also, augmented and VR are characterized by divergent cognitive development; that is, the student learns by doing and proposing different formulas for solving problems (Alper et al., 2021; Johnson & Westbrooks, 2021; Kozcu Cakir, Guven, & Celik, 2021; Moreno Martinez et al., 2016; Gandolfi, 2018, Philippe et al., 2020).

Although there are numerous studies on the benefit of using ICT and its promising future in teaching, it is necessary to know the capacities of the students and discuss whether the design of activities with VR can be beneficial. For this, models are used, such as the technology acceptance model, TAM (Technology Acceptance Model), to know if technology will be used optimally (Fathema et al., 2015; Scherer, et al., 2019). The TAM is one of the most widely used validated models to assess new technologies' level of acceptance. It extracts information of different dimensions: perceived utility (UP), perceived ease of use (FUP), perceived enjoyment, attitude towards use, and intention to use it (Cabrero and Pérez, 2018).

Objectives

The first objective was to know the degree of satisfaction or success of the group of students of the Human Anatomy subject about virtual and augmented reality. Moreover, to know the degree of technological acceptance by measuring the TAM instrument. The second objective was to determine if this emerging technology was an enriching experience by analyzing the satisfaction and usefulness of the students in the face of augmented and virtual reality. Moreover, validate the teaching-learning proposal by analyzing the acquisition of knowledge, content, and objectives of the study unit through the pretest and post-test comparative analysis.

Method

Samples of Study

The study was carried out in a secondary school in Andalusia (Malaga, Spain). Specifically, about the module of professional training studies of the health branch, the medium degree of nursing and health care. The total number of students in the study is 16 (in figure 1, the distribution of the sample is shown in the graphic). This study shows a semi-quantitative analysis of the TAM questionnaire to verify the degree of adaptation and acceptance of the augmented reality methodology to be used in this type of high school students The analysis of data was carried out using the Statistical Program GraphPad Prism 4, and also SPSS v 14. It was statistically significant the p-value <0.05.

Programming

For the Virtual Reality, was used the Students' mobile phones, viewers from Google Cardboard, and the Google Cardboard application, developed by Google, synchronized the viewer with the Smartphone. It works for Android or IOS operating systems (Dougherty, 2015; Brown and Green, 2016). The work plan carried out focused on five sessions. In the first session, an adaptation to VR of the TAM questionnaire was passed, which included two dimensions: UP and FUP. The UP was aimed at knowing if the subject thought that VR Systems could contribute or not to improve their performance. The FUP was designed to measure the degree of ease that VR Systems use could entail. In order to apply the TAM model and to adapt the scale, the Likert scale was used, made up of seven levels of importance: from "extremely disagree" to "extremely agree".

A pre-test was also passed to assess the previous contents, and brainstorm was carried out. When the next two sessions, lectures were given. In the fourth session, the Augmented and VR practice was carried out. Google viewers, smartphones, internet connection, and the "Sketchfab" application were used (Garcia-Bonete; Jensen and katona, 2019). The students were divided into three groups and received instructions on the operation of the viewer, the content to be viewed, and a poster with QR codes to scan to download the necessary applications.

Finally, VR systems were assessed using the second part of the TAM questionnaire and a questionnaire to diagnose the quality of the objects observed during the activity. In the fifth session, the post-test was carried out to verify knowledge acquisition.

Formative Program

The training program lasted 12 hours in total, divided into five sessions (Figure 1). The first session was used to carry out a knowledge pre-test and brainstorming. Subsequently, the explanations on the didactic unit of heart anatomy, distribution, and histology were started.

In session 2, students are introduced to virtual reality, and the operating mechanism is explained to them; cooperative groups are organized to work on augmented reality activities. This class is dedicated to the practice of VR and its management using different examples so that students become familiar with the terms, with the software, and with the operating mechanism.

Session 3, VR is applied directly to the main anatomical topic taught in the class, the heart, the cardiovascular system.

Session 4 is divided into three days, and on those days, activities are scheduled to work on the cardiovascular and lymphatic system and the anatomical dissection of the heart. The activities are carried out in cooperative groups to improve student interaction and gamification. The last session is used to carry out the post-test. Session 5 is dedicated to make a post-test about the knowledge acquired.

During the training program's execution, three e-rubrics are made using the co-Rubric software (https://corubric.com). This program allows for cooperative rubrics between students. The rubric designed is made up of 6 items destined to assess the ease of use of the resource presented by each group, the aesthetics of it and the poster shown, the quality of the explanation given by each group, the temporal organization, and the management and development of the session.
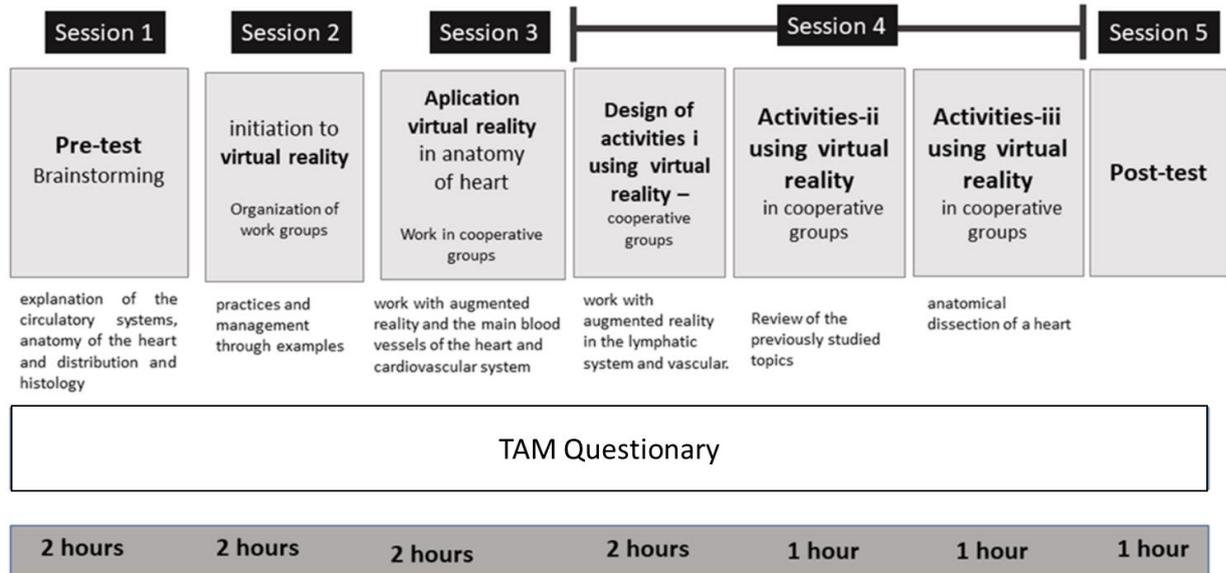
Figure 1. Formative Program

Results

Our results about the sample of the study's distribution have shown how the majority proportion of students are women (Figure 2). Related with the results involved of the perception of our students, specially how students recognize the usefulness of the system, how they consider its use useful, how they have enjoyed it, and if they

intend to use it in the future It was developed the figure 3, where the data shows the cumulative frequency (in percentage%) of the items evaluated in the satisfaction questionnaire on the augmented and VR resource used in the classroom. In general, the analyzed students showed high satisfaction in using these systems. The data reflect a very high statistical significance ($p < 0.001$) according to this system's use.
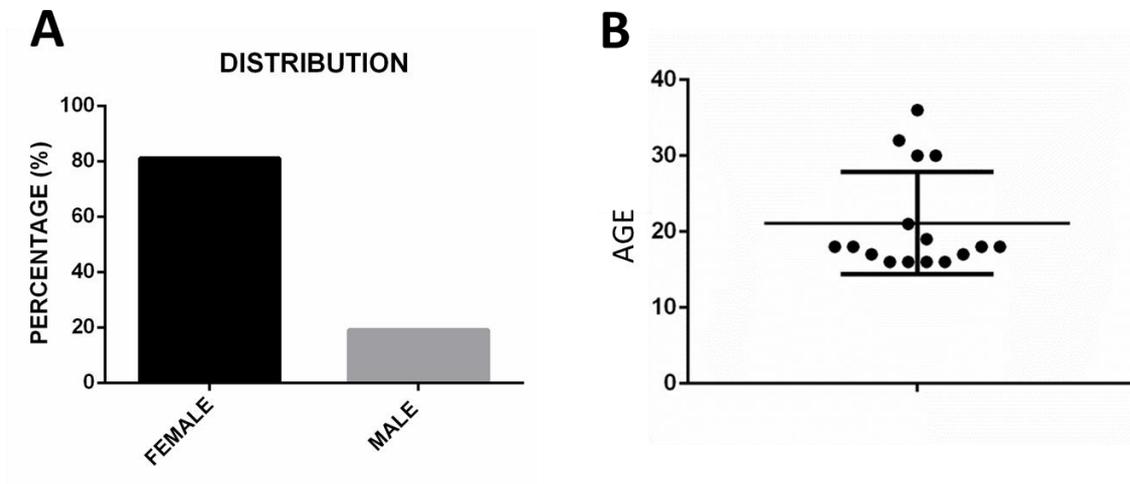
Figure 2. The graphic shows the distribution in the classroom. (A) represent the students samples evaluated in the study; (B) the mean age of the sample.
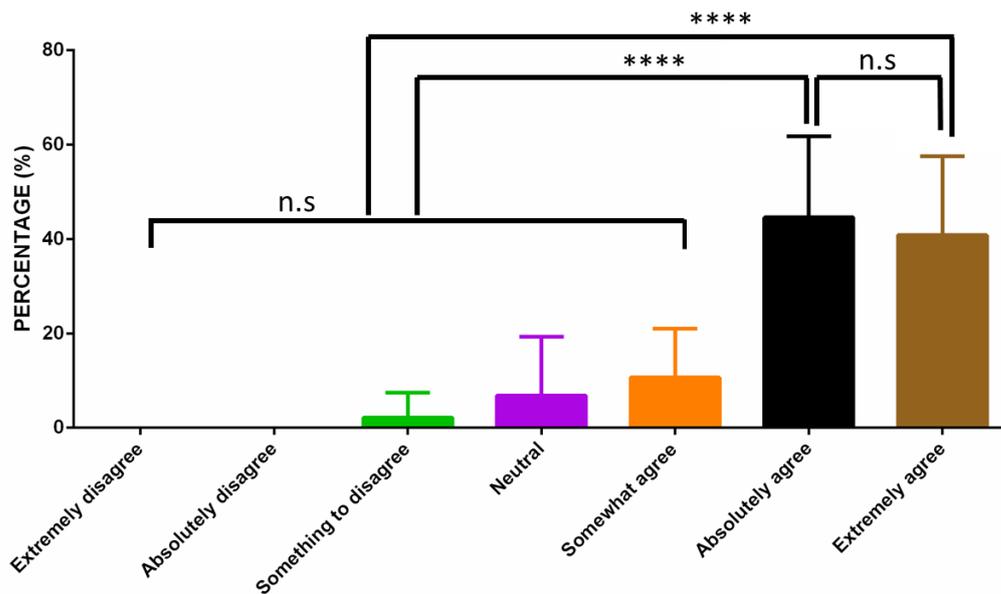
Figure 3. The figure shows the cumulative frequency (in percentage%) of the items evaluated in the satisfaction questionnaire on the augmented and VR resource used in the classroom. (The Analysis was performance using One-way ANOVA test, the statistical significance ***$p < 0.001$)

The analysis shows the comparison with the rest of the results. No significant (n.s) differences were found between the groups of samples extremely, absolutely, something disagree, neutra and somewhat agree; neither

between extremely and absolutely agree.

Results related to specific items evaluated in TAM score

The figure 4A shows how the students' perception, based on augmented reality, improved their learning by 60% concerning the students who are neutral or occasionally in agreement. The results related to the students' perception (see Figure 4B) about their improvement in learning using this method showed a comparable response among those who thought that they little agree (30%) and significantly agree (30%) with their improvement in knowledge performance.

However, the students' results (see Figure 4C) on whether they think that VR is useful for learning is the vast majority (above 50%) significantly agree with this opinion and a small minority (less than 2%) there is little agreement.
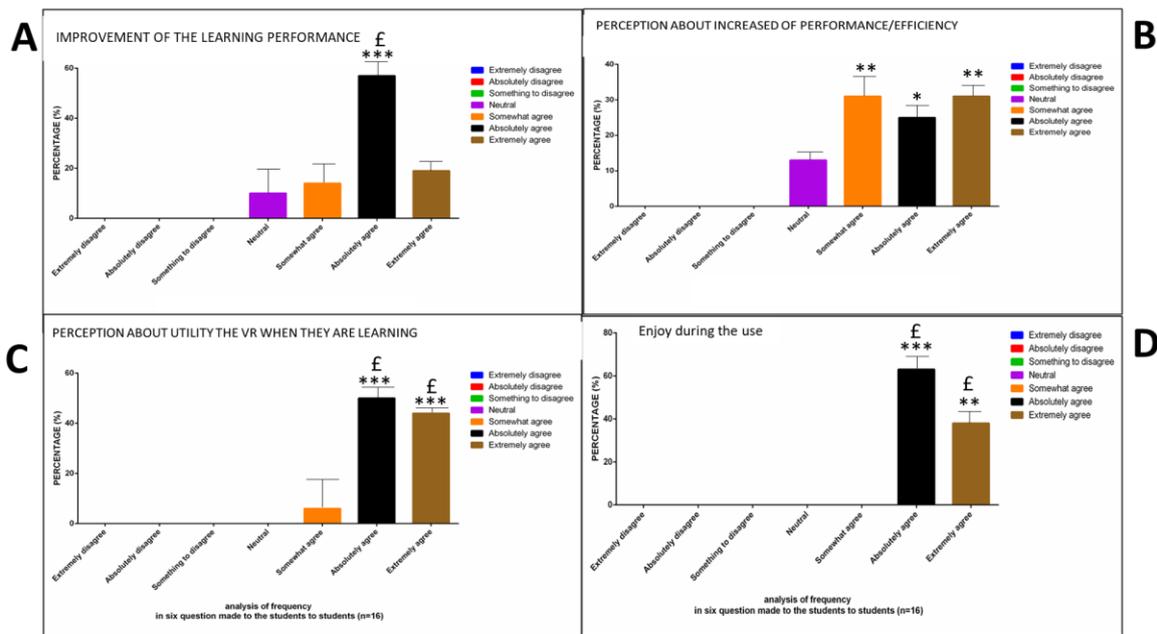
Figure 4. The graphics show the figure (A) Frequency analysis about the perception of utility using VR system in the improvement of the learning performance. (B) Frequency analysis about the usage of the VR System involved with the efficiency increases. (C) Frequency analysis about the usage of the VR System when the student is learning. (D) Frequency of the perception about enjoying during the use. The statistical analysis shows the differences between the groups with the neutral group (with symbol *) where it is represented as signification *p<0,05; **p<0,01; ***>p0,0001. And the comparison with the somewhat agree as a symbol £ represents signification as p<0,01.

The results obtained from the second part of the TAM and the quality diagnostic questionnaire (see Table 1) for augmented reality objects confirmed that the majority of the students enjoyed the experience. Regarding the

diagnosis of the quality of the objects observed in virtual reality, the majority of the student perceives in a positive way the aspects related to "technical and aesthetic aspects of the VR resource used" and "ease of use" (see Table 1).

Table 1. Results of the quality of the diagnostic instrument

(%) total amount	Operation of the application presented	Resource aesthetics	Technical function of the resource	Screen information rating	Ease of handling or use	Ease of understanding of technical handling
very positive	50	25	50	63	31	25
positive	50	75	50	31	50	69
indifferent	0	0	0	6	19	9
negative	0	0	0	0	0	0
very negative	0	0	0	0	0	0

Finally, the study shows how most students tend to strongly agree when considering that the tutorial of the program presented for VR offered information in an understandable and useful way and that this information made VR understandable and straightforward. From the results obtained in this preliminary study, it is observed that the implementation of VR presented in this training program was positive concerning the perceived experience. Therefore, we could consider that this resource has great potential for future interventions.

Results related to analysis of knowledge test: pretest and post-test

The post-test results show a significant improvement in knowledge acquisition compared to the pre-test. Associating all this result with the application of VR is not possible since it would have been necessary to use a second control group, where the VR application program had not been established to verify that the improvement in results is due to the use of of this technique. Indeed, this fact limits our study. Another progress that will be made shortly is the search for a more active role by the students, where they will be asked to be part of the design of virtual or augmented reality activities in future didactic interventions to involve them more in the contents of the subject considering the students as a more active part of the program.

The figure 5 shows the improvement of the knowledge acquired on the anatomical study when virtual and augmented reality has been used to study anatomical structures and the three-dimensional arrangement of organs. The analysis evaluates the grades from 0 to 10. The standards from 0 to 4 are considered inferior, from 5 to 6 sufficient, the 7 to 8 notable, and 9 to 10 outstanding. The results show a mean range of qualification in the pretest of 1.98 and later after applying the training program of 8.51, these data show a statistical significance of $p < 0.0001$ (analyzed by T-Student, see Table 3)
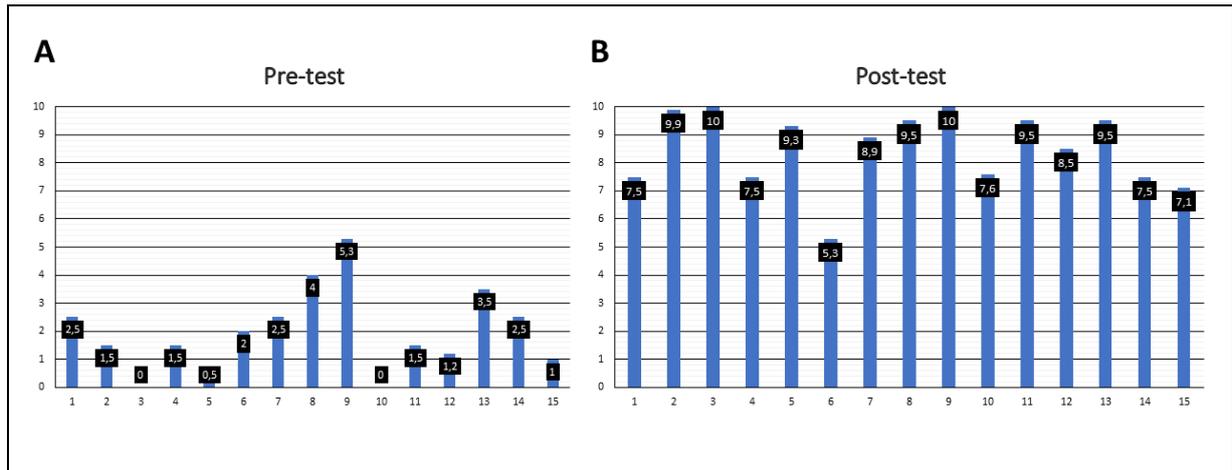
Figure 5. Results about (A) pre-test and (B) post-test related with 15 questions about the knowledge of anatomical structures and human anatomy.

Table 2. Statistical Analysis between the Pretest and Post-test

	Paired Samples Test								
	Paired Differences								
	Mean	Standard Derivation	Error Derivation	95% Confidence Interval			t	gl	Signification
Pre vs Post -test	-6.540	1.7904	0.4623	Down (7.5315)	Up 5.5485)	(-	-14.148	14	0.0001

Discussion

In general lines, our students presented high satisfaction in the use of this technology in the classroom. The results obtained in the first part of the TAM questionnaire showed that the majority perceived VR as an easy-to-apply system that could facilitate understanding, learning, and performance. These results corroborate the study carried out by Iwanaga et al, 2021, where they show that during the time of the COVID Pandemic, the use of workspace in the classroom of Human Anatomy were very successful, it due to the advantages of the use of virtual and augmented reality in the context of confinement.

The results obtained in the second part of the TAM and the VR object quality diagnostic questionnaire confirmed that most of the students perceived VR as a fun system and a tool that they would like to use in future classes. Regarding the diagnosis of the quality of the objects observed in Virtual Reality, the majority positively perceived the technical and aesthetic aspects of the VR resource and the ease of use. Finally, the majority strongly agreed that the presented program guide offered useful and understandable information and that, in turn, it made the VR resource understandable and straightforward.

This methodology's versatile capacity was verified during this experimental development since the use of VR only required having a viewer, a smartphone, internet connection, and free applications (Molina-Carmona et al., 2018), which can be used in any high school. The results described, it can be deduced that both the TAM and the questionnaire that measured the quality of the objects shown in VR had a very positive result on the use of this tool. Besides, the study published by Poner et al., 2019 showed that the students' perception towards the use of VR was considered useful for Neuroanatomy Learning.

On the other hand, the post-test results showed a significantly improvement of knowledge, it could be indicating that VR for understanding and learning anatomical content could be beneficial. However, although the students' role has been active during the immersion experience in VR, it has not been so when searching and designing the VR activity. For this reason, in future interventions, it could be the students themselves in groups, the one in charge of searching and designing the VR activity.

Conclusion

We, in this preliminary study, can conclude from the results obtained that the use of VR for learning anatomical content has been very positive, especially when teaching is not face-to-face. This tool could be used as a resource with great potential for future interventions given the very positive experience shown by the students. It is necessary to carry out new research on the use of virtual reality, combining it with a greater involvement of students in the design and implementation of activities.

Recommendations

Given our experience in this field, we recommend the use of virtual and augmented reality for the study of forensic anatomical structures as a reasonable practice, which does not require dissection, which can be transferred to any secondary school, and which also improves student learning, without requiring a significant memory effort.

Acknowledgements

References

Aguilar, M. (2012). Aprendizaje y Tecnologías de Información y Comunicación: Hacia nuevos escenarios educativos. *Revista Latinoamericana de Ciencias Sociales, Niñez y Juventud, 10*(2), 801-811.

Alper, A., Oztaş, E. S., Atun, H., Cinar, D., & Moyenga, M. (2021). A Systematic Literature Review towards the Research of Game-Based Learning with Augmented Reality. *International Journal of Technology in Education and Science (IJTES), 5*(2), 224-244. https://doi.org/10.46328/ijtes.176

Barma, S., Daniel, S., Bacon, N., Gingras, M. A., & Fortin, M. (2015). Observation and analysis of a classroom teaching and learning practice based on augmented reality and serious games on mobile platforms. International Journal of Serious Games, 2(2).

Barr, R. B., & Tagg, J. (1995). From teaching to learning—A new paradigm for undergraduate education. Change: The magazine of higher learning, 27(6), 12-26.

Boza, A., Toscano, M. y Méndez, J. M. (2009). El impacto de los proyectos TICs en la organización y los procesos de enseñanza aprendizaje en los centros educativos. *Revista de Investigación Educativa, 27* (1), 263-289.

Brown, A., & Green, T. (2016). Virtual reality: Low-cost tools and resources for the classroom. TechTrends, 60(5), 517-519.

Brown, B.A., Ribay, K., Perez, G., Boda, P.A., & Wilsey M. (2020). A Virtual Bridge to Cultural Access: Culturally Relevant Virtual Reality and Its Impact on Science Students. *International Journal of Technology in Education and Science (IJTES), 4*(2), 86-97.

Brunstein, J. (2014). Experiencias de los Académicos Acerca de Enseñar, Aprender y Evaluar Anatomía Humana. *Tesis Doctoral Pontificia Universidad Católica de Chile*.

Cobo, C., & Moravec, J. (2011). Introducción al aprendizaje invisible: la (r) evolución fuera del aula. *REencuentro. Análisis de Problemas Universitarios*, (62), 66-81.

Contreras, R. S. y Eguia, J. L. (2016). Gamificación en aulas universitarias. Bellaterra. Institut de la Comunicació, Universitat Autònoma de Barcelona. Pp. 8-10.

Dougherty (2015). Google intensifies focus on its cardboard VR device. Re- cuperado de https://www.nytimes.com/2015/05/29/technology/google-intensifies- focus-on-its-cardboard-virtual-reality-device.html.

Fathema, N., Shannon, D., & Ross, M. (2015). Expanding the Technology Acceptance Model (TAM) to examine faculty use of Learning Management Systems (LMSs) in higher education institutions. *Journal of Online Learning & Teaching*, *11*(2).

Frenk, J., Chen, L., Brhrutta, Z., Cohen, J., Crips, N., Evans, T., y otros. (2011). Profesoinales de la salud para el nuevo siglo: Transformando la eduación para fortalecer los sistemas de salud en un mundo interdependiente. *Revista Peruana de Medicina experimental y Salud Pública*, 337-341.

Gandolfi, E. (2018). VR and augmented reality. Handbook of Research on K-12 Online and Blending Learning, 545-561.

Garcia-Bonete, M. J., Jensen, M., & Katona, G. (2019). A practical guide to developing virtual and augmented reality exercises for teaching structural biology. Biochemistry and Molecular Biology Education, 47(1), 16-24.

Hutson, J. & Olsen, T. (2021). Digital Humanities and Virtual Reality: A Review of Theories and Best Practices for Art History. *International Journal of Technology in Education (IJTE), 4*(3), 491-500. https://doi.org/10.46328/ijte.150

	International Conference on	
ICRES	**Research in Education and Science**	**istes** Organization
www.icres.net	April 1-4, 2021 Antalya, TURKEY	www.istes.org

Iwanaga, J., Kamura, Y., Nishimura, Y., Terada, S., Kishimoto, N., Tanaka, T., & Tubbs, R. S. (2021). A new option for education during surgical procedures and related clinical anatomy in a VR workspace. Clinical Anatomy, 34(3), 496-503.

Johnson, K. L., & Westbrooks, K. (2021). Quelling the Boredom with Alternative Instruction: Augmented Reality, Escape Kits, and Scavenger Hunts. *International Journal on Social and Education Sciences (IJonSES), 3*(1), 180-196. https://doi.org/10.46328/ijonses.65

King, B. & Smith, C.P. (2018). Mixed-reality Learning Environments: What Happens When You Move from a Laboratory to a Classroom? *International Journal of Research in Education and Science (IJRES), 4*(2), 577-594. DOI:10.21890/ijres.428961

Kozcu Cakir, N., Guven, G., & Celik, C. (2021). Integration of Mobile Augmented Reality (MAR) Applications into the 5E Learning Model in Biology Teaching. *International Journal of Technology in Education (IJTE), 4*(1), 93-112. https://doi.org/10.46328/ijte.82

Kurilovas, E., Juskeviciene, A., Kubilinskiene, S., & Serikoviene, S. (2014). Several semantic web approaches to improving the adaptation quality of virtual learning environments. J. UCS, 20(10), 1418-1432.

Leiva, V. y Mora, E. (2014). Aplicación de la tecnología de la información y comunicación en la enseñanza de anatomía para estudiantes de enfermería. *Revista de Enfermería Actual de Costa Rica*, *26*. 1-13.

Martínez, N. M. M., & López, J. L. O. (2016). Herramientas y propuestas de innovación basadas en la tecnología de realidad aumentada aplicadas a la literatura infantil y juvenil/Tools and proposals for innovation based on augmented reality technology applied children's literature. *Tejuelo*, *25*, 217-244.

Martínez, N. M. M., Olivencia, J. J. L., & Terrón, A. M. (2016). Mobile learning, Gamificación y Realidad Aumentada para la enseñanza-aprendizaje de idiomas. *IJERI: International Journal of Educational Research and Innovation*, (6), 16-34.

Miguélez-Juan, B. (2018). El uso de realidad virtual en la formación secundaria postobligatoria: aplicación en el bachillerato artístico. In U. Garay-Ruiz, E. Tejada-Garitano, y C. Castaño-Garrido (Eds.), *Uso de nuevas tecnologías y tendencias ac tuales en Educación* (pp. 54-61). Bilbao: Universidad del País Vasco/Euskal Herriko Unibertsitatea, Servicio Editorial.

Minguélez-Juan, B., Núñez, P. y Mañas-Viniegra, L. (2019). La Realidad Virtual Inmersiva como herramienta educativa para la transformación social: Un estudio exploratorio sobre la percepción de los estudiantes en Educación Secundaria Postobligatoria. *Aula abierta, 48* (2), 157-166.

Molina-Carmona, R., Pertegal-Felices, Ma. L., Jimeno-Morenilla, A., & Mora-Mora, H. (2018). VR learning activi- ties for multimedia students to enhance spatial ability. *Sus- tainability, 10*(4), 1-13. Recuperado de: https://doi.org/10.3390/su10041074

National Library Medicine. (8 de Julio de 2019). *U.S. National Library Medicine*. Recuperado el 30 de Diciembre de 2019, de https://www.nlm.nih.gov/research/visible/visible_human.html

Olivencia, J. J. L., & López, E. A. (2013). La "digiculturalidad" o la interculturalidad a través de las TIC: una tendencia emergente de e-learning humanizador. *Migramos a una Nueva Plataforma<*, *13*(1).

Ortiz, A. (2011). Diseño y elaboración de materiales didácticos. In *Procesos educativos con TIC en la Sociedad del Conocimiento* (pp. 153-162). Pirámide.

Philippe, S., Souchet, A. D., Lameras, P., Petridis, P., Caporal, J., Coldeboeuf, G., & Duzan, H. (2020).

Multimodal teaching, learning and training in virtual reality: a review and case study. VR & Intelligent Hardware, 2(5), 421-442.

Ponte, R. P., Sanders, L. L. O., Júnior, A. P., Kubrusly, M., & Marçal, E. (2019). Development and Usability Assessment of a Mobile Application for Neuroanatomy Teaching: A Case Study in Brazil. Creative Education, 10(03), 600.

Raúl Reinoso (2012). Posibilidades de la realidad aumentada en educación. En *Tendencias emergentes en educación con TIC*. Espiral, 2012. p. 175-197.

Rovetto, P. (2008). *Ideas médicas: Una mirada histórica.* Cali: Universidad del Valle.

Salazar, J. (2011). Estado actual de la web 3.0 o web semántica. *Revista Digital Uni- versitaria,12*(11), 1-7.

Scherer, R., Siddiq, F., & Tondeur, J. (2019). The technology acceptance model (TAM): A meta-analytic structural equation modeling approach to explaining teachers' adoption of digital technology in education. *Computers & Education*, *128*, 13-35.

Spitzer, V. M., & Ackerman, M. J. (2008). The Visible Human® at the University of Colorado 15 years later. *Virtual Reality*, *12*(4), 191-200.

Torres Santomé, J. (2015). Organización de los contenidos curriculares y relevancia cultural. En S. Gimeno, *Los contenidos. Una reflexión necesaria* (págs. 91-102). Madrid: Morata.

Universtity   of   Colorado.   (s.f.).
http://www.ucdenver.edu/academics/colleges/medicalschool/centers/HumanSimulation/Pages/Home.asp

Investigation the Genome Variation of ST-253 of Pseudomonas Aeruginosa Isolates

Mohammad Abdul Rahmman Mohammad Al-Maeni

University of Baghdad, Iraq

Shaymaa Fouad Rasheed AlKhazraji

University of Baghdad, Iraq

Abstract: The genic variation analysis of Pseudomonas aeruginosa after filtering the spurious variation appeared that 222 variable loci out of 5572 loci were detected. The type of variation analysis revealed that single nucleotide polymorphism was highly significant compared with other types of variation due the fact that the genome variation was achieved on the level of microevolution. Moreover, the proportional effect of functional scheme showed that genes responsible for environmental information were the highest comparable to another scheme. The genes of environmental information processing locate on outer membrane and face the defense strategy of the host therefore change in proteins coded by these genes lead to escape the immune system defense strategies. Furthermore, the non-synonymous change was the highest comparable with synonymous change among environmental information processing genes. Another significant result was represented by the fact that variation was located in the conserved domain for the proteins coded by genes responsible for environmental information in 29 out 0f 31. One of the factors that lead to adapt isolates with the bad environmental conditions is the location of the variation for proteins within conserved domain. Phylogenetic analysis indicates that significant level for variation correlated with environmental information processing genes comparable with other schemes.

Keywords: Genome variation, ST-253, Pseudomonas aeruginosa

Introduction

One of the most common grams negative opportunistic pathogenic bacteria is the *Pseudomonas aeruginosa* (Crovadore et al. 2018). Mortality and morbidity in the cystic fibrosis mainly caused by *P. aeruginosa* (Spencer *et al* 2003). The motility of P. *aeruginosa* accomplished by a single polar flagellum and has ability to produce blue-green pigment called pyocyanin (Crovadore et al. 2018). The ability of this bacterium species to accumulate many mutations mediating phenotypic adaptations leads to produce multiple clones with differing antimicrobial susceptibility profiles (Ashish et al. 2013). Multiple phenotypic and genotypic changes of this

bacterium species enhance its ability to resistance to antibiotics (Wee et al. 2018). *P. aeruginosa* causes many nosocomial infections which is correlated with skin, urinary tract, and respiratory tract infections (Mosquera-Rendón et al. 2016). In *P. aeruginosa,* it has been reported that at the starting point of the infection expression for the virulence factors is high and high susceptibility to antibiotics however, expression to the virulence factors become less and the isolates becomes more resistance to antibiotics in chronic infection (Lozano et al. 2018). phenotypic traits and typing using single nucleotide polymorphisms (SNPs) give evidence for the fact that *P. aeruginosa* form clonal population and undergoes linkage equilibrium (Tümmler, 2006). The aim of the study is to find the variation in genes that have an essential function in the organism and play a significant role in the adaptation of *P. aeruginosa* with stress condition

Materials and Methods

Description of Isolates

The genome comparator was achieved on nine isolates of *Pseudomonas aeruginosa* (analysis is carried out on on next generation sequencing data). The isolates were taken from https://pubmlst.org website. Database icon was selected from the homepage then *Pseudomonas aeruginosa* was selected from the list menu of database. After that the isolates icon was selected from *Pseudomonas aeruginosa* MLST Database homepage then press Search or browse database icon finally the names of isolates were selected from the Search or browse *Pseudomonas aeruginosa* MLST Database. The isolates were used under the study listed as follows (Table 1).

Table 1. The Isolates of *Pseudomonas Auroginosa* were Used under the Study

ST	Isolates	ID
253	TSB 1	3333
253	TSB 2	3334
253	TSB 3	3335
253	TSB 4	3336
253	TSB 5	3337
253	TSB 6	3338
253	TSB 7	3339
253	TSB 8	3340
253	TSB 9	3341

Determination the Variation in the Genome of Isolates

Genome comparator program (GC) was used to detect the variation in the coding regions of the genome. This program (Jolley and Maiden, 2010) is hosted on Bacterial Isolates Genome Sequence data base (BIGSdb) and the analysis was carried out using a particular reference genome (PA01). The program was set with its default using 70 as a minimum % identity. In the output file, the annotation was shown as T refer to gene truncated and

X refers to gene absent

The Process of Filtration of the Variable Loci

Different criteria for the filtration were used, these are X signal (found in most of the isolates) refers to the fact that the gene is absent therefore they were excluded from the analysis. Genes have multiple copies within the whole genome refer as paralogous loci were also excluded from the analysis. Alignment containing gaps at the start or at the end were also excluded from the analysis and the variation was located within the SSR were also removed. Genes that are truncated in many isolates and the piece of the DNA with 100 base pairs long were excluded from the analysis.

Using ParSnp Package for Construction of Phylogenetic Tree

Phylogenetic tree was constructed using ParSnp V1.2 through aligning whole isolates under the study with one of the isolates which was selected as a reference genome (selected from whole isolates under the study). FigTree program was used for the purpose of colouring the isolates and their branches and the output of ParSnp was used as input for FigTree program.

Genes Variation through Non-synonymous and Synonymous Polymorphism

Synonymous, internal stop codon and non-synonymous change was detected using SNAP program. The method of the detection was developed through (Nei and Gojobori, 1986) using statistical analysis of (Ota and Nei, 1994) (Korber, 2000).

Detection the Location of Variation for the Varied Protein in Conserved Domains

This analysis in fact need BLAST search, The BLAST tool was used to compare between each varied protein with conserved domain database that hosted in NCBI website. The location of the variation for each protein was detected if it is located within the conserved domain from BLAST output. The significant values for the BLAST result relying on E value and if it is less or equal to 1E-05 (Marchler-Bauer *et al.*, 2014)

Detecting Two Parameters within the Variable Loci which are Proportional Effect and Functional Schemes of Variation

KEGG refer to Kyoto Encyclopedia of Genes and Genomes was used for the purpose of identifying the functional scheme of each gene by using BLAST program that hosted in KEGG website, however, the proportional effect was calculated relying on two parameters, the first parameter is genes number in the whole genome for particular group and the second parameter is all variable genes for each group. This achieved by dividing the first parameter on second parameter (Kanehisa et al., 2016).

Results and Discussion

GC Method for Determination the Genome Variation in Genes

The GC program was run to detect the variation in the genes using PA01 as reference genomes. The number of the genes that were compared through analysis was 5572 loci by comparing reference genomes against targets isolates. The number of the variable genes detected using the above-mentioned method were 342 variable genes while the missing genes were 188, the identical genes in all isolates including the reference genome were 259 and the identical genes in all isolates without the reference genome were 5027. For the purpose of excluding spurious variable genes, the real varied genes were detected among 342 using different filtration. processes Removal of the data with incomplete or absent genes represented the first filtration process by which 18 out of 342 were removed. The second filtration process is represented by removing genes with multiple copies within the genome which were 16 out of 342. The third filtration process was to remove alignment containing gaps at the beginning and at the end by which 15 out of 342 was removed. Removing loci located within the SSR represented the last filtration processes by which 71 out of 342 were removed. Therefore, the real variable loci were 222 using the above approach.

Analysis the Type of Variation within the Genome for the Isolates

From the analysis of the type of genetic variation for the isolates with (ST-253), the result showed that the variation with the type of substitutions was higher than the type of variation caused by insertion and deletion. The type of variation caused by single nucleotide polymorphism (SNP) with 154 was higher compare with genes carried other types of variation (see Figure 1).
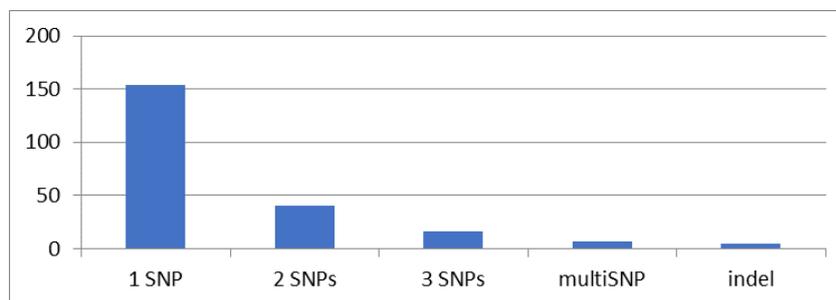
Figure 1. The Analysis of the Type of Genetic Variation among Isolates belonging to (ST-253)

The highest percentage of one SNP change comparable with other type of variation was expected because all the isolates belongs into same ST therefore the study of the genome variation within the isolates was on the level of microevolution.

The functions of the variable loci were detected using annotation data for each locus while functional schemes were detected for all variable loci using (KEGG). The result showed that the number of variable loci was 157, 31, 23, and 10 coded by the functional schemes metabolic pathway functions, Environmental Information

Processing, Cellular Processes, and genetic information processing respectively. The calculation of the above functional schemes does not put into consideration the fact that the number of genes in each scheme is different. Therefore, the proportional effect of the function of variable loci was calculated. The result after calculating the proportional effect was shown that the highest number of variable loci were belonging to environmental information processing genes with 0.107 (see Table 2).

Table 2. Functional Schemes For The Variable Genes And Classified Through KEGG

Scheme	Total number of variable gene in each scheme (genome)	Variable genes in scheme	Proportional effect
Environmental Information Processing	288	31	0.107638889
Cellular Processes	392	23	0.058673469
Genetic Information Processing	168	10	0.05952381
metabolism	2443	157	0.064265248

As the variable genes were the highest in the environmental information processing and these genes were coded for proteins located on the outer membrane, therefore, the immune system can attack these proteins as they are in the outer membrane therefore these genes try to alter their sequence to code for variable protein hence escape immune attack strategies.

As the variable genes within the environmental information processing were the highest, the variation within this scheme was deeply investigated. The genome variation was analysed for the synonymous change, non-synonymous change and indel. The synonymous change is the change in the DNA sequence but does not lead to change the amino acid sequence while non-synonymous change is the change in the DNA sequence that leads to change the amino acid sequence. Indel means the insertion or deletion events. The genome variation within the environmental information processing showed that the non-synonymous change was the highest comparable with other categories (see Figure 2).
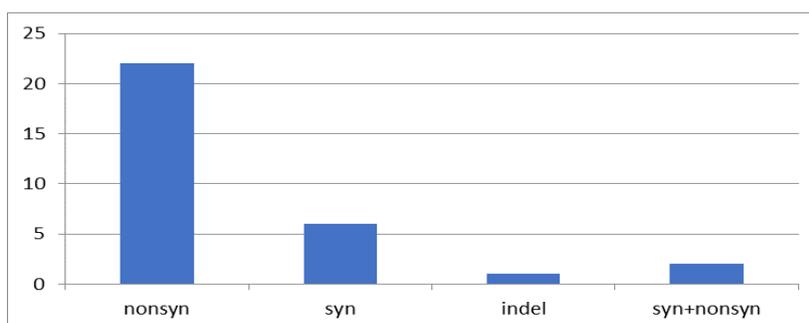
Figure 2. The Genome Variation within the Environmental Information Processing Showed that the Non-synonymous Change was the Highest Comparable with Other Categories

This give an indication for the important of the variation within the genes that belonging to this scheme because most of the variable genes were non-synonymous which means the change in their DNA leads to change in the protein sequences.

The environmental information processing scheme involves genes coding mostly for ABC transporter However, variation with genes carrying more than 3 SNPs or indel was mostly found within genes coding for methylesterase, a binding protein component of ABC transporter and AmgR proteins. Therefore, these genes may help the isolates to persist for a long time and escape the immune attack strategies

BLAST tool was used to search against conserved domain databases hosted in NCBI to indicate whether the position of each non-synonymous mutation located within conserved domains. The location of the variation within the conserved domain may give evidence for the important of this variation for the isolates to stay for a long time within the host. 29 out of 31 genes showed the variation in their proteins were located within the conserved domains. This also confirms the fact that these genes in this scheme played a major role in persistence of isolates in their host.

Further analysis was carried out for the detection of the importance of the variable genes of the environmental information processing for the evolution of the isolates by constructing phylogenetic tree using only the variable genes of environmental information processing and another tree was constructed using whole variable genes of the isolates (see Figures 3, 4).
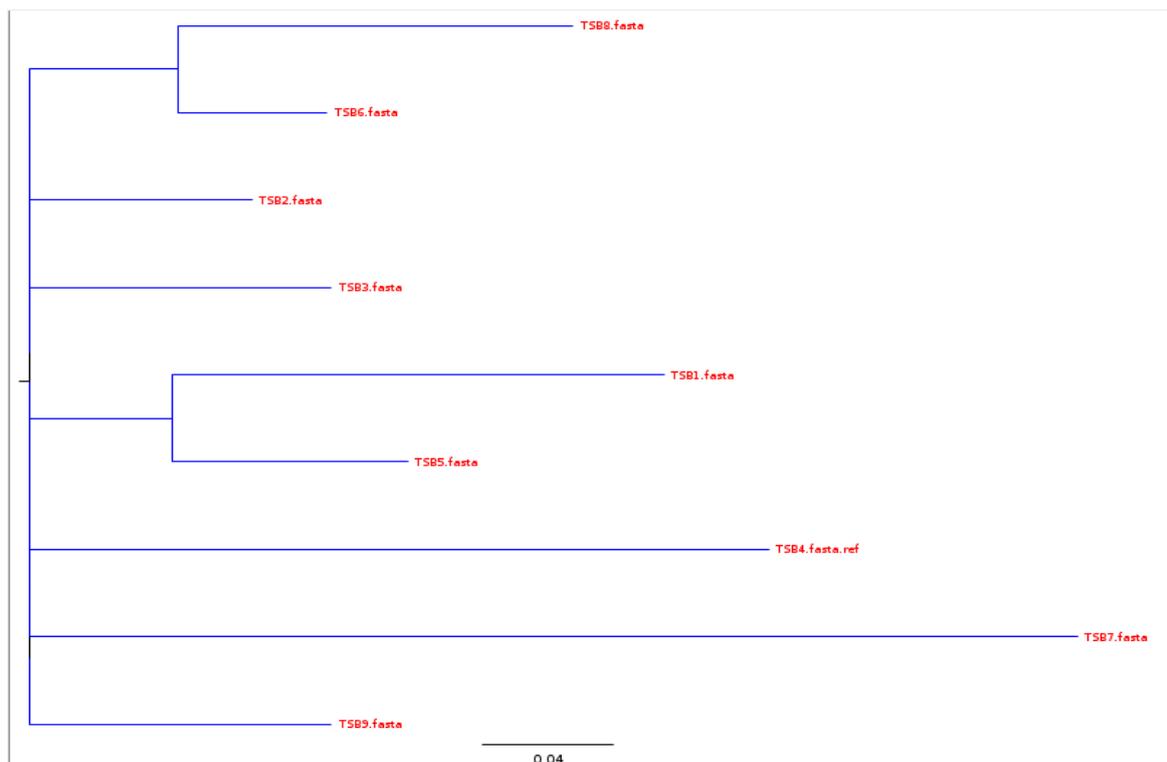
Figure 3. Tree Constructed using Variable Genes of Environmental Information Processing

The tree comparison showed that there was a change in the topology of the tree that constructed using variable genes of environmental information processing comparable with tree that constructed using whole variable genes. The change in the topology can be clearly seen from clustering TSB1 isolate with TSB5 in the tree that constructed using variable genes of environmental information processing while the TSB1 isolate was clustered with TSB2 isolates in the tree that constructed using whole variable genes.
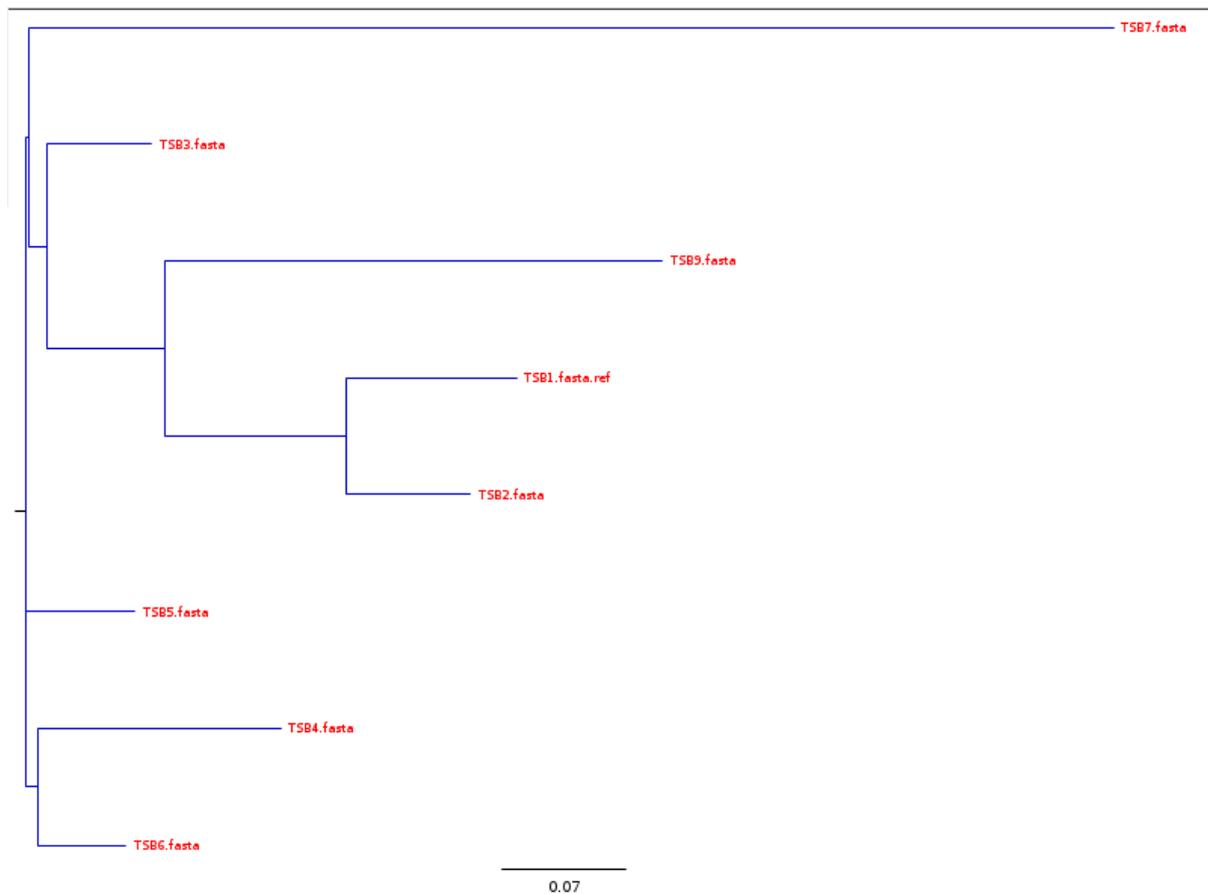
Figure 4. Tree Constructed using whole Variable Genes

Conclusion

The variation was mainly concerned about the protein that located within the outer membrane; therefore, we assume the immune system recognizes these proteins and attack them while the genes coding for these proteins undergoes variation to escape immune system of the host. The variation mainly was higher within the environmental information processing to adapt the Pseudomonas aeruginosa to stress conditions and most of the variation was highly effective because they were non-synonymous changes.

Recommendations

It is important to increase the number of isolates under the analysis to give butter solution for the problem under

the study. It is important to include biofilm formation and visualization the scheme that will be varied due to resistance of antibiotic mediating biofilm formation.

Acknowledgements

References

Ashish, A., Paterson, S., Mowat, E., Fothergill, J. L., Walshaw, M. J., & Winstanley, C. (2013). Extensive diversification is a common feature of Pseudomonas aeruginosa populations during respiratory infections in cystic fibrosis. *Journal of Cystic Fibrosis*, *12*(6), 790-793.

Crovadore, J., Grizard, D., Chablais, R., Cochard, B., Blanc, P., & Lefort, F. (2018). Whole-Genome Sequence of Pseudomonas aeruginosa Strain 4014, Isolated from Soil in France. *Microbiology Resource Announcements*, *7*(10).

Korber, B. (2000). HIV signature and sequence variation analysis. *Computational analysis of HIV molecular sequences*, *4*, 55-72.

Kanehisa, M., Sato, Y., & Morishima, K. (2016). BlastKOALA and GhostKOALA: KEGG tools for functional characterization of genome and metagenome sequences. *Journal of molecular biology*, *428*(4), 726-731.

Kanehisa, M., Sato, Y., Kawashima, M., Furumichi, M., & Tanabe, M. (2016). KEGG as a reference resource for gene and protein annotation. *Nucleic acids research*, *44*(D1), D457-D462.

Lozano, C., Azcona-Gutiérrez, J. M., Van Bambeke, F., & Sáenz, Y. (2018). Great phenotypic and genetic variation among successive chronic Pseudomonas aeruginosa from a cystic fibrosis patient. *PloS one*, *13*(9), e0204167.

Marchler-Bauer, A., Derbyshire, M. K., Gonzales, N. R., Lu, S., Chitsaz, F., Geer, L. Y., ... & Lanczycki, C. J. (2015). CDD: NCBI's conserved domain database. *Nucleic acids research*, *43*(D1), D222-D226.

Mosquera-Rendón, J., Rada-Bravo, A. M., Cárdenas-Brito, S., Corredor, M., Restrepo-Pineda, E., & Benítez-Páez, A. (2016). Pangenome-wide and molecular evolution analyses of the Pseudomonas aeruginosa species. *BMC genomics*, *17*(1), 45.

Nei, M., & Gojobori, T. (1986). Simple methods for estimating the numbers of synonymous and nonsynonymous nucleotide substitutions. *Molecular biology and evolution*, *3*(5), 418-426.

Ota, T., & Nei, M. (1994). Divergent evolution and evolution by the birth-and-death process in the immunoglobulin VH gene family. *Molecular biology and evolution*, *11*(3), 469-482.

Spencer, D. H., Kas, A., Smith, E. E., Raymond, C. K., Sims, E. H., Hastings, M., ... & Olson, M. V. (2003). Whole-genome sequence variation among multiple isolates of Pseudomonas aeruginosa. *Journal of bacteriology*, *185*(4), 1316-1325.

Tümmler, B. (2006). Clonal variations in Pseudomonas aeruginosa. In *Pseudomonas* (pp. 35-68). Springer, Boston, MA.

Treangen, T. J., Ondov, B. D., Koren, S., & Phillippy, A. M. (2014). The Harvest suite for rapid core-genome alignment and visualization of thousands of intraspecific microbial genomes. *Genome biology*, *15*(11), 524.

Wee, B. A., Tai, A. S., Sherrard, L. J., Zakour, N. L. B., Hanks, K. R., Kidd, T. J., ... & Beatson, S. A. (2018). Whole genome sequencing reveals the emergence of a Pseudomonas aeruginosa shared strain sub-lineage among patients treated within a single cystic fibrosis centre. *BMC genomics*, *19*(1), 644.

Assessment of Ecotourism Perception of Rural Youth for Rural Development: A Case Study of Yığılca

Yaşar Selman Gültekin

Düzce University, Turkey, https://orcid.org/0000-0003-0325-4527

Hikmet Sarı

Düzce University, Turkey, https://orcid.org/0000-0002-7895-1565

Abstract: Rural development can be explained as increasing the production, income and welfare levels of people living in rural areas to develop socio-economic and cultural aspects, eliminating imbalances, creating physical and social infrastructure similar to those in urban areas, processes, activities and organizations for better evaluation of agricultural products and their attempts. Within the scope of rural development activities, the target audience consists of young people living in rural areas. Study area is located in the Western Black Sea region of Turkey and it is a district of Düzce. It also gives out immigration. The survey technique was used within the scope of the study. The questionnaire, which is applied to the young people (15-34 ages) living in Yığılca, is multiple choice and planned to be open and including open-ended questions for 10 minutes. During the interviews with young people, questions regarding their socio-demographic characteristics, education opportunities, transportation, movements to urban areas were asked, and then their knowledge levels about ecotourism concept and income from ecotourism activities in their region were tried to be evaluated.

Keywords: Rural development, Rural youth, Ecotourism, Education, Yığılca

Introduction

Tourism movements has improved as the initial mass tourism in Turkey. There have been changes in people's tourism demands due to reasons such as the increasing population over time, environmental damage caused by technological developments, business pace, increase in income levels and increase in education levels. As the longing for nature started to increase, the concept of ecotourism emerged. Ecotourism activities have increased gradually in the last 20 years and it is seen that this increase will continue in the future. Ecotourism can be described as the most suitable type of tourism to be developed in natural and cultural areas that take into account the development of the local people, including the elements of rural and cultural tourism (Aydın, 2010; Türksoy, 2018).

Ecotourism according to The International Union for Conservation of Nature (IUCN); It is defined as "*environmentally sensitive travel and visits to relatively undisturbed natural areas in order to appreciate and enjoy nature, creating a low level of negative visitor impact that benefits the local community, providing active*

	International Conference on		
ICRES	**Research in Education and Science**		**istes** Organization
www.icres.net	April 1-4, 2021	Antalya, TURKEY	www.istes.org

socio-economic participation, and improving conservation" (UNWTO, 2021). Another definition is adopted as "an approach or attitude that guarantees the sustainability of the natural resources of the earth, supports the economic development of local people, while protecting and observing their social and cultural integrity" (Aydın, 2010). Based on these definitions, it comes to the forefront that ecotourism is not just a curiosity but will be beneficial for the local people and the economy with a correct planning, and ecotourism can develop depending on environmental impacts and economic conditions.

The United Nations World Tourism Organization (UNWTO) emphasizes that tourism is the largest employer industry in the world today, and it is seen that it will provide job opportunities to local people with ecotourism activities. Ecotourism is a type of tourism that is intertwined with rural settlements and based on natural resources. Due to its many positive effects, its importance as an alternative or complement to existing tourism types in developed and developing countries in tourism is better understood every day (Dilek and Şahin 2002). Most of ecotourism activities in Turkey by making forest areas and protected areas of the tourists with the local population living in rural areas are emerging interaction.

Increasing the economic contribution of ecotourism; It depends on the communication they establish between the tourism industry, public institutions, local people and ecotourists (Şahin and Aksu, 2003). Therefore, the participation of the local people, which is the focus of ecotourism, is of great importance in this context. One of the most important reasons for the emergence of ecotourism is to provide protection. Ecotourism activities are a set of studies that are generally carried out in places where people's social life takes place and that need socio-economic needs as well as ecological. For this reason, the characteristics of the social and economic life of the people living in the region, especially young people, should be analyzed and the results of this analysis should be used to ensure public support (Yalçınalp, 2005). Since ecotourism consists of travels to natural and cultural areas, the people living in the region have a very important effect on the development of ecotourism. It should not be forgotten that "forest villagers are a social entity", which is defined by the law numbered 6831 and meant people living in villages close to forest areas. Above all, a successful and purposeful ecotourism activity can only be realized if the local people want it. From this point of view, the common denominator of most of the solutions produced should be to ensure the participation of all relevant parties as much as possible in the management of forest resources.

This study will contribute to the local people living in rural areas economically by using the natural and cultural resources in rural areas more effectively, increase employment opportunities, prevent migration with on-site development and raise living standards, and aims to evaluate the ecotourism perception of rural youth by putting forth ecotourism activities that can help to minimize economic inequality. For this purpose, the perceptions of the young population living in rural areas of Düzce province Yığılca district about the use of ecotourism activities as a tool in rural development were evaluated.

Materials and Method

The study area covers the Western Black Sea Region Düzce province Yığılca district. Yığılca District, which is between Düzce, Bolu and Zonguldak provinces, is the Alaplı district of Zonguldak province from the north; it is surrounded by the Mengen district of Bolu province from the east. It is located in the northeast of Düzce Province, in the northwest of Bolu Province, in the southwest of Zonguldak, in the northeast of Kaynaşlı district and in the southeast of Akçakoca district. It is also 35 km away from Yedigöller National Park, which is one of the important tourism centers of our country (see Figure 1).

Figure 1. Location of Yığılca District in Turkey (URL-1)

The research consists of primary and secondary data sources. Within the scope of the study, primary data were obtained by using the interview and questionnaire technique as the data collection tool of the region. Within the scope of the study, the target group was selected as the young population between the ages of 15-34 living in the region. Within the scope of the study, a total of 155 young people were interviewed in 39 villages of Yığılca district. The questionnaire includes closed-ended demographic information to determine the ecotourism knowledge level of young people living in the region, their perspective on ecotourism activities and whether they want tourists to come to the region, the priority activities in the region in terms of rural development, the current problems in the region and the obstacles to ecotourism, support ecotourism activities. questions were asked to determine whether they would not support it, the degree of satisfaction among local stakeholders and incoming tourists, the migration status of the region and how these would affect ecotourism. In determining the questionnaire questions, the studies of Altanlar (2007), Berik (2018), Gültekin (2010), Hoşcan (2008) and Türker (2013) were used.

The secondary data source for the study, Turkish Statistical Institute (TÜİK), Düzce Governorship, Yığılca District Governorship, Yığılca Municipality, Düzce Culture and Tourism Directorate, Yığılca Forest

Management Directorate, Düzce Nature Protection and National Parks Directorate database, academic dissertations on ecotourism, articles, papers, books and reports.

Results

In the study, questions were asked to determine the sociodemographic characteristics of the individuals participating in the survey. These; it can be listed as age, gender, marital status, occupation, number of household members. The gender of the participants whose age range is 18-29 was 66.6% male and 33.3% female proportionally, 86% of them were married and 13.3% were single in terms of marital status. Considering their educational status, 53.3% are high school, 40% are undergraduates, 6.3% are graduates, and 33.3% of these professions are students, 20% are engineers, 20% are graduates. worker, 13.3% farmer, 13.3% occupational safety specialist.

Table 1. Distribution of urban and rural population of Yığılca district by age groups and gender (TÜİK, 2018)

Age Groups	Urban				Rural			
	Gender		Total		Gender		Total	
	Male	Female	Person	%	Male	Female	Person	%
0-4	135	140	275	8.1	414	359	773	5.9
5-9	136	119	255	7.6	385	330	715	5.5
10-14	125	134	259	7.7	484	433	917	7.0
15-19	130	111	241	7.2	573	513	1086	8.3
20-24	103	137	240	7.1	409	375	784	6.0
25-29	125	122	247	7.3	406	309	715	5.5
30-34	153	148	301	9.0	380	304	684	5.2
35-39	143	127	270	8.0	417	356	773	6.0
40-44	120	103	223	6.6	410	426	836	6.4
45-49	127	93	220	6.5	499	455	954	7.3
50-54	93	97	190	5.6	477	467	944	7.2
55-59	106	96	202	6.0	454	518	972	7.5
60-64	65	76	141	4.2	458	457	915	7.0
65-69	63	65	128	3.8	360	375	735	5.6
70-74	39	40	79	2.3	230	268	498	3.8
75+	46	53	99	3.0	336	425	761	5.8
TOTAL	**1709**	**1661**	**3370**	**100**	**6692**	**6370**	**13062**	**100**

According to the Address Based Population Registration System (ADNKS) in 2018, Yığılca district has a population of 16.432. While 3.370 of the population expresses the number of people living in urban areas and 13.062 people living in rural areas, it reveals the difference. Yığılca District has the highest rural population

proportionally in Düzce Province. When we examine the population in terms of gender, 51.12% of the population of Yığılca, which is 16.432, is male and 48.87% is female, and these rates are almost the same in urban and rural areas (see Table 1).

According to the answers given in face-to-face interviews and questionnaire forms with young people between the ages of 15-34 in Yığılca; When it comes to Yığılca, it is seen that nature, beekeeping, agricultural products, forestry activities, caves, waterfalls and canyon come to mind. However, as a result of the interviews with the local people, it was seen that the most preferred areas in Yığılca were Sarıkaya Cave, Saklıkent Waterfall and Geyiklibel Natural Park and Canyon, respectively.

When the findings regarding the evaluation of ecotourism knowledge levels of young people in the region were examined in the survey study, the participants responded that ecotourism is 40% travels made by protecting nature, 40% do not have information, 13.3% are beneficial to rural development and 6.6% have just heard about ecotourism concept.

To the question of "which season is the most preferred season in terms of tourism in Yığılca district?", the answer was given, it is suitable for 46.6% summer season, 33.3% summer and autumn seasons, 13.3% summer and spring seasons, 6.6% all seasons for touristic activities. In the questionnaire study, 86.6% answered the question of whether the natural beauties of Yığılca are sufficient or insufficient, sufficient and 13.3% insufficient. However, when asked whether it is sufficient or insufficient in terms of ecotourism activities, the answer was 66.6% inadequate, 20% sufficient, 13.3% partially sufficient.

To the question of "would you support ecotourism activities?" for young people, 93.3% said yes in order to protect nature, generate income, develop tourism, create new job opportunities, transport, education, health problems and prevent out-migration, while 6.6% no. However, to the question of whether the satisfaction of tourists is important to you, 93.3% answered yes and 6.6% no. However, to the question of whether young people are conscious of ecotourism, 5.3% answered no, 33.3% yes, 13.3% might be conscious.

In the interviews with the local people, it is seen that the areas where the tourists coming to the agglomerate contribute economically are the sale of agricultural products, the sale of animal products, the sale of honey, handicrafts and guidance services. To the question of whether the investments made in the region are sufficient, 93.3% answered no and 6.6% yes.

When the local people were asked what the current problems of the piles were, the answer was given the power outage in the summer, the lack of health, education and transportation infrastructure, the closure of the roads in the winter, and the lack of income. One of the problems of Yığılca district in recent years is the issue of immigration. "Would you consider immigration to young people from the region?", the answers were 33.3% yes, 40% no, 6.6% seasonally. It is seen that the participants who say yes attribute this situation to unemployment, welfare level, social life, lack of income, getting a better education, health and transportation

reasons.

Ecotourism activities in Yığılca; cave tourism, waterfall tourism, bicycle tourism, camping tourism, trekking, orientering, sport fishing, canoeing, sailing, nature photography, wildlife watching, agrotourism. Cave tourism can be done in Sarıkaya and Gökçekaya Caves in Yığılca. Sarıkaya Cave, which is the largest cave in the Western Black Sea Region, has stalactites made of limestone and sandstones. Sarıkaya is a water passage way and the branch of Aksu stream passes through it. There are Saklıkent and Yogunpelit Waterfalls in Yığılca District, where waterfall tourism is carried out. Hasanlar Dam provides the opportunity to have a picnic around the lake in appropriate seasons. The lake and its surroundings offer photo safari opportunities with their changing tones depending on the season. In addition, activities such as canoeing, sailing, rowing sports, water biking and angling can be done. The region where the Geyikbeli Canyon Nature Park is located is in a location that can be preferred by the visitors as it is located on the road route of Yedigöller National Park. The forest area along the canyon is very attractive with fir, beech, black pine and oak trees, many small lakes and waterfalls, viewing points, natural vegetation with resting areas and clear flowing waters. Activities such as trekking, photo safari, daily picnics, angling, canyon climbing and cycling can be done in the field. This information about the study area was determined as a result of interviews with Düzce provincial cultural and tourism directorate, Yığılca district governorship, and Yığılca municipality, institutions and organizations (see Figure 2).
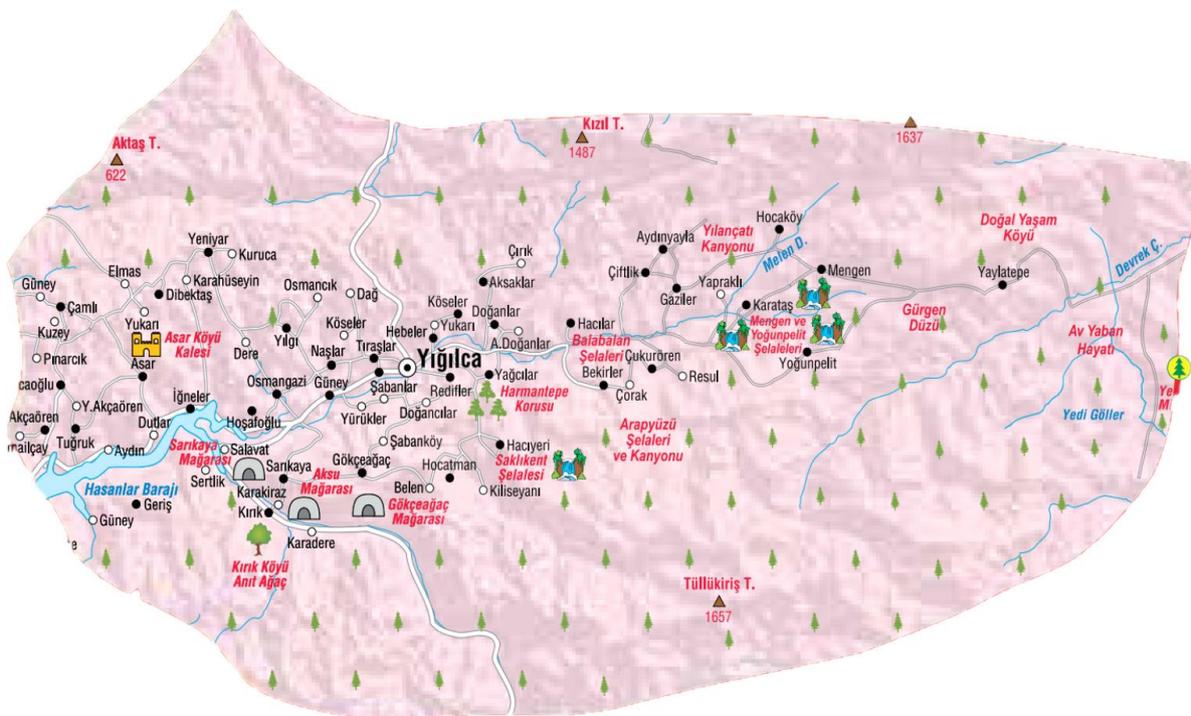

Figure 2. Ecotourism destinations of Yığılca District (URL-2)

Discussion

It is seen that the main livelihood of the local people living in the rural areas of Yığılca District, which is the

study area, is agriculture and forestry. The district has limited employment opportunities and it is an out-migration settlement. On the other hand, Yığılca district has a potential suitable for ecotourism activities that have natural appeal, especially in rural areas. Implementing its potential in terms of ecotourism with investments and projects can support the development of the local people (Türksoy, 2018). Ecotourism activities in Yığılca; cave tourism, waterfall tourism, bicycle tourism, camping tourism, trekking, orientering, sport fishing, canoeing, sailing, nature photography, wildlife watching, agrotourism. These activities should be considered as a tool to reduce the unemployment rate of local people, especially young people, and to provide young people with new job opportunities.

Planning must be made before a region or region opens up to ecotourism (Gültekin, 2010). This issue makes ecotourism planning in and around Yığılca more important. With a healthy ecotourism planning, it is possible to prevent the migration of the young population by ensuring rural development in the Yığılca region. It is great importance that ecotourism, which can be a response to the negativities experienced as a result of unplanned studies in mass tourism, is carried out in a planned manner.

As included in the definition of ecotourism, the protection of nature is another important element. Ecotourism activities generally take place in the living spaces of the people of that region. For this reason, these activities are ecological as well as socio-economically important studies (Aydın, 2010). The characteristics of the local people in that region should be analyzed thoroughly from this wool. Within the scope of the analysis results, it is primarily necessary to provide trainings to the local people in increasing awareness of ecotourism, gaining economic gain, fulfilling the requirements of the service sector, destination marketing and providing these activities (Türksoy, 2018). In addition, it is seen as an important requirement for young individuals in the region to receive training in order to be able to guide the field. Especially in these trainings, the employment of the young population in the region should be targeted and their emigration should be prevented. In this context, the local people should be helped by the universities in the region.

It has been determined that investments and infrastructure in Yığılca district are insufficient. There is no valid industrial establishment other than a cement factory in the region. Turkey's Tourism Strategy 2023 has been prepared and declared by the Ministry of Culture and Tourism which the Yığılca district is located within the Western Black Sea Region area as part of ecotourism (Türker, 2013). More successful results should be achieved by collaborating with universities, development agencies and other state levels using this opportunity. In this context, tourism incentives will be given to decision makers, local administrators or local people, and it will help both rural development and development plans. In this way, the existing infrastructure will be strengthened and it will ensure continuity in both the development of Yığılca and tourism.

Conclusion and Recommendations

Within the scope of ecotourism marketing, all stakeholders of the tourism industry should take an active role. It

	International Conference on	
ICRES	**Research in Education and Science**	**istes** Organization
www.icres.net	April 1-4, 2021 Antalya, TURKEY	www.istes.org

should benefit the recognition of the region by adding destination centers and routes in advertising, promotion, websites and tourism catalogs. Thus, it will contribute to both the region and the people of the region. Today, the promotion and advertising network that develops with technology should be used in all aspects. In this regard, although social media tools are effective, active social media phenomena with high recognition, the activities of the program producers to visit, see and promote various places should be used in the promotion of the region by local administrations or organizers. In addition, informative, introductory and educational brochures should be distributed about the activities carried out or to be carried out in the region.

Handicraft studies should be increased in the region. In this context, production workshops should be established by encouraging local administrations and local entrepreneurs in particular. In addition, marketing of local foods and products is of great importance. Cooperatives in this regard will strengthen the production network and help it reach the marketing channels.

In recent years, agrotourism has become popular in our country. Activities to increase the attractiveness of the public with activities ranging from organic agriculture to the cultivation of horticultural plants, even greenhouse cultivation to four-season production, afforestation works and individual sapling planting training should be carried out. If agrotourism is directed properly, it will increase the income of the people of the region. Also named after the stack of bees in the region Turkey has become a brand approved by the patent industry. Especially foods such as honey, dairy products, wild strawberries, chestnuts, walnuts and hazelnuts should be offered to visitors, brochures and booklets should be created and promoted on the products that grow naturally in the region and their production. collection activities can be carried out. In addition, the work on collecting the local mushrooms on site is another attractive activity for those concerned.

Yığılca district is a very limited settlement in terms of accommodation opportunities. Among the investments to be made, a study should be carried out to provide accommodation opportunities. These studies are considered as activities that will benefit the development and development of Yığılca district and the employment of young individuals by preserving the existing population of the region.

References

Altanlar, A. (2007). *Research of Akçakoca Alternative Tourism Opportunities*. (Unpublished master dissertation). Düzce University, Institute of Science and Technology, Landscape Architecture Department, Düzce.

Aydın, İ. Z. (2010). *Assessing the Socio-economic Effects of Ecotourism Activities on Local Communities (Case of Camili Biosphere Reserve in Turkey)*. (Unpublished master dissertation). Karadeniz Technical University, Institute of Science and Technology, Forest Engineering Department, Trabzon.

Berik, M. (2018). *Determining the Ecotourism Potential of Bolu Province: A Study on Dörtdivan, Kıbrıscık and Seben Districts*. (Unpublished master dissertation). Atılım University, Institute of Social Science,

Ankara.

Dilek, F., & Şahin, Ş. (2002). *Environment Friendly Tourism Practices: Green Hotel Management and Ecotourism,* Ankara: Rural Environment Yearbook, Rural Environment and Forestry Problems Research Association.

Gültekin, P. (2010). *Determination of Düzce Uğursuyu and Aksu Basins Ecotourism Potential and Landscape Management*. (Unpublished master dissertation). Düzce University, Institute of Science and Technology, Landscape Architecture Department, Düzce.

Hoşcan, N. (2008). *The Use of Natural and Cultural Values in Forest Villages in Ecotourism Activities: A Study in Bolu Province, Mudurnu District*. (Unpublished master dissertation). Ankara University, Institute of Social Science, Ankara.

Şahin, M., & Aksu, M. (2003). Place and Sustainable Development of Tourism in Sustainable Tourism Movements in Turkey, *Standart: Journal of Economics and Technic,* 42(494): 80-86.

TÜİK, (2018, March 11). Turkish Statistical Institute database, Retrieved from http://www.tuik.gov.tr

Türker, N. (2013). Evaluation of Western Black Sea Region's Ecotourism Resources and An Ecotourism Route Proposal. *The Journal of Academic Social Science Studies.* 6(4): 1093-1128.

Türksoy, N. (2018). *The Role of Tourism Activities in Rural Development of Saros Region*. (Unpublished doctoral dissertation). Namık Kemal University, Institute of Science and Technology, Agricultural Economics Department, Düzce.

UNWTO, (2021, March 5). The United Nations World Tourism Organization, Ecotourism definition, Retrieved from https://www.unwto.org/international-year-ecotourism-2002

URL-1, (2021, March 14). Turkey Directory Webpage, Retrieved from https://www.turkiye-rehberi.net

URL-2, (2021, February 20). Yığılca District Governorship Database, Retrieved from http://www.duzce.gov.tr/yigilca

Yalçınalp, E. (2005). *Investigation of Highland Tourism at the Scale of Some Tourism Centers in Trabzon within the Scope of Ecotourism*. (Unpublished master dissertation). Karadeniz Technical University, Institute of Science and Technology, Trabzon.

Young Repatriates in Kazakhstan: Problems and Solutions

Dinara Taldybayeva

Khoja Akhmet Yassawi International Kazakh-Turkish University, Kazakhstan,

https://orcid.org/0000-0003-4194-8482

Azhar Serikkaliyeva

Al-Farabi Kazakh National University, Kazakhstan,   https://orcid.org/0000-0003-3704-5969

Gulnar Nadirova

Khoja Akhmet Yassawi International Kazakh-Turkish University,   https://orcid.org/0000-0002-7837-2598

Daulet Zhailybayev

Khoja Akhmet Yassawi International Kazakh-Turkish University,   https://orcid.org/0000-0003-4848-0632

Abstract: When the state, the so-called "historical homeland" of many ethnic groups living outside, calls them to return and become a part of their fellow citizens, it takes on a great responsibility for the fate, rights, and interests of repatriates. One of the existing directions of the Kazakhstan government policy, which was initiated after gaining independence, was the process of attracting qandastar - ethnic Kazakhs from abroad, and the enrollment of a large number of young people from this group in Kazakhstan universities through the provision of grants for a full course of study. This state strategy brought expectations that the young generation, who came to Kazakhstan for education will also affect the national identity and culture of the local community. However, the youth also associated certain plans with moving to their historical homeland. The purpose of our research is to find out how the expectations of qandastar students coincided with real self-realization in Kazakhstan. We conducted a series of interviews with people who have graduated from Kazakhstani universities in the past few years.

Keywords: Kazakhstan, Qandastar, Education, Society, Migration

Introduction

The appearance of the Kazakh diaspora is associated with the historical settlement of the Kazakh people in the period after the end of the cycle of the Kazakh-Dzhungar wars in the 18th century. The defeat of the Dzungar

state by the troops of the Qing Empire in 1755, and then the suppression of uprisings against the rule of the Manchurian Empire, led to the desolation of significant areas of the Dzungaria steppe. Despite the opposition of the Qing government, by 1776 Kazakh families occupied their historical pastures on the present territory of the PRC - in Altai, the valleys of the Irtysh, Tekes, Ili rivers, on Tarbagan and further to the east (Mendikulova, 1997).

Later, after some governments changed in Central China, as well as the establishment of a communist regime, the Kazakhs of these territories actively resisted the establishment of Mao Zedong's power in the present Xinjiang Uygur Autonomous Region (XUAR) of the People's Republic of China (PRC). In the process of confrontation between national minorities and the Chinese authorities, Kazakhs were part of two main groups - the so-called East Turkestan Republic (ETR), oriented towards Moscow, and more independent rebel groups, the most famous of which was the Ospan Islam-uly (Ospan batyr) in southern Altai (Hasanly, 2015). After Moscow made a bet on Mao Zedong in 1949, it canceled the ETR project, the leadership of which was summoned to negotiations in Moscow and died in a plane crash. Thus, the movement submitted to the PRC. However, independent rebels continued to fight not for independence, but for personal freedom, for which several groups broke through from China across Tibet to Kashmir, which was controlled at that time by Indian and then Pakistani troops. There, it was decided to move to Turkey, as a Muslim and kindred country to the Kazakhs (Layas, 2018). Other small groups of Kazakhs who found themselves outside of Kazakhstan - in Iran, Afghanistan, Europe, left the territory of traditional residence of Kazakhs during the tragic events of the first half of the early 20th century: the rebellion of 1916, the revolutions in Russia in 1917, the civil war of 1917-1920, mass famine in Kazakhstan, Ukraine, and the Volga region, collectivization, Stalinist repressions and the II World War of 1939-1945.

According to the data of the World Association of Kazakhs, more than 5 million or 30-35% of the total number of Kazakhs live outside of Kazakhstan in 43 countries of the world. Most of them live in Uzbekistan - more than 2 million, China - about 2 million, and in Russia - about 1 million. In other countries, the number of ethnic Kazakhs is much smaller- in Mongolia 83 thousand, in Turkmenistan - 74 thousand, in Turkey - 12 thousand, in Kyrgyzstan - 10 thousand, in Iran - 5 thousand. According to statistics, as of February 1, 2021, 1 million 71.2 thousand people returned to their historical homeland and received the status of qandas. In 2020, the majority of arrivals - about 55.5%, were from China. Compatriots from Uzbekistan accounted for 28.8%, from Turkmenistan - 9.1%, from Mongolia - 3.4%, while also the number of immigrants of working age is 55.9%, 32.6% of people are younger than of working age, and 10.5% are pensioners. In 2021, some numbers have changed significantly. 65.9% came from Uzbekistan, 19.3% from China, 6.3% from Turkmenistan, 4.2% from Mongolia, and 4.3% from other countries. At the same time, the number of migrants of working age is 58.7%, under working age - 21.4%, and 19.8% - pensioners (Forbes.kz, 2021).

The legal documents regulating the process of repatriates' integration are being gradually improved. In the Law of the Republic of Kazakhstan "On Amendments and Additions to Certain Legislative Acts of the Republic of Kazakhstan on the Regulation of Migration Processes" dated May 13, 2020, some changes were made in

comparison with 1997. Thus, the term "oralman", denoting persons of Kazakh nationality without citizenship, who permanently resided outside its borders at the time of the acquisition of sovereignty by the Republic of Kazakhstan and arrived in Kazakhstan for permanent residence, has now been replaced by "qandas", which translates as "blood relative", "compatriot". Qandastar - an official term and plural form to designate ethnic Kazakhs-repatriates, which is used from 2019, replacing the previous official term "oralman" (returnee). Although the essential content of the Law is not so much a terminological change as the creation of more favorable conditions for ethnic Kazakhs who immigrate to their historical homeland (Forbes.kz, 2021)

Some Kazakhstani researchers have contributed to the study of the problems of repatriates associated with the adaptation of this social group to Kazakhstani society. Research by G. Mendikulova "Historical destinies of the Kazakh diaspora. Origin and development" (1997) were among the first works of this kind. In the monograph by B. Kalshabayeva "Kazakhs of Central Asia (historical and ethnographic research" on the culture and traditions of Kazakhs of Uzbekistan, there is a special chapter entitled "Problems of repatriation and adaptation of the Kazakh diaspora in Central Asia at the present stage" (Kalshabayeva, 2011). The monograph by K. Nurymbetova (2011) "Problems of Repatriation in Independent Kazakhstan: Historical Analysis" traces the process of returning our compatriots to their historical homeland, and in the book "Ways of integrating repatriates into Kazakhstani society: realities and challenges" authors A. Kalysh and D. Kassymova (2013) study the psychological and social factors associated with the adaptation and integration of compatriots into the local society. In the field of studying the problems of including qandastar in Kazakhstani society, mention should be made of the research project "Cultural and linguistic adaptation of the young generation of repatriated Kazakhs in the conditions of modern Kazakhstan" (2015-2017), which aimed to develop a resource scientific, methodological and information package for qandastar who are students of Kazakhstani universities. Besides, the project studied the factors influencing the process of forming their intercultural competence.

Sociological theories analyzing the problems of social adaptation in the country of emigration consider feelings of alienation from the country of emigration (often due to prejudice and discrimination) and difficulties in accepting foreign values and social norms as the main reasons for the return of most migrants to their homeland (Cassarino, 2004; Kunuroglu, van de Vijver, & Yagmur, 2016). Theoretically, there are three categories of emigration motives: preservation (striving for physical, social, and psychological security), self-development (personal growth while acquiring new abilities, knowledge, and skills), and materialistic motivations (promoting wealth and financial well-being). According to Schwartz's theory of values, each motivation is associated with a preference for certain values (Schwartz, Cieciuch, Vecchione, Davidov, Fischer, Beierlein, et al. 2012). Preservation is associated with the values of security and survival, self-development is associated with openness to changing values, and materialism is associated with the values of self-improvement (Tartakovsky & Schwartz, 2001).

In 2018, the quota for receiving grants for studying at Kazakh universities for persons of Kazakh ethnicity who are not citizens of the Republic of Kazakhstan was increased from 2 to 4%. In the 2020-21 academic year, the number of grants allocated was 1777, including 1000 at the preparatory departments of universities. Qandastar

ICRES

International Conference on
Research in Education and Science

www.icres.net   April 1-4, 2021   Antalya, TURKEY   www.istes.org

istes
Organization

are admitted to universities after passing the Unified National Test or Complex Testing (Mukanov, 2018). Based on the theory of motivation, we set the goal of our research - to find out to what extent the expectations of students-qandastar coincided with their real self-realization, the facts, and events of their life in their historical homeland - Kazakhstan. We strive to gain a deeper understanding of the social and psychological processes that returnees go through, in particular the complex nature of their identity, adaptation, sense of belonging, and intergroup relationships. To do this, we need, first, to understand the motivational goals of the repatriates, expressed in their value preferences (Schwartz et al., 2012; Tartakovsky & Schwartz, 2001) and, secondly, to study the group identification of repatriates, including identification with the country of origin, with the historical homeland and their ethnic group (Tartakovsky et al., 2017). In addition, we want to identify social, cultural, and linguistic problems that influence the adaptation process.

Method

Given the dynamic and complex nature of return migration, we have adopted a qualitative approach to our research. Qualitative data were collected using semi-structured in-depth interviews. This way of collecting data allows informants to talk freely about their personal experiences. Makarova and her colleagues (2021) state that the level of personality development and the graduate's readiness for life cannot be assessed here and now, but only after years. To find out to what extent the qandastar are satisfied with the current situation, how the process of socialization and adaptation of graduates to the local community is going on, we conducted a series of interviews with repatriates who graduated from Kazakh universities some years ago, with one exception. The total number of respondents is 15 people.

The interview questions were divided into 4 main blocks: In the first block, we found out the demographic characteristics of our interlocutors: age, gender, place of residence, marital status, specialty, time of arrival in the Republic of Kazakhstan, place of work, and current position. The questions of the second block were aimed at clarifying the reasons and motivations for the move. Three options for reasons were offered to choose from: 1) a significant difference in economic conditions in the country of immigration (RK) and the country of origin, 2) the presence of problems of social adaptation in the country of emigration, so some theories suggest that most migrants return to their historical homeland from the country of origin for feelings of alienation, discrimination, and other social problems, and 3) to realize personal value preferences. At the same time, motivational goals were divided into three categories:

1. self-preservation (striving for physical, social, and psychological security, stability, and certainty in life, as well as obedience to public expectations),
2. self-development (for example, obtaining higher education, personal growth through the acquisition of new abilities, knowledge, and skills),
3. self-improvement (achievement of high social status and material well-being).

We devoted the next block to the problems of adaptation, we were interested in the relations of qandastar with

people in Kazakhstan and in the country, they left, their group, and personal identification. Here the greatest number of questions was asked regarding family and friendship ties, emotional and psychological feelings, assessment of one's social status. The last, fourth block of questions gave us an understanding of the satisfaction or dissatisfaction of our respondents with their life in Kazakhstan, financial situation, and career.

Results

Among the interviewed qandastar, five had previously had Chinese citizenship, four were residents of Turkmenistan, two respondents were repatriated from Uzbekistan and the same number were from Turkey, one person had Mongolian citizenship, and one previously had Russian citizenship. Socio-demographic characteristics showed that the age of repatriates varied in a wide range from 17 to 40 years, among them there was a higher proportion of women (53% versus 47%) and a higher proportion of repatriates have a family (60% versus 40%). Among working repatriates, the proportion of those employed in professional jobs was 73%, and 20% of those interviewed held managerial and commercial positions.

Table 1. Demographic indicators

Category	Quantity	Percentage %
Age (years)	17-40	
Gender		
male	7	47
female	8	53
Family status		
family	9	60
single	6	40
Occupation		
students	1	7
Professionals	11	73
managers or businessmen	3	20
Country of origin		
China	5	33
Turkmenistan	4	27
Uzbekistan	2	13
Turkey	2	13
Mongolia	1	7
Russia	1	7
Place of residence		
Almaty	8	53
Almaty region	2	13
Aktau	3	20
Nursultan	1	7
Shymkent	1	7

Reasons for Migration

To determine the reasons and motivations for the move, we, first of all, asked our respondents to compare their economic conditions in the country where they lived before migration with the current situation in Kazakhstan. Three respondents admitted that they lived materially better in the country of origin (China, Russia, Turkey)

than in Kazakhstan. "My family was quite prosperous in our village, my father was an official in a local municipality, and also was engaged in cattle breeding and trade. Therefore, our move here was never about high rank and career" (Respondent 1, 38 years old, male).

Eight people said that in Kazakhstan they live in better conditions than in their country of origin (mainly Mongolia, Uzbekistan, and Turkmenistan). The rest believe that their conditions here are about the same and that life and economic circumstances "depend on the person himself" (Respondent 2, 21 years old, woman).

During the interview, the majority of respondents indicated the desire for self-development (9 respondents) as the motivation for the move. Thus, they seek personal development through higher opportunities - getting the education and the opportunities that it gives. The rest of the respondents were divided into two equal groups: the first is focused on values of self-preservation and stability, saving of ethnic identity (3 people) ("My parents sacrificed a calm and comfortable life, it was difficult for them to adapt here, including entering the local society and job search. However, they returned to their homeland for the sake of their posterity, so that they remain Kazakhs (Respondent 3, 35 years old, male). The second group (3 respondents) pointed out simultaneously two motivations - self-development and self-improvement, the latter they understand as achieving a high social status: "Belonging to the titular ethnic group, of course, allows people to feel different, which is why the idea of "being sultan in their own country" played a large role in immigration"(Respondent 4, 35 years old, male). Three respondents told about the unfavorable attitude towards them as representatives of a minority in the country of origin, which forced them to leave the state; the rest hardly mentioned anything about the problems of social deprivation and feelings of alienation in the country of origin, discrimination and difficulties in accepting foreign values and social norms, except for some psychological discomfort in two more cases and the absence of schools with the Kazakh language of instruction in one case.

Adaptation

The next block of questions reveals the process of qandastar adapting to Kazakhstani society, the process of forming their new identity, group, and individual, as well as maintaining old and building new social ties.

When asked about the existence of discrimination against them in the local community as "strangers" or people who came from outside, four respondents answered that they did not feel any discrimination towards themselves, the rest of the interlocutors admitted that they felt bias towards themselves in varying degrees - from weak to clearly and sharply expressed, especially during the first period of their stay in Kazakhstan. This was seen at the routine level and in some official organizations: "In the first years of my stay in Kazakhstan, I felt this dislike very strongly, to be honest; it caused me severe mental pain. I think now there are fewer such cases. I am an educated person, a well-known middle-class businessperson. This is why I have not felt this attitude in recent years. Of course, there are different people, including envious people. I think it's better not to pay attention to such people." (Respondent 5, 33 years old, male). Among the main adaptation problems faced by qandastar students, not from the former USSR, there were two, which were mentioned by the majority: the

lack of Russian language knowledge and exhausting bureaucratic procedures in the execution of numerous local documents.

The adaptation process includes building relationships in a new environment, so we found out during the interview whether the repatriates are satisfied with their relations with representatives of the local community in the Republic of Kazakhstan, as well as whether they maintain contact with the country of origin. Only one of the interviewees said that he did not have good relations in Kazakhstan, as well as in the origin country, where he is not going to return. In addition, one more respondent admitted that she would like to go to another country from Kazakhstan, but not to her homeland. All other interlocutors are satisfied with the relationship in the local community; the majority have not broken their ties with the country of origin, especially those who have relatives there. "There is a connection with China, my relatives live there, but I rarely go there. Of course, I miss my native land, I dream about it. When I went there in 2010, 8 years after the move, I saw my home, my native land; I could not hold back my tears. I would like to go there, visit my relatives, but for a maximum of 2 weeks, no more than that". (Respondent 1, 38 years old, male). Many visit their parents who still live outside of Kazakhstan. However, no one is going to return to the country of origin.

The definition of a group identification system includes identification with the country of origin and the group of their fellow tribesmen in it, as well as identification with the country of current residence, that is, Kazakhstan, and the group of qandastar in Kazakhstan. The interviews showed that 9 out of 15 respondents poorly identify themselves with the host country, and 8 people also poorly assess their identity with the country of birth. 7 respondents still identify themselves with the group of their fellow tribesmen in the country of origin, but 8 interlocutors do not consider themselves to be the Kazakh diaspora in that country. 7 respondents identify themselves with the group of qandastar in Kazakhstan, and 8 people consider themselves full-fledged Kazakhstani Kazakhs. To determine personal identification, we asked respondents to choose from the proposed answer options one or more that correspond to their self-identification. When choosing between identifying oneself as a qandas or a Kazakhstani Kazakh, we needed to clarify that we are not talking about the legal status of a person of Kazakh nationality who was born and permanently resided outside of Kazakhstan. Moreover, many of the qandastar have applied for citizenship of the Republic of Kazakhstan, and some have already received it. We were much more interested in the level of adaptation to the local community, in other words, did our interlocutor feel culturally and psychologically that he/she became a part of the surrounding world, or still feel their "otherness", dissimilarity to local Kazakhs differs from them in a different cultural/ideological background. Perhaps this was the most sensitive and therefore subjectively evaluative part of the interview for many of our interlocutors. Thus, 13 out of 15 interviewed qandastar certainly and extremely emotionally stated that being a Kazakh, a citizen of Kazakhstan is an important part of their self-determination: "speaking about Kazakhs, I say" we ", not" they"; "When Kazakhs are criticized, I take it personally"; "I need to think of myself as a Kazakh". At the same time, six respondents strongly rejected the qandas identity. "I no longer identify myself as an oralman/qandas, I consider myself a full-fledged citizen of Kazakhstan" (Respondent 5, 33 years old, male).

Nevertheless, three respondents admitted that they perceive themselves as a qandas largely than a Kazakhstani Kazakh. "Since I studied Chinese from kindergarten, received a school education in the Chinese system, grew up in their culture and mentality, I consider myself as a person from China, I realize that China is my homeland, although I returned to Kazakhstan, to my historical homeland" (Respondent 6, 27 years old, female). Six respondents demonstrated a kind of "hybrid" identification, on the one hand, it seems quite natural for them to see themselves as a Kazakhstani Kazakh, this is an important element of their self-determination, but at the same time, they "continue to think of themselves as a qandas".

Satisfaction

In the last block of questions, we were interested in the satisfaction of the qandastar with their life in Kazakhstan. Life satisfaction included satisfaction with interpersonal relationships, financial status, and career. We have used the well-known and still relevant Life Satisfaction Scale, developed in 1985 by a team of scientists (Diener, Emmons, Larsen, & Griffin, 1985). When asked about satisfaction with their lives in Kazakhstan, five respondents answered that they were satisfied - "My life situation is wonderful", seven people rated it as average - "Mostly satisfied", two people admitted that they are not satisfied with their living conditions. One of the respondents did not speak on this topic.

Satisfaction with interpersonal relationships was measured using a one-item scale, in which participants were asked to rate their degree of satisfaction with the number of friends and acquaintances, as well as the quality of their relationship with them: no friends (0), up to two close friends (1), from three to ten close friends (2) and more than ten close friends (3). We asked to estimate the number of close friends, excluding their parents, partner, or children in this list, but it was possible to include other relatives. The average indicator on our three-point scale was 2.37, which indicates a high level of social ties of repatriates within Kazakhstani society. This is important because friends are an important part of a social resource.

In terms of satisfaction with their financial position, 12 respondents rated their financial position as "average", "slightly above average", "slightly below average". One person is completely dissatisfied with his financial situation; two of our interlocutors are completely satisfied. In the area of careers, 12 respondents said that they work in their specialty or have a full-time job, and in general, they like what they do. Two people are not satisfied and would like to change the field of activity. One interlocutor plans to leave Kazakhstan in search of other opportunities abroad.

Table 2. Satisfaction indicators

	Fully satisfied	Incompletely satisfied	Unsatisfied	No answer
Life satisfaction	5 (33%)	7 (47%)	2 (13%)	1(7%)
Financial satisfaction	2 (13%)	12 (80%)	1(7%)	-
Career satisfaction	12 (80%)	2 (13%)	1(7%)	-

ICRES	International Conference on Research in Education and Science	istes Organization
www.icres.net	April 1-4, 2021 Antalya, TURKEY	www.istes.org

Discussion

The present study applies the general theory of emigration motivation (Tartakovsky & Schwartz, 2001), according to which people emigrate to facilitate the achievement of their general motivational goals, expressed in their personal value preferences. The qandastar who come to Kazakhstan are driven by a strong motivation for self-development and a less pronounced materialistic motivation. As the interview data showed, migrants return to Kazakhstan mainly for non-economic reasons, although among the interviewed persons, eight people noted that their living conditions in Kazakhstan are better than they were in the country from which they came. Nevertheless, most of them return to Kazakhstan to develop their abilities, acquire new knowledge and skills, and a higher social status. Can we conclude based on the data obtained about the achievement of self-development by our interlocutors and the growth of their social status?

All interviewed interlocutors have received higher education or are in the process of obtaining it. According to the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan, which conducted a sample survey of the quality of life of the population in 2020, 63.5% of respondents (according to subjective assessment) are satisfied in general with their life (Kazistaev, 2020). Our data on qandastar in the "completely satisfied" category gives a result of 33%. Thus, if we sum up the indicators "completely satisfied" and "incompletely satisfied", and it is this calculation that is carried out by the Committee on Statistics ("satisfied in general"), then they will give a much higher figure of 80%, which is higher than the general Kazakhstani indicator.

The level of satisfaction with their financial situation in the country is 41.6%. This figure includes both those who consider themselves to be in the middle level of income, who make up the majority (63.3%), and those who consider themselves high - 0.7% and low - 0.3%. (Kazistaev, 2020). On this basis, we can summarize in our data those who are completely satisfied and incompletely satisfied, and this will be significantly higher than the country indicator, namely - 93%, and, indeed, people with an average income level among them are the majority - 85%. The degree of satisfaction with the career of repatriates, that is, having a job in their specialty, based on the interview data, is high - 80%. This is higher than in Kazakhstan as a whole, where, according to 2017 data, 77% of survey participants are satisfied with their work (inform.kz, 2017).

Self-identification of migrants, as well as the perception of "homeland" influenced their decision to return (Tartakovsky et al., 2016). All the respondents we interviewed, of course, are ethnic Kazakhs, they were Kazakhs abroad, and even more so, they continue to consider themselves as such in Kazakhstan. The emphasis in the interview was on something else - whether they felt themselves to be a part of the civil society of this country, given that it is somewhat broader than the concept of "Kazakh ethnos". This is, indeed, a very sensitive topic, since discussions about the creation of a national Kazakh state on an ethnic basis vs. a Kazakh state on a civil basis have arisen since independence and periodically flare up with varying degrees of intensity. It is not surprising that repatriates, fueled by romantic feelings, come to the land of their ancestors, to the "country of

ICRES

**International Conference on
Research in Education and Science**

www.icres.net   April 1-4, 2021   Antalya, TURKEY   www.istes.org

istes
Organization

Kazakhs". "Before visiting Kazakhstan, we dreamed of it, dreamed of it as a distant country like the United States. This happened because of watching Kazakh channels, modern programs, and musical shows. Then the opening of Kazakhstani YouTube channels had just begun, the flow of information from Kazakhstan became open. I believe that this had a great cultural impact on the oralmans, weakened the processes of assimilation (or "sinification") of the Kazakhs of China. We came for the sake of the future of our offspring" (Respondent 1, 38 years old, male). However, after arrival, many find themselves not in the Kazakh, but the Kazakhstani environment, in which the Russian language, which is a foreign language for them, occupies a strong position in public life, and knowledge of their native Kazakh language, is not always sufficient for official and unofficial communication. One of the interlocutors expressed this as follows: "It is impossible to fully penetrate this (Kazakhstani) society, this is a Russian-speaking society that has a different mentality and psychology that came from the Soviet Union, the way of life is also completely different. Therefore, Kazakhs returning from China get involved in an adventure and inevitably sacrifice themselves" (Respondent 1, 38 years old, male).

Thus, the process of adapting to their home country turns out to be more complicated than initially assumed, while the ties with the country of origin for many have weakened, although they have not completely disappeared, and in their historical homeland, they feel discrimination and bureaucratic obstacles to varying degrees. This led to the fact that some of our respondents, judging by the interviews, combine "hybrid" identification, feeling themselves not completely ethnic Kazakhs from abroad, but not quite citizens of the Republic of Kazakhstan, which indicates the incompleteness of the adaptation process. The nostalgic identification with their homeland, based on the stories and memories of several generations of older relatives, obviously came into conflict with the real situation in Kazakhstan and was reflected in the group and individual identity of the qandastar. The data obtained are consistent with the conclusions of some studies that immigrants before migration can idealize life in their ethnic homeland (Tartakovsky, 2009), the return to which is described both by the inviting party and by the migrants themselves as a return to their "roots" or "to the land of their ancestors". One of the goals, as we have seen, is to prevent their children from experiencing negative stereotypes or any kind of discrimination in a society where they are a minority. At the same time, repatriates, as a rule, do not refuse to maintain social ties with the country where they were born and where their relatives very often stayed. This can explain the complex "hybrid" identity felt by some interviewees (Tartakovsky et al., 2017).

Migration entails dramatic changes in the social environment, the loss of social capital in the country where young people have been from the moment of birth, have had multiple and varied social ties, social status, certain protections, and guarantees. Such significant social changes can be compatible with a high level of self-development motivation and openness to values change since they are associated with the desire for novelty and changes in life, as well as the realization of the desire to independently determine their actions (Tartakovsky & Schwartz, 2001). If for some of the qandastar the return was dictated by the desire to return to their historical homeland to avoid the "dissolution of national identity" in the dominant foreign culture (Roth, 2020], then another part of the migrants moved to an economically more growing country, which contributed to the achievement of materialistic motivational goals expressed in values self-improvement (achieving high social

status and control over people and resources).

We see that the repatriates assessed their economic status rather positively than negatively, and they assessed the changes in their economic conditions over the past year well. At the same time, the interpersonal adaptation of the returnees was less successful: some migrants felt discriminated against and were less satisfied with their interpersonal relationships. According to the qandastar, there have been situations when society can perceive the qandastar as strangers and discriminate against them. However, it should be noted that, in general, returnees reported a relatively low level of perceived discrimination.

The level of material well-being at which, in their opinion, they are now, makes them strive for a higher one: "I am realized, there is room to grow and there are opportunities, the rest depends on me" (Respondent 7, 39 years old, woman), "Good, but it still needs to be improved" (Respondent 8, 36 years old, male). Also, all interlocutors have the advantage of living in a megalopolis or a large city, as opposed to the "hinterland" and rural areas. In a big city, there are much wider opportunities for employment and, therefore, protection against unemployment. All interviewees highly value the opportunity to have a job "I have a job. I like it. I am grateful" (Respondent 9, 35 years old, woman), "Many Kazakhs from China are engaged in business, but teaching is my spiritual choice. Thus, for me to be a businessman with a high income or a military man with a low salary (30 thousand tenge) is equally unattractive, in both cases, I am not in my place (Respondent 1, 38 years old, male). In addition to the presence of a developed chain of interpersonal relationships in our society, ethnocultural or national belonging to the so-called "titular nation" plays a significant role, which can also serve as a social resource (Yadov, 2001). On the other hand, in terms of cultural identity, the results obtained partly support Sussman's model (2010), which argues that the majority of returning migrants simultaneously belong to the country of emigration and the country of origin. Therefore, the analysis of the results obtained allows us to conclude that the qandastar are mostly more endogenous people, those who take responsibility for their actions on themselves, are more confident in the future, value education as a resource of competitiveness, besides, they are free from the burden of Soviet action patterns (Konstantinovsky, 2000), speak foreign languages, at least the language of the country where they came from. All these factors are an additional resource for employment and mobility.

Rising to a higher level of generalization, we observe today social interaction between the qandastar group and society, which can be defined by the concept of social capital. Its components are the advantages created by the position of the studied group, which we considered in our study, as well as by the result of the interaction of these two parties, that is trust. We mean the trust of repatriates to other social groups, social and political institutions, their confidence, and hope that society will fulfill its obligations, promises, etc. The adaptation process is impossible without mutual trust. From the point of view of the repatriates, responding to the call of Kazakhstan, the tribesmen came to the country, which is an act of great confidence in the government on their part, passed the established procedures, entered local universities, studied and worked for the development of the country, fulfilling their obligations to society. Kazakhstani society, in turn, with more or less success, is trying to fulfill its obligations to fellow tribesmen within the framework of educational grants programs, legal

registration of status, and resettlement. It would be an exaggeration to say that everything is going well. Nevertheless, the emergence of some barriers in the application and improvement of legislative norms and the policy of adapting qandastar, in general, does not reduce the degree of trust of repatriates in society, although it affects their emotional and psychological assessment of the environment around migration processes. Thus, the social capital of this group of qandastar, although it can undergo various kinds of changes, looks generally stable.

Perhaps the limitation of this study is the sample of qandastar, which was small; moreover, it was not accidental, since we interviewed only those who received higher education in Kazakhstani universities within the framework of the grant program for this group of repatriates. Participants were recruited from different geographic regions and different countries of origin. Thus, even though this sample is small and not random, it can be sufficiently representative for the studied issue.

Conclusion

Many countries are trying to attract their citizens living abroad to return, focusing on business and employment opportunities that currently exist in their home country. This policy can be successful given the predominantly materialistic motivation and self-development motivation of returning migrants. The social group of qandastar, which was the object of our study, was attracted to the greatest extent by the opportunity to get higher education in the universities of Kazakhstan, that is, to increase their social capital and social status. Answering the question of our research - to what extent the expectations of students-qandastar coincided with their real self-realization, we can state that a modern repatriate, student or graduate of a Kazakh university, is generally satisfied with the conditions of his/her life in Kazakhstan, more or less satisfied with his/her financial situation and career, open to change and self-improvement values. He/she perceives the existing negative aspects of the adaptation process in the host community with the hope of positive changes. The results obtained demonstrate that the repatriates, although they differ from the local population in their value preferences, group identification, and socio-psychological characteristics, are prone to quick adaptation as a condition of their growing into the Kazakh society and strengthening the status of a citizen of Kazakhstan.

Recommendations

In order not only to train but also to keep graduates in this country, to enable them to apply all the acquired skills, abilities, professional knowledge, satisfy their aspirations and make society richer and more prosperous, they must be provided with the conditions for further self-realization - employment opportunities, preferably in the specialty they received, as one of the most important components of life satisfaction, the provision of citizenship of Kazakhstan without long delays, a compulsory package of services, etc., that is, the state's obligations after the presentation of a higher education diploma do not end.

Acknowledgements

References

Cassarino, J. P. (2004). Theorizing return migration: The conceptual approach to return migrants revisited. International Journal on Multicultural Societies, 6, 253–279.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. Journal of Personality Assessment, 49(1), 71–75.

Hasanly, J. (2015). Xinjiang in the orbit of Soviet politics. Stalin and the Muslim Movement in East Turkestan (1931-1949): monograph. Moscow: Flinta.

How satisfied Kazakhstanis are with their work. (2017, August 10). Inform.kz. Retrieved from https://www.inform.kz/ru/naskol-ko-dovol-ny-kazahstancy-svoey-rabotoy_a3053667inform.kz

Kalysh, A., & Kassymova, D. (2013). Ways of integrating oralmans into Kazakhstani society: realities and challenges. Almaty: Kazakh University/

Kalshabaeva, B.K. (2011). Central Asian Kazakhs: historical and ethnographical research. Almaty: Kazakh University.

Kazistayev, E. (2020, August 5). Most of Kazakhstanis are happy with their lives. Assessment of the Statistics Committee. Liter.kz. Retrieved from https://liter.kz/bolshinstvo-kazahstanczev-dovolny-svoej-zhiznyu-oczenka-komiteta-statistiki/.

Konstantinovsky, D.L. (2000). Youth of the 90s; Self-determination in a new reality. Moscow: Institute of Sociology RAS.

Kunuroglu, F., van de Vijver, F., & Yagmur, K. (2016). Return Migration. Online Readings in Psychology and Culture, 8(2)

Layas, G. (2018). The great exodus of the Kazakhs. Almaty: AmalBooks.

Makarova, O., Ldokova, G., & Egorova, R. (2021). Analysis of students' views of the quality of pedagogical education in Russia. International Journal of Education in Mathematics, Science, and Technology (IJEMST), 9(3), 462-481. https://doi.org/10.46328/ijemst.1624

Mendikulova, G.M. (1997). Historical fate of the Kazakh diaspora. Origin and development. Almaty: Gylym.

More than 800 ethnic Kazakhs have received kandas status since the beginning of 2021. (2021, February 16). Forbes.kz. Retrieved from https://forbes.kz/news/2021/02/16/newsid_244004.

Mukanov, B. (2018, June 7). The quota for grants for oralmans in Kazakhstan was increased from 2 to 4%. Informburo.kz. Retrieved from https://informburo.kz/novosti/kvotu-na-granty-dlya-oralmanov-v-kazahstane-uvelichili-s-2-do-4.html.

Nurymbetova, K.K. (2011). Repatriation issue in independent Kazakhstan (1991-2008). Almaty: Nurai Print

Service.

Roth, K. (2020). World Report 2020: China as a source of global threat to human rights. Human Rights Watch. Retrieved from http://www.hrw.org/ru/world-report/2020/country-chapters/337324.

Sussman, N. M. (2010). Return migration and identity: A global phenomenon, a Hong Kong case. Hong Kong: Hong Kong University Press.

Schwartz, S. H., Cieciuch, J., Vecchione, M., Davidov, E., Fischer, R., Beierlein, C., et al. (2012). Refining the theory of basic individual values. Journal of Personality and Social Psychology, 103(4), 663–688. 10.1037/a0029393.

Tartakovsky, E., & Schwartz, S. H. (2001). Motivation for emigration, values, wellbeing, and identification among young Russian Jews. International Journal of Psychology, 36(2), 88–99. 10.1080/00207590042000100. Tartakovsky, E., Patrakov, E., & Nikulina, M. (2017). Motivational goals, group identifications, and psychosocial adjustment of returning migrants: The case of Jews returning to Russia. International Journal of Psychology, 52, 78-86. 10.1002/ijop.12291.

Tartakovsky, E. (2009). Cultural Identities of Adolescent Immigrants: A Three-Year Longitudinal Study Including the Pre-Migration Period. Journal of Youth and Adolescence, 38, 654–671. 10.1007/s10964-008-9370-z.

Yadov, V.A. (2001). Social resource of individuals and groups as their capital: the possibility of applying a universal methodology for studying real stratification in Russian society. In T. I. Zaslavskaya (Ed.). Who is seeking to lead Russia and where? Actors of the macro-, meso- and micro-levels of the modern transformation process (pp. 310 -318). Moscow: Moscow Higher School of Social and Economic Sciences.

Investigation of Teacher Opinions on STEM Education

Mustafa Tevfik Hebebci

Necmettin Erbakan University, Turkey, https://orcid.org/0000-0002-2337-5345

Abstract: The aim of this study is to examine the opinions of teachers working in various branches on STEM education. The research was designed by case study, one of the qualitative research methods. The study group of the research consists of seven teachers selected by purposeful sampling method. The data were collected using a structured interview form developed by the researchers. The data obtained from the study group were analyzed by content analysis method, one of the qualitative research methods. A total of five themes were created as a result of the analysis. It is seen that teachers' views on STEM education are generally positive. In this context, multidisciplinary in the definition theme for STEM; 21st century skills in the theme of student impact; populist approaches in contact STEM Education in Turkey; not being understood in contact with the mistakes made; It was concluded that views on infrastructure and equipment were emphasized in the theme of integration.

Keywords: STEM education, STEM, teacher opinions

STEM Eğitimine İlişkin Öğretmen Görüşlerinin İncelenmesi

Özet: Bu araştırmanın amacı çeşitli branşlarda görev alan öğretmenlerin STEM eğitimine yönelik görüşlerinin incelenmesidir. Araştırma nitel araştırma yöntemlerinden durum çalışmasıyla desenlenmiştir. Araştırmanın çalışma grubunu amaçlı örnekleme yöntemiyle seçilen çeşitli branşlardaki yedi öğretmenden oluşturmaktadır. Verilerin toplanmasında araştırmacılar tarafından geliştirilen yapılandırılmış görüşme formu kullanılmıştır. Çalışma grubundan elde edilen veriler nitel araştırma yöntemlerinde sıklıkla kullanılan içerik analizi yöntemiyle çözümlenmiştir. Yapılan analizler sonucu toplam beş tema oluşturulmuştur. Öğretmenlerin STEM eğitimine yönelik görüşlerinin genellikle olumlu olduğu görülmektedir. Bu bağlamda STEM'e yönelik tanım temasında çok disiplinlilik; öğrenciye etki temasında 21 yüzyıl becerileri; Türkiye'de STEM Eğitimi temasında popülist yaklaşımlar; yapılan yanlışlar temasında anlaşılamama; entegrasyon temasında alt yapı ve donanıma yönelik görüşlerin vurgulandığı sonucuna ulaşılmıştır.

Anahtar Kelimeler: STEM eğitimi, STEM, Öğretmen görüşleri

Giriş

Bilim ve teknoloji alanlarındaki liderlik mücadelesi ve dünya üzerindeki değerli kaynakların azalması ülkeler arası rekabeti her geçen gün daha da artırmaktadır (Akgündüz vd., 2015). Bu rekabette söz sahibi olmak isteyen ülkeler; fen, teknoloji, mühendislik ve matematik (STEM) alanları üzerinde önemle durmakta ve bu alanlarda uzmanlaşmış üretken ve yaratıcı bireylerin gelişimine yönelik çalışmalar yapmaktadır (Holdren, Lander, & Varmus, 2010; Yıldırım & Altun, 2015). Nitekim bu alanlarda dünyaya öncülük eden ülkeler dikkate alındığında nitelikli bireyler yetiştirebilmek için eğitim sistemlerinde kapsamlı reformlar ve yatırımlar yaptıkları görülmektedir (Bybee, 2010; Sanders, 2009).

Eğitim alanındaki güncel sayılabilecek; yenilikçi yaklaşımlarından biri disiplinler arası çalışmayı vurgulayan ve bazı çevrelerce son yılların en önemli eğitim hareketi olarak nitelendirilen fen, teknoloji, mühendislik ve matematik (STEM) eğitimidir (Berlin & Lee, 2005; Kuenzi, 2008). İlk kez 90'lı yıllarda gündeme gelen STEM eğitimi (Sanders, 2009), öğrencilere STEM alanlarında bütüncül eğitim verme amacında olan (Morrison, 2006), günümüzde birçok eğitim hareketini destekleyen; okul öncesinden lisans üstü eğitimine kadar tüm yaş gruplarındaki formal ve informal eğitimleri kapsayan disiplinler arası bir yaklaşımdır (Capraro vd., 2016; Daugherty, 2013; Israel, Maynard, & Williamson, 2013; Landicho, 2020; Lindsay, 2020; Minken et al., 2020; Uhomoibhi & Ross, 2018; Yang & Baldwin2020).

STEM eğitimi, uluslararası rekabette söz sahibi olmak isteyen ülkeler için stratejik bir öneme sahiptir (Corlu, Capraro ve Capraro, 2014). Ayrıca STEM eğitimi her ülkenin gündeminde önemli bir yer tutan problem çözme, yenilikçilik ve tasarımı vurgulamaktadır (Hernandez vd., 2014). STEM eğitimini oluşturan alanlar, 21. yüzyıl becerilerinin kazandırılması konusunda da önem taşımaktadır (Bybee, 2010). Morrison (2006) STEM eğitimi ile yetiştirilmiş bireylerin problem çözme, eleştirel düşünme, yaratıcı düşünme, yenilikçilik gibi çağın gerektirdiği becerilere sahip olduğunu belirtmektedir.

STEM okuryazarı olan bireyler yetiştirmek, bu alanlara olan ilgiyi ve bu disiplinlerde yetiştirilmiş nitelikli kişi sayısını artırarak ülke ekonomisine katkı sağlamak STEM eğitiminin en temel amacı olarak dikkati çekmektedir (Carnevale, Smith, & Melton, 2011; Thomas, 2014). Bu amacın gerçekleştirilmesinin ön koşullarından biri yeterli sayıda ve nitelikte STEM becerilerine sahip öğretmenlere sahip olmaktır (Bakırcı & Kutlu, 2018). Wang (2013), STEM eğitiminin etkili bir biçimde yürütülebilmesinin bu disiplinlerde yetişmiş nitelikli öğretmenlerle mümkün olabileceğini ifade etmiştir. Eğitim sisteminin en önemli bileşenlerinden biri olan öğretmenlerin STEM eğitimine yönelik görüşlerinin belirlenmesinin önemli olduğu düşünülmektedir.

2000'li yıllarla birlikte araştırmacıların büyük ilgisini çeken STEM eğitimine yönelik çalışmaların sayısının her geçen gün arttığı görülmektedir. Son yıllarda STEM eğitimine ilişkin öğretmen görüşleri araştırmacıların ilgisini çeken konular arasındadır. Uğraş (2017) yapmış olduğu çalışama da okul öncesi öğretmenlerinin, STEM eğitim uygulamalarına ilişkin görüşlerini incelemiştir. Bakırcı ve Kutlu (2018) ise fen bilimleri öğretenlerinin

görüşlerini ele almıştır. İlgili araştırmada STEM eğitimi uygulamalarının motivasyon, derse karşı ilgi, yaratıcılık, araştırma sorgulama becerilerini olumlu yönde etkileyeceği sonucuna ulaşılmıştır. Benzer nitelikte fen bilimleri öğretmenlerinin STEM eğitimine yönelik görüşlerini inceleyen bir diğer çalışma Eroğlu ve Bektaş (2016) tarafından yapılmıştır. Gülgün, Yılmaz ve Çağlar (2017) fen bilimleri öğretmenleriyle yürüttüğü çalışmada öğretmenlerin STEM eğitimine ilişkin olumlu görüşlere sahip olduğunu ancak ülkemizde uygulama yönünden sorunlar olduğu sonucuna ulaşılmıştır.

Literatür incelendiğinde STEM disiplinleri ve eğitimiyle ilgili yönelik pek çok araştırmanın olduğu görülmektedir. Bu araştırmaların önemli bir bölümünün ise öğrencilere yönelik olduğu dikkati çekmektedir. Öğretmenleri kapsayan çalışmaların ise genellikle öğretmen adaylarıyla gerçekleştirildiği görülmektedir (Ergün, 2020; Kızılay, 2018; Tekerek & Karakaya, 2018). Bu bağlamda doğrudan öğretmenlerin STEM eğitimine yönelik görüşlerini inceleyen çalışmaların sayısının uluslararası literatürle karşılaştırıldığında sınırlı sayıda olduğu görülmektedir (Eroğlu ve Bektaş, 2016; Siew, Amir & Chong, 2015). Ayrıca mevcut çalışmaların genellikle aynı branşta görev yapan öğretmenlere yönelik olduğu; farklı alanlardaki öğretmenlerin görüşlerini inceleyen çalışmaların oldukça sınırlı olduğu dikkati çekmektedir. Eğitim sisteminin en önemli parçalarından biri olan öğretmenlerin STEM eğitimine yönelik görüşlerinin belirlenmesinin önem taşıdığı düşünülmektedir. Bu kapsamda, yapılan bu araştırmanın literatüre katkı sağlayacağı söylenebilir.

Araştırmanın Amacı

Bu araştırmanın amacı çeşitli branşlarda görev yapan öğretmenlerin STEM eğitimine yönelik görüşlerinin incelenmesidir.

Araştırmanın Problemi

Çeşitli branşlarda görev yapan öğretmenlerin STEM eğitimine yönelik görüşleri nelerdir?

Yöntem

Bu bölümde araştırma deseni, çalışma grubu, veri toplama aracı, geçerlik ve güvenirlik, araştırma süreci ve verilerin çözümlenmesine ilişkin başlıklar yer almaktadır.

Araştırma Deseni

Eğitim ortamlarında yürütülen STEM eğitimine yönelik öğretmen görüşlerini inceleyen bu çalışma durum çalışması temelinde nitel bir araştırmadır. Durum çalışması, araştırmacının gerçek yaşamda güncel sınırlı bir sistem hakkında çoklu bilgi kaynakları aracılığıyla derinlemesine bilgi toplayarak, durum temaları ya da durum betimlemeleri ortaya koyduğu nitel bir yaklaşımdır (Creswell & Poth, 2016).

Çalışma Grubu

Genellikle bir grup katılımcı tanımlanarak gerçekleştirilen durum çalışmaları, birbiriyle etkileşim içinde olan, aynı yeri paylaşan birbirini tanıyan kişilerden oluşturulması önerilmektedir (Büyüköztürk vd., 2013). Bu bağlamda mevcut araştırmanın katılımcıları, amaçlı örnekleme yöntemiyle seçilen, Afyonkarahisar ili Çay ilçesinde birbirleriyle çeşitli projeler düzenleyen, çeşitli branşlarda görev yapan 7 öğretmenden oluşturulmuştur. Araştırmada zengin bilgiye sahip olduğu düşünülen durumların daha derinlemesine incelenmesine olanak sunması (Patton, 1987) nedeniyle amaçlı örnekleme yönteminden faydalanılmıştır. Çalışma grubuna ilişkin demografik bilgiler Tablo 1'de gösterilmiştir.

Tablo 1. Öğretmenlere ait demografik bilgiler

Öğretmen	Cinsiyet	Yaş	Branş
Öğretmen 1	Erkek	41	Bilişim Teknolojileri
Öğretmen 2	Kadın	33	İngilizce
Öğretmen 3	Kadın	45	İngilizce
Öğretmen 4	Erkek	28	İngilizce
Öğretmen 5	Kadın	38	Bilişim Teknolojileri
Öğretmen 6	Kadın	41	Matematik
Öğretmen 7	Erkek	31	Fen Bilgisi

Veri Toplama Aracı

Araştırma verilerinin toplanmasında yapılandırılmış görüşme formlarından yararlanılmıştır. Araştırma kapsamında iki bölümden oluşan görüşme formlarının ilk bölümünde katılımcıların demografik bilgilerine ilişkin sorular; iki bölümde ise, araştırmacılar tarafından ilgili alan yazın taraması yapılarak taslak sorular haline getirilip uzman görüşüne sunularak son hali verilen açık uçlu yedi soru bulunmaktadır.

Araştırma Süreci ve Verilerin Çözümlenmesi

Araştırma verileri toplanmadan önce çalışma grubuna araştırmacı tarafından "Üç Boyutlu Tasarım ve Üretim Süreçlerinde STEM Eğitimi Uygulamaları" adlı bir eğitim verilmiştir (Araştırmacı doktora tezi bütünleşik STEM eğitimi kapsamında gerçekleştirmiştir). Bu eğitim içinde teorik ve pratik uygulamalar içeren ve araştırmacı tarafından daha önce farkı gruplara da verilmiştir. Eğitimlerin sona ermesinin ardından görüşme soruları elektronik ortamda katılımcılara iletilmiştir. Elektronik formda, soruların doğru bir yanıtının olmadığı, katılımcıların kimliklerinin gizli tutularak verdikleri cevapların yalnızca bilimsel amaçlarla kullanılacağı vurgulanmıştır. Katılımcıların gerçek isimleri yerine takma isimler kullanılmıştır.

Çalışma grubundan elde edilen araştırma verileri, nitel araştırma yöntemlerinde sıklıkla kullanılan içerik analizi yöntemiyle çözümlenmiştir. İçerik analizi, metinlerin sınıflandırılıp düzenlenmesinde, karşılaştırılıp teorik

	International Conference on	
	Research in Education and Science	
www.icres.net	April 1-4, 2021 Antalya, TURKEY	www.istes.org

sonuçların ortaya çıkarılmasında etkili olan bir yöntemdir (Cohen, Manion & Morrison, 2007). Verilen cevaplar araştırmacılar tarafından detaylı bir şekilde değerlendirilerek katılımcıların görüşlerini yansıtan kodlar oluşturulmuştur. Ardından birbiriyle ilişkili kodlar bir araya getirilerek tema ve alt temalar oluşturulmuştur. Son olarak birbiriyle ilişkilendirilen tema ve kodlar yorumlanarak süreç sonuçlandırılmıştır.

Geçerlik ve Güvenirlik

Araştırmanın geçerlik ve güvenirliğini sağlamak adına birtakım önemler alınmıştır (Büyüköztürk vd., 2013; Gibbs, 2007; Yıldırım & Şimşek, 2011). İç geçerliğin sağlanması için uzman incelemesi ve katılımcı teyidinden yararlanılmıştır. Araştırmacılar tarafından hazırlanan görüşme formu için uzman görüşü alınmıştır. Ayrıca 1 öğretim üyesi ve 2 öğretmenden görüşme sorularına ilişkin okunabilirlik ve anlaşılabilirlik değerlendirmesi istenmiştir. Geri bildirimler doğrultusunda görüşme formu düzenlenerek son halini almıştır. Analiz sürecinde konu alanında uzman bir araştırmacıyla birlikte değerlendirme toplantıları yapılarak iç geçerliğin artırılmaya çalışılmıştır. Veri toplama sürecinin ardından araştırmacı topladığı verileri özetlemiş ve katılımcılara konuya ilişkin bir rapor göndererek katılımcı teyidi yapmıştır. Araştırmanın dış geçerliğini sağlamak için araştırma deseni, çalışma grubu, veri toplama araçları, veri toplama süreci, verilerin analizi ve bulgular detaylı bir biçimde betimlenmiştir.

Güvenirliğin sağlanması için verileri 2 araştırmacı tarafından analiz edilerek kod ve temalar oluşturulmuştur. Araştırmacılar arasındaki görüş birliği için uyum yüzdesinden yararlanılmıştır. Bu araştırmadaki uyum yüzdesi %92 olarak hesaplanmıştır. Miles ve Huberman (1994) uyum yüzdesinin %70 ve üzeri olmasının araştırmanın güvenirliği için yeterli olduğunu belirtmektedir. Ayrıca elde edilen bulgular katılımcıların doğrudan görüşleriyle yorum yapılmadan sunulmuştur. Araştırmacı, elde ettiği verileri kodlarken sürekli ham verilerle karşılaştırarak olası hataların önüne geçmeye çalışmıştır. Bulgular ve sonuç bölümleri arasındaki tutarlılık durumu araştırmacılar tarafından tartışılarak fikir birliğine varılmıştır.

Bulgular

Verilerin analizi sonucu öğretmen görüşlerinden elde edilen veriler çözümlenerek bir kelime bulutu oluşturulmuştur. Böylelikle öğretmenlerin yapılandırılmış görüşme formunda hangi kelimeleri daha yoğun bir şekilde vurguladığı ortaya çıkarılmıştır. Öğretmenlerin STEM eğitimine yönelik sorularda yoğun bir biçimde kullandığı kelimelerden bazıları şunlardır: STEM (n=26), eğitim (n=15), disiplinler arası (n=11), teknoloji (n=11), öğrenci (n=10), entegrasyon (n=9).

Şekil 1. Öğretmen Görüşlerine İlişkin Kelime Bulutu

STEM'e Yönelik Tanım Temasına İlişkin Bulgular

Öğretmen görüşlerinden elde edilen verilerin analizi "STEM'e Yönelik Tanım" temasının altı koddan oluştuğunu göstermektedir: (1) Multidisipliner, (2) Yaklaşım, (3) Yaparak yaşayarak öğrenme, (4) Model, (5) Etkin teknoloji, (6) Disiplinler arası ahenk.

Şekil 2. STEM'e Yönelik Tanım Temasına İlişkin Kodlar

Şekil 2 incelendiğinde çalışma grubundaki öğretmenlerin tamamının STEM eğitimine yönelik tanımlarında multidisipliner yani disiplinler arası kavramını vurguladıkları görülmektedir. Konuya ilişkin bazı öğretmen görüşleri şu şekildedir:

    Öğretmen 1: "...4 disiplinin birlikte kullanılmasıdır."

    Öğretmen 3: "Pek çok kişinin yeni bir metot olarak algıladığı, oysa özellikle eski Türk insanının pratik

	International Conference on	
ICRES	**Research in Education and Science**	**istes** Organization
www.icres.net	April 1-4, 2021 Antalya, TURKEY	www.istes.org

zekasıdır STEM. Mesela, Karadeniz bölgesinde yıllar öncesinde derelerin üzerinden ve hızlı geçiş sistemini yaparken, ihtiyaç duyulan malzeme, sağlamlık, kurulacak sistem üzerinde düşünür ve sonrasında inşa ederken, fizik, matematik ve mühendislik disiplinlerinden faydalanmıştır insan."

Yaparak yaşayarak öğrenme ve yaklaşım da katılımcılar tarafından vurgulanan diğer kavramlardır. Bazı öğretmenler STEM eğitiminin bir model olarak açıklarken bazıları yaklaşım kavramını kullanmayı tercih etmiştir. Bu konuya ilişkin görüşlerden bazıları şu şekildedir:

Öğretmen 5: "Birçok dersin birbiri içerisinde kullanarak, dersi yaparak uygulayarak daha anlaşılır duruma getirmek."

Öğretmen 7: "Fen, teknoloji, mühendislik ve matematik alanlarına özgü bilgi ve becerileri kullanarak bir problemin çözümüne disiplinler arası bir yaklaşımda bulunmaktır."

Öğrenciye Etki Temasına İlişkin Bulgular

STEM eğitimine ilişkin bulgulardan ikincisi STEM eğitimi uygulamalarının öğrencilere olan etkisi ile ilgili görüşlerdir. Katılımcılardan elde edilen veriler analiz edildiğinde 1 alt tema ve toplam 7 kodun ortaya çıktığı görülmektedir. Oluşturulan alt tema ve kodlar: (1) 21. Yüzyıl becerileri, (1.1) Yaratıcılık, (1.2) Problem çözme, (1.3) Eleştirel düşünme, (1.4) Verimlilik ve üretkenlik (2) Uygulama becerileri, (3) Bütüncül bakış açısı, (4) Derse ilgi ve katılım.
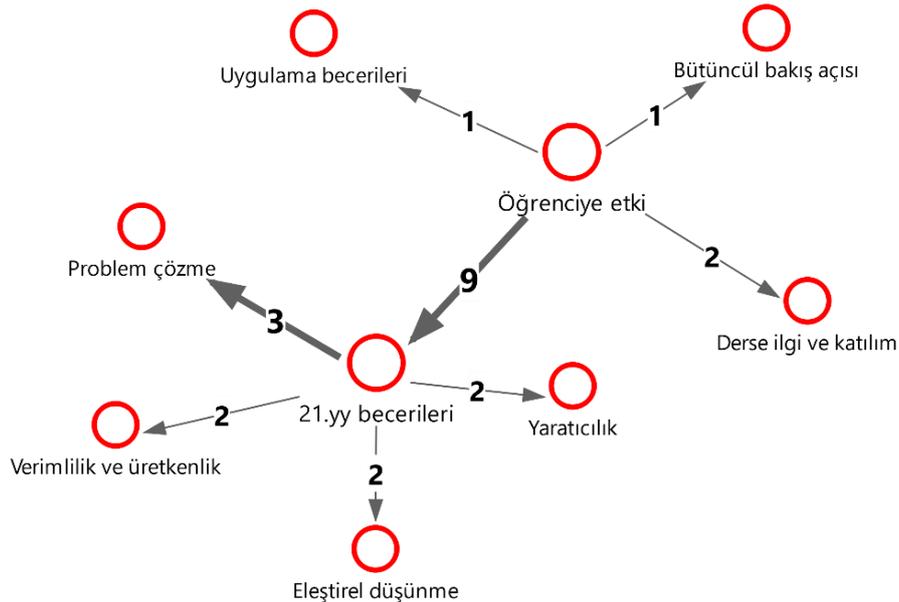
Şekil 3. Öğrenciye Etki Temasına İlişkin Alt Tema ve Kodlar

Şekil 3 incelendiğine öğretmenlerin "öğrenciye etki" temasında farklı fikirlerde olduğu görülmektedir. Öğretmen görüşlerinin özellikle 21. Yüzyıl becerilerini öne çıkardığı dikkati çekmektedir. Öğretmen görüşlerinden elde edilen bulgular göz önüne alındığında STEM eğitiminin; problem çözme, derse ilgi ve

katılım bakımından önemli etkileri olduğunu göstermektedir. Bu konuya ilişkin bazı öğretmen görüşleri şu şekildedir:

> *Öğretmen 2: "...Öğrenciler üzerinde başta problem çözme, eleştirel düşünme, yaratıcılık olmak üzere 21. yüzyıl becerilerinin gelişimine katkı sağlayacaktır..."*
>
> *Öğretmen 1: "STEM eğitimi uygulamaları öğrencinin derse ilgisini ve kavrama düzeyini artırır..."*
>
> *Öğretmen 4: "...Öğrencilerin eleştirel düşünme ve uygulama becerilerini geliştirecektir. Derse etkin katılımları sağlanacaktır."*

Öğretmen görüşlerinin üzerinde durduğu diğer kavramlar eleştirel düşünme, yaratıcılık, verimlilik ve üretkenliktir. Bu başlıklara yönelik bazı öğretmen görüşleri şu şekildedir:

> *Öğretmen 7: "...STEM eğitiminin öğrencilere pek çok anlamda katkısı olacaktır. Bunlardan en önemlileri ise hayal gücü ve yaratıcılık becerileridir..."*
>
> *Öğretmen 3: "STEM eğitiminin bizlere yapacağı en büyük iyilik Eleştirel düşünebilen, üretebilen öğrencilerin sayısının artmasıdır..."*
>
> *Öğretmen 1: "Anlama ve uygulama verimliliğini artırır."*

Türkiye'de STEM Eğitimi Temasına İlişkin Bulgular

Türkiye'de uygulanan STEM eğitimine ilişkin öğretmen görüşlerinin değerlendirildiği bu tema, bir alt tema ve altı koddan oluşmaktadır: (1) Yetersiz, (2) Temenni, (3) Uygulanmıyor, (4) Yanlışlar, (4.1) Popülist, (4.2) Yanlış anlaşılma, (4.3) Yetkin olmayan kişi ve kurumlar.
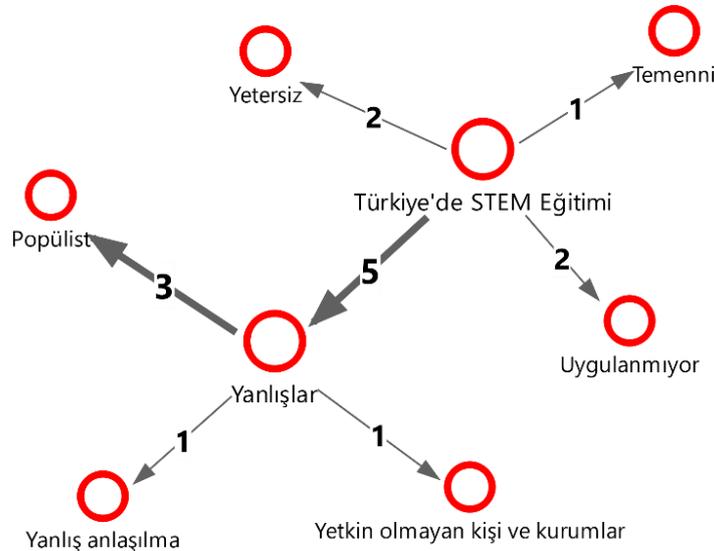
Şekil 4. Türkiye'de STEM Eğitimi Temasına İlişkin Alt Tema ve Kodlar

Şekil 4 incelendiğinde öğretmen görüşlerinin Türkiye'de uygulanmaya çalışılan STEM eğitimine yönelik

olumsuz görüşlere sahip olduğu görülmektedir. STEM eğitimine Türkiye'de popülist yaklaşıldığı, yapılmaya çalışılanların yetersiz olduğu ve çoğu yerde de sadece kâğıt üzerinde uygulandığı dikkati çekici bulgular arasındadır. STEM eğitimine popülist yaklaşıldığını ifade eden bazı öğretmen görüşlerinden biri şu şekildedir:

> *Öğretmen 1: "Dürüst olmak gerekirse ülkemizde STEM eğitimine yönelik girişimlerin büyük bir kısmının popülist olduğunu düşünüyorum. Büyük bir kısmı samimiyetten uzak, gösteri amaçlı... Gerek okul seviyesinde gerekse de idari (ilçe MEM, il MEM, bakanlık) seviyede popülist yaklaşıldığı düşüncesindeyim..."*

> *Öğretmen 7: "Ülkemizde büyük bir kesim tarafından gösteri, reklam amaçlı kullanılıyor... Maksat yapmış gibi olmak..."*

STEM eğitiminin Türkiye'de yanlış anlaşıldığını, uygulama sorunları olduğunu ve yetersiz kaldığını vurgulayan öğretmen görüşlerinden bazıları ise şu şekildedir:

> *Öğretmen 7: "...Ayrıca robotik uygulamaları da STEM gibi algılanmaktadır. Bunlar tek başına STEM uygulaması olarak değerlendirilemez. Ülkemizde doğru uygulandığını düşünmüyorum..."*

> *Öğretmen 3: "STEM ile ilgili ülkemizde çalışmalar olduğunu görmek güzel ama ne yazık ki yeterli değil... Ayrıca STEM ile568 ilgili öğretici kurslar vardır, ama çoğunun içi yetkin olmayan kişiler sebebiyle boştur..."*

> *Öğretmen 4: "...Yeterli olduğunu düşünmüyorum. Çünkü ciddi bir şekilde STEM eğitiminin doğru şekilde ne anlatıldığını ne de uygulandığını düşünmüyorum..."*

Yapılan Hatalar Temasına İlişkin Bulgular

STEM eğitiminin uygulanması sürecindeki yanlışlara yönelik öğretmen görüşlerinin incelendiği bu tema altı kod altında ele alınmıştır: (1) Ticari bakış açısı, (2) Yüzeysellik, (3) Anlaşılamama, (4) Moda, (5) Belirli sınıf düzeyine odaklanma, (6) Branş sınırlılığı.
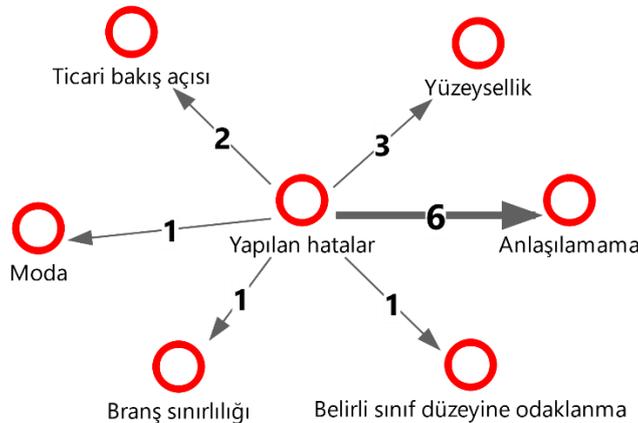
Şekil 5. Yapılan Yanlışlar Temasına İlişkin Kodlar

Şekil 5 incelendiğinde öğretmen görüşlerinin STEM eğitimin doğru olarak anlaşılamaması üzerinde yoğun bir

ICRES
International Conference on
Research in Education and Science
www.icres.net   April 1-4, 2021   Antalya, TURKEY   www.istes.org

şekilde görüş bildirdiği görülmektedir. Bu tema altında Türkiye'de STEM eğitimi temasından elde edilen bulguları destekleyen görüşlerin olduğu dikkati çekmektedir. Öğretmenlerin konuya ilişkin bazı görüşleri şu şekildedir:

> *Öğretmen 7: "STEM eğitimi ne yazık ki çok ama çok yanlış anlaşılıyor…Her problem çözme STEM değildir. Robotik uygulamaları STEM değildir. Robotik uygulamaları STEM için sadece bir araç olabilir…"*
>
> *Öğretmen 5: "Hazır Robotik setlerle STEM Eğitimi adı altında sözde eğitimler verilmesi."*
>
> *Öğretmen 4: "…STEM eğitimi tam anlaşılamadığı için nasıl kullanılır boyutu çözülememektedir."*
>
> *Öğretmen 3: "…STEM için mutlaka son teknoloji ürünü araçların olması gerektiği düşüncesi yanlıştır. Her şeyden önce STEM'in doğasını anlamak gerek…"*
>
> *Öğretmen 2: "…En büyük yanlışta STEM eğitiminin sadece bir etkinlik ya da proje olduğunu sanmak…"*

STEM eğitimine olan yüzeysel bakış açısı, ticari kaygılar öğretmenler tarafından dile getirilen bir diğer sorunlar arasındadır. Konuya ilişkin bazı öğretmen görüşleri şu şekildedir:

> *Öğretmen 6: "…Okul buna destek vermiyor sadece MEB istediği için bilgisi bu kadar idarenin kulüp kuruldu ama zaman yok çalışmak için evrak üzerinde işte…"*
>
> *Öğretmen 1: "…Basit te olsa böyle bir çalışma yaptık", "Olsun başlangıç için bu da yeterli" gibi yaklaşımlardan bir an önce vazgeçip daha ciddi çalışmalar yapılmalı…"*
>
> *Öğretmen 3: "Ne yazık ki bazı çevreler tarafından tamamen ticarete döndü… Set satalım, set alalım. Hazır uygulamalar yapalım. Bu şekilde STEM olmaz, olmamalı…"*

Ayrıca Öğretmen 3 STEM eğitimine yönelik çalışmaların belirli alanlara (fen, matematik vb.) yoğunlaştığını bunun dışında kalan alanların ise göz ardı edildiğini ifade etmiştir. Benzer şekilde STEM eğitimine yönelik çalışmaların belli kademeler de yoğunlaştığını bunun her kademelerde uygulanması gerektiğini şu şekilde vurgulanmıştır:

> *Öğretmen 3: "Tüm kademelerde STEM eğitimine yönelik çalışmaların olmaması önemli bir yanlıştır. 21. yüzyıl becerileri var olacak veya mevcut tüm öğrencilerin kazanması gereken nitelikleri içermektedir. Bu sebepten, acilen, her sınıf düzeyi için planlanması gerekenler vardır. STEM için mutlaka son teknoloji ürünü araçların olması gerektiği düşüncesi yanlıştır. Branş kısıtlaması yanlıştır. STEM'in doğasındaki disiplinler arası çalışma anlayışını ön plana çıkarmak, sayısal dersler mi sözel dersler mi karmaşasını ortadan kaldıracaktır."*

Entegrasyon Temasına İlişkin Alt Tema ve Kodlar

Öğretmen görüşlerinden elde edilen son tema entegrasyondur. Bu tema kendi içinde problemler ve öneri alt temasına ayrılmıştır. Problemler alt teması, STEM entegrasyonu sürecinde ya da sonucunda ortaya çıkan sorunlara ilişkin kodlardan oluşmaktadır. Öneriler alt teması ise STEM entegrasyonunun daha etkili olabilmesi için sunulan önerileri içermektedir. Sırasıyla bu alt temalara ilişkin kodlar şu şekildedir: (1) Zaman kısıtlılığı,

(2) Bilgi karmaşası, (3) Geleneksel sınıf düzeni, (4) Belli branşlar, (5) Müfredat, (6) Öğretmen yeterliliği, (7) Örnek çalışmalar, (8) Alt yapı ve donanım, (9) Hizmet içi eğitim.
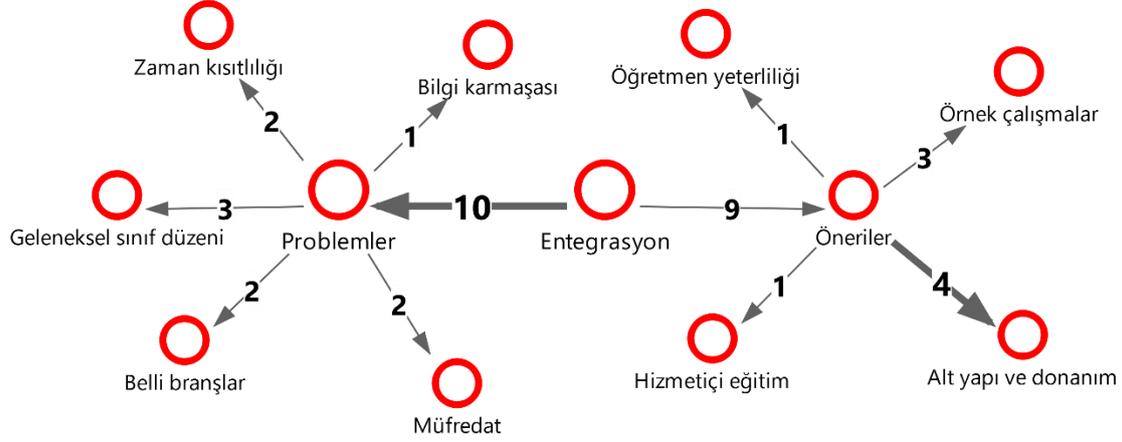
Şekil 6. Entegrasyon Temasına İlişkin Alt Tema ve Kodlar

Şekil 6 incelendiğinde öğretmen görüşlerinin problem ve öneri alt temasında benzer sayıda olduğu görülmektedir. Öneriler alt teması incelendiğinde öğretmen görüşlerinin alt yapı ve donanım ile örnek çalışmalar üzerinde yoğunlaştığı görülmektedir. Genel itibariyle öğretmenlerin eğitim ortamlarına STEM entegrasyonunun sağlanması için alt yapı ve donanım eksikliklerinin giderilmesi üzerinde durduğu söylenebilir.

> *Öğretmen 2: "...STEM'in eğitim ortamlarına entegrasyonunun sağlanabilmesi için öncelikle okullarımızın bu eğitim yaklaşımına yönelik teknik ve alt yapılarının uygun olması gerekir... STEM eğitiminin etkililiğini artırmak istiyorsak proje tabanlı öğrenmeye uygun okullara sahip olmalıyız..."*
>
> *Öğretmen 5: "...gerekli materyal ve ortam sağlandığında olabilir."*
>
> *Öğretmen 3: "İhtiyaç olan atölye düzenidir. Bu olmadıkça herhangi bir kolaylık yoktur. Sonuç olarak tüm sınıflar atölye düzenine dönüştürülmeli, okullara gerekli donanım sağlanmalıdır..."*

Öğretmen görüşlerinin ortaya çıkardığı diğer konu ise STEM eğitimine yönelik rehber niteliğindeki çalışmaların sayısının artırılmasıdır. Ayrıca bazı öğretmenler öğretmenlerin konular hakkında bilgilendirilmesi gerektiğini ifade etmiştir. Konulara ilişkin bazı öğretmen görüşleri şu şekildedir:

> *Öğretmen 1: "En kısa sürede daha ciddi çalışmalar yapılarak, branş bazında bol örneklerle eğitim sistemimize entegre edilmeli..."*
>
> *Öğretmen 7: "...ders içerisine entegre etmekten ziyade STEM yaklaşımına dayalı öğretim programları geliştirilerek dersler bu kapsamda şekillendirilmelidir."*
>
> *Öğretmen 3: "Bu entegrasyonu gerekli buluyorum. Her ne kadar STEM var olana koyulmuş bir isimse de teknolojiyi kullanmada ve eğitim sisteminde yapılan yanlışlar, STEM becerilerinin körelmesine sebep olmuştur. Bu yüzden, yeniden ortaya çıkarılması STEM'in doğru uygulanması sayesinde olacaktır. Ancak bunun için tüm branş öğretmenlerinin eğitim alması gerekmektedir."*

Problemler alt temasında ise öne çıkan kavramlardan ilki geleneksel sınıf düzenidir. Bunu zaman kısıtlılığı, müfredat ve belli branşlar takip etmektedir. Bazı öğretmenlerin konuya ilişkin görüşleri şu şekildedir:

Öğretmen 3: "Mevcut sınıf düzeni ders sürecini zorlaştırır, çünkü kilise düzeninde oturan öğrencilerin olduğu sınıfların oluşumu, başlı başına iletişimsizlik, takım halinde çalışamama, yaratıcı olamama gibi olumsuzluklar üzerine kuruludur... STEM çoğunlukla sayısal alanı ilgilendiriyor görünse de, doğası farklı disiplinlerin bir arada çalışarak bir ürün ortaya koyması anlamına gelmektedir..."

Öğretmen 5: "...materyallerin güncellenmemesi ve derslik sıkıntısı dersi sıkıntılı hale getirebilir."

Öğretmen 4: "...bir konuyu doğrudan kolayca anlatmak varken illa etkinliklerle vermeye çalışmak gereksiz zaman kaybı ve bilgi karmaşası oluşturabilir."

Tartışma ve Sonuç

Bu araştırmada çeşitli branşlarda ve farklı kademelerde görev yapan öğretmenlerin STEM eğitimine yönelik genel görüşleri incelenmiştir. Eğitim sisteminin en önemli unsurlarından biri olan öğretmenlerin STEM eğitimine ilişkin görüşlerinin derinlemesine incelenmesi oldukça önemlidir. Öğretmenlerden alınan görüşler genel olarak incelendiğinde bir takım problem, eleştiri ve öneriler olmasına rağmen olumlu nitelikte olduğu görülmektedir. Literatürde bu sonucu destekleyen pek çok çalışma vardır (Erdogan & Ciftci, 2017; Siew, Amir, & Chong, 2015; Freeman, Alston, & Winborne, 2007; Gülgün, Yılmaz, & Çağlar, 2017).

Araştırma sonuçlarından ilki öğretmenlerin STEM eğitimini nasıl tanımladığı ile ilgilidir. Burada elde edilen temel sonuç öğretmenlerin STEM eğitimini disiplinler arası bir yaklaşım olarak ele almış olmasıdır. Literatürde elde edilen bu sonuçla benzer nitelikte çalışmalar olduğu görülmektedir (Bakırcı & Kutlu, 2018; Eroğlu & Bektaş, 2016). Nitekim katılımcılardan STEM eğitimine yönelik tanım yapmaları istendiğinde hemen hemen hepsinin "fen, matematik, teknoloji ve mühendislik disiplinlerinin birlikte kullanımı" şeklinde tanımladığı görülmektedir. Elde edilen bu bulgu öğretmenlerin STEM eğitimine yönelik genel bir fikre sahip olduğu şeklinde yorumlanabilir.

Öğrenciye etkisi temasında öğretmenlerin genel olarak STEM eğitiminin öğrencilere olan olumlu etkilerinden bahsettikleri görülmüştür. Bunların başında da problem çözme, eleştirel düşünme ve yaratıcılık gibi temel 21. yüzyıl becerileri gelmektedir. Ayrıca derse olan ilgi, bütüncül bakış açısı ve uygulama becerileri öğretmenler tarafından STEM eğitiminin olumlu etkileri arasında gösterilmiştir. STEM eğitimi, öğrencilerin farklı disiplinleri bütünleştirerek araştırma, problem çözme ve takım çalışması becerilerinin gelişmesini sağlamaktadır. Bu da günlük yaşam problemlerini çözebilen ve toplumun ihtiyaçlarına çözüm üretebilen ve içinde bulunduğu yüzyıla uyum sağlayabilen bireylerin yetiştirilmesine katkı sağlayacaktır (Kızılay, 2018). Uğraş (2017) tarafından okul öncesi öğretmenlerle yapılan bir araştırmaya göre STEM eğitimi, öğrencilere disiplinler arası bakış açısı, problem çözme, bilimsel süreç ve 21. yy. becerileri kazandıracağı sonucuna ulaşılmıştır. Yürütülen çalışma ile benzer sonuçları taşıyan farklı araştırmaların da olduğu görülmektedir (Kim & Choi, 2012; Riskowski vd., 2009; Thomas, 2014).

ICRES

International Conference on
Research in Education and Science

www.icres.net | April 1-4, 2021 | Antalya, TURKEY | www.istes.org

istes
Organization

Bir diğer sonuç, Türkiye'de uygulanmaya çalışılan STEM eğitimine yönelik görüşleri içermektedir. Bu tema incelendiğinde genellikle olumsuz görüşlerin olduğu dikkati çekmektedir. Bu konuya ilişkin öğretmen görüşlerinin STEM eğitiminin ülkemizde hakkıyla uygulanamadığı, yetersiz kaldığı ve genellikle gösteri amaçlı kullanıldığı şeklinde olduğu görülmektedir. Bu bağlamda Altunel (2018) yapmış olduğu çalışmada STEM eğitiminin doğasına aykırı uygulamalara işaret etmiştir. Bu bağlamda özellikle özel okulların "STEM eğitimi yapıyoruz!" "STEM laboratuvarımız var!" gibi genellikle ticari kaygıların ön planda tutulduğu çalışmaların yanlış olduğunu vurgulamıştır. Ayrıca Akgündüz (2016), "STEM'i Rahat Bırakın: Türkiye'de STEM Adına Yapılan Hatalar ve Öneriler" başlıklı çalışmasında ülkemizde STEM eğitimine yönelik yapılan hataları şu şekilde özetlemiştir: (1) Yapılan tüm bilimsel etkinliklerin STEM eğitimi olarak adlandırılması, (2) STEM eğitiminin sadece robotik setler aracılığıyla yapıldığı düşüncesi, (3) STEM eğitiminin Maker hareketi ile karıştırılması, (4) STEM eğitiminin bir model ve öğretim tekniği olarak algılanması, (5) Çeşitli programlama etkinliklerinin STEM eğitimi sanılması.

Araştırmanın sonuçlarından bir diğeri STEM eğitiminde yapılan yanlışlar ve problemlerdir. Öğretmen görüşlerinin büyük bir kısmı STEM eğitimindeki en büyük yanlışın STEM eğitimini doğru anlayamamak, geleneksel sınıf düzeni, zaman kısıtlılığı, müfredata uygunluk olduğu görülmektedir. Eroğlu ve Bektaş (2016), STEM eğitiminin zaman, malzeme, amaç haline getirme ve konuya hâkim olma zorunluluğu gibi olumsuzluklara sahip olduğunu belirtmiştir. Siew, Amir ve Chong, (2015)'da yaptıkları çalışma da benzer sonuçlara ulaşmıştır. Ayrıca öğretmenlerin üzerinde durduğu bir diğer konu STEM uygulamalarının müfredatın içinde yer verilmesinin güç olmasıdır. 2018 yılında itibaren öğretim programları STEM eğitimine uygun hale getirilmeye çalışılsa da bu yönde birtakım problemlerin olduğu görülmektedir. Literatür incelendiğinde bu sonucu destekleyen bazı çalışmaların olduğu görülmektedir (Özcan & Koştur, 2018; Uğraş, 2017).

Bu araştırmada alt yapı ve donanım, öğretmen yeterlilikleri, örnek çalışmaların niteliğinin ve niceliğinin artırılması STEM entegrasyonuna yönelik öneriler olarak ortaya çıkmıştır. Corlu, Capraro ve Capraro (2014), STEM eğitiminin öğretmen eğitimine olan etkisini incelediği araştırmada ihtiyaç olan iş gücünü karşılayacak yeterliliklere sahip öğretmenlere sahip olunmadığını öne sürmektedir. Akgündüz vd. (2015) tarafından hazırlanan STEM Türkiye Raporu'nda da benzer sonuçlara ulaşıldığı görülmektedir. Literatürdeki çalışmalar da dikkate alındığında özellikle öğretmenlerin STEM eğitimine yönelik farkındalık, bilinçlendirme ve yeterliliklerinin artırılması önem taşımaktadır. Nitekim, Stolhmann vd. (2012) öğretmenlerin STEM uygulamalarını sınıf ortamında gerçekleştirme sürecinde problem yaşadıklarını ve kendilerini yetersiz hissettiklerini ifade etmiştir. Bu yetersizlik hissinin ortadan kaldırılması için öğretmenlere bu konularda destek verilmesi hatta gerekli durumlarda hizmet içi eğitimler düzenlenmesi önem taşımaktadır.

Araştırmada sıklıkla vurgulanan donanım ve alt yapı eksikliği STEM eğitiminde tartışmalı bir konudur. Bazı araştırmacılar donanım ve alt yapı eksikliğinin STEM eğitiminde önemli bir sorun olduğunu ifade etmektedir (Brown vd., 2011; Gebbie, Ceglowski, & Taylor, 2012). Siew, Amir, & Chong (2015) tarafından yapılan araştırmada, STEM eğitimi uygulamalarının geniş zamana ve bütçeye ihtiyacı olduğu, uygulamaların gerçekleştirileceği okulların asgari düzeyde teknolojik alt yapıya sahip olması gerekliliği vurgulanmıştır. Benzer

ICRES

**International Conference on
Research in Education and Science**

istes
Organization

www.icres.net   April 1-4, 2021   Antalya, TURKEY   www.istes.org

şekilde Bakırcı ve Kutlu (2018), öğretmenler ile gerçekleştirdiği çalışmasında, okullarda teknolojik araç ve laboratuvar malzemesi eksikliği olduğunu, özellikle devlet okullarında STEM yaklaşımını uygulayabilmenin zor olduğunu vurgulamıştır.

Bu araştırmada ekipman ve donanım eksikliği birçok öğretmen tarafından önemli bir eksik olarak dile getirilmiş olsa da basit materyaller aracılığıyla da etkili STEM eğitimi uygulamalarının gerçekleştirilebileceğini birkaç öğretmen dile getirmiştir. Nitekim bazı öğretmenler STEM eğitimi için pahalı robotik setlere ihtiyaç olmadığı, bu tarz girişimlerin büyük bir kısmının göz boyama ve gösteri amaçlı olduğu şeklinde görüş bildirmiştir. Literatürde benzer sonuçlara sahip çalışmaların olduğu görülmektedir (Altunel, 2018).

Sınırlılıklar

Bu araştırmanın amacı farklı branşlarda görev yapan ve STEM eğitimi konusunda farkındalığa sahip olan öğretmenlerin STEM eğitimine yönelik görüşlerini belirlemeyi amaçlamaktadır. Bu araştırma öğretmenlerin STEM eğitimine yönelik görüşleri ile sınırlandırılmıştır.

Öneriler

Çalışma sonucunda elde edilen bulgular temel alınarak araştırmacılara STEM eğitimine ilişkin yeni araştırmalar için aşağıda belirtilen öneriler yapılabilir:

- Farklı eğitim seviyesinde ve branşlarda görev alan öğretmenlerin görüşleri incelenebilir.
- Eğitim fakültelerinde STEM eğitimi ile ilgili derslere yer verilerek öğretmen adaylarının STEM eğitimine ilişkin bilinçlendirilmeleri sağlanabilir.
- Öğretmenlere STEM eğitimine yönelik farkındalık ve becerilerin kazandırılması için hizmet içi eğitimler düzenlenebilir.
- STEM alanında verilen eğitimler belli branşlar (fen, matematik vb.) ile sınırlandırılmayıp, farklı branşlardaki öğretmenlere de verilerek, STEM eğitiminin uygulama alanı genişletilmelidir.
- Öğretmenlerin ders uygulamalarının gözlemlendiği uzun süreli bir etkileşimin söz konusu olduğu bir araştırma planlanabilir.

References

Akgündüz, D. (2016). *STEM'i Rahat Bırakın: Türkiye'de STEM Adına Yapılan Hatalar ve Öneriler [Leave STEM alone: Mistakes and Suggestions Made on behalf of STEM in Turkey].* https://www.egitimpedia.com/stemi-rahat-birakin-turkiyede-stem-adina-yapilan-hatalar-ve-oneriler/, Erişim Tarihi [Date of Access]: 01.04.2019.

Akgündüz, D., Aydeniz, M., Çakmakçı, G., Çavaş, B., Çorlu, M. S., Öner, T., & Özdemir, S. (2015). STEM eğitimi Türkiye raporu [STEM education Turkey report]. *İstanbul: Scala Basım [Scala Press].*

Akgündüz, D., Ertepınar, H. Aydeniz, M., Çakmakçı, G., Çavaş, B., Çorlu, M. S., Öner, T., & Özdemir, S. (2015). *STEM Eğitimi Türkiye Raporu: Günün Modası mı Yoksa Gereksinim mi? [STEM Education Turkey Report: Today's Fashion or Necessity?]* İstanbul: İstanbul Aydın Üniversitesi STEM Merkezi ve Eğitim Fakültesi [Istanbul Aydın University STEM Center and Faculty of Education].

Altunel, M. (2018). *STEM Eğitimi ve Türkiye: Fırsatlar ve Riskler [STEM Education and Turkey: Opportunities and Risks].* Seta Perspektif [Seta Perspective]. https://setav.org/assets/uploads/2018/07/ STEM_Eg%CC%86itimi-1.pdf, Erişim Tarihi [Date of access]: 30.03.2020

Bakırcı, H., & Kutlu, E. (2018). Fen bilimleri öğretmenlerinin FeTeMM yaklaşımı hakkındaki görüşlerinin belirlenmesi [Determining the views of science teachers about the STEM approach]. *Turkish Journal of Computer and Mathematics Education*, *9*(2), 367-389.

Berlin, D. F., & Lee, H. (2005). Integrating science and mathematics education: Historical analysis. *School Science and Mathematics*, *105*(1), 15-24.

Brown, R., Brown, J., Reardon, K., & Merrill, C. (2011). Understanding STEM: current perceptions. *Technology and Engineering Teacher*, *70*(6), 5-9.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö.E., Karadeniz, Ş. ve Demirel, F. (2008). Bilimsel araştırma yöntemleri [Scientific research methods]. Ankara: Pegem Yayınları [Pegem Press].

Bybee, R. W. (2010). Advancing STEM Education: A 2020 vision. *Technology and Engineering Teacher*, *70*(1), 30-35.

Capraro, R. M., Capraro, M. M., Barroso, L. R., & Morgan, J. R. (2016). Through biodiversity and multiplicative principles Turkish students transform the culture of STEM education. *International Journal of Education in Mathematics, Science and Technology*, *4*(1), 1-8.

Carnevale, A. P., Smith, N., & Melton, M. (2011). *STEM: Science Technology Engineering Mathematics.* Washington: Georgetown University Center on Education and the Workforce. https://files.eric.ed.gov/fulltext/ED525297.pdf, Erişim Tarihi [Date of access]: 30.03.2020.

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education*. New York: Routledge.

Corlu, M. S., Capraro, R. M., & Capraro, M. M. (2014). Introducing STEM education: implications for educating our teachers for the age of innovation. *Egitim ve Bilim*, *39*(171), 74-85.

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches.* Sage publications.

Daugherty, M. K. (2013). The Prospect of an "A" in STEM education. *Journal of STEM Education: Innovations and Research*, *14*(2), 10-15.

Erdogan, I., & Ciftci, A. (2017). Investigating the Views of Pre-Service Science Teachers on STEM Education Practices. *International Journal of Environmental and Science Education*, *12*(5), 1055-1065.

Ergün, A. (2020). 2012-2018 Yılları Arasında Türkiye'de Gerçekleştirilen STEM Eğitimi Konulu Lisansüstü Tezlerin İncelenmesi [Analysis of Graduate Theses on STEM Education Carried Out in Turkey Between 2012-2018]. *Akdeniz Eğitim Araştırmaları Dergisi [Mediterranean Journal of Educational Research], 14*(31), 393-421. https://doi.org/10.29329/mjer.2020.234.19

Eroğlu, S., & Bektaş, O. (2016). STEM eğitimi almış fen bilimleri öğretmenlerinin STEM temelli ders etkinlikleri hakkındaki görüşleri [Opinions of STEM-trained science teachers about STEM-based course

activities]. *Eğitimde Nitel Araştırmalar Dergisi [Journal of Qualitative Research in Education], 4*(3), 43-67. https://doi.org/10.14689/issn.2148-2624.1.4c3s3m

Freeman, K. E., Alston, S. T., & Winborne, D. G. (2008). Do learning communities enhance the quality of students' learning and motivation in STEM? *The Journal of Negro Education*, *77*(3), 227-240.

Gebbie, D. H., Ceglowski, D., Taylor, L. K., & Miels, J. (2012). The role of teacher efficacy in strengthening classroom support for preschool children with disabilities who exhibit challenging behaviors. *Early Childhood Education Journal*, *40*(1), 35-46.

Gibbs, G. R. (2007). *Thematic Coding and Categorizing. Analyzing Qualitative Data.* London: Sage Publications.

Gülgün, C., Yılmaz, A., & Çağlar, A. (2017). Fen bilimleri dersinde uygulanan STEM etkinliklerinde bulunması gereken nitelikler hakkında öğretmen görüşleri [Teachers' opinions about the qualifications that should be found in STEM activities applied in science lessons]. *Journal of Current Researches on Social Sciences*, *7*(1), 459-478.

Gülgün, C., Yılmaz, A., & Çağlar, A. (2017). Teacher Opinions about the Qualities Required in STEM Activities Applied in the Science Course. *Journal of Current Researches on Social Sciences, 7*(1), 460-478.

Hernandez, P. R., Bodin, R., Elliott, J. W., Ibrahim, B., Rambo-Hernandez, K. E., Chen, T. W., & de Miranda, M. A. (2014). Connecting the STEM dots: measuring the effect of an integrated engineering design intervention. *International Journal of Technology and Design Education*, *24*(1), 107-120.

Holdren, J. P., Lander, E. S., & Varmus, H. (2010). *Report To The President Prepare And Inspire: K-12 Education in Science, Technology, Engineering, And Math (STEM) For America's Future*. Executive Office of the President President's Council of Advisors on Science and Technology (PCAST) https://nsf.gov/attachments/117803/public/2a--Prepare_and_Inspire--PCAST.pdf, Erişim Tarihi [Date of access]: 01.12.2018.

Israel, M., Maynard, K., & Williamson, P. (2013). Promoting literacy-embedded, authentic STEM instruction for students with disabilities and other struggling learners. *Teaching Exceptional Children*, *45*(4), 18-25.

Kızılay, E. (2016). Fen bilgisi öğretmen adaylarının FeTeMM alanları ve eğitimi hakkındaki görüşleri [Opinions of pre-service science teachers about STEM fields and education]. *The Journal of Academic Social Science Studies, 47*, 403-417.

Kim, G. S., & Choi, S. Y. (2012). The effect of creative problem solving ability and scientific attitude through the science based STEAM program in the elementary gifted students. *Elementary Science Education, 31*(2), 216-226.

Kuenzi, J. J. (2008). *Science, Technology, Engineering, and Mathematics (STEM) Education: Background, Federal Policy, and Legislative Action* (Congressional Research Service Reports). http://digitalcommons.unl.edu/crsdocs/35/, Erişim Tarihi [Date of access]: 27.09.2017.

Landicho, C.J.B. (2020). Research Attitudes, Motivations, and Challenges of STEM Education Researchers. *International Journal of Technology in Education (IJTE), 3*(1), 49-61.

Lindsay, K. G. (2020). A Multilevel Binary Logistic Regression Model of Success in Anatomy and Physiology I: A Retrospective Analysis. *International Journal of Research in Education and Science (IJRES), 6*(2),

361-368.

Miles, M. B., & Huberman, A. (1994). *Qualitative data analysis.* USA: Sage Publication.

Minken, Z., Macalalag, A., Clarke, A., Marco-Bujosa, L., & Rulli, C. (2021). Development of Teachers' Pedagogical Content Knowledge during Lesson Planning of Socioscientific Issues. *International Journal of Technology in Education (IJTE), 4*(2), 113-165. https://doi.org/10.46328/ijte.50

Morrison, J. (2006). *Attributes of STEM Education: The Student, The School, The Classroom.* Baltimore, MD: Teaching Institute for Excellence in STEM. http://www.wytheexcellence.org/media/STEM_Articles.pdf, Erişim Tarihi [Date of access]: 08.03.2020.

Özcan, H., & Koştur, H. İ. (2018). Fen bilimleri dersi öğretmenlerinin STEM eğitimine yönelik görüşleri [Science teachers' views on STEM education]. *Özgün Araştırma Dergisi [Journal of Original Research]*, *8*(4), 364-373.

Patton, M. Q. (1987). *How to use qualitative methods in evaluation* (No. 4). USA: Sage Publication.

Riskowski, J. L., Todd, C. D., Wee, B., Dark, M., & Harbor, J. (2009). Exploring the effectiveness of an interdisciplinary water resources engineering module in an eighth-grade science course. *International Journal of Engineering Education, 25*(1), 181-195.

Sanders, M. (2009). STEM, STEM education, STEMmania. *The Technology Teacher*, *68*(4), 20-26.

Uhomoibhi, J. & Ross, M. (2018). Many-body Approaches to Cross-level and Multidisciplinary Initiatives for Encouraging Learners into STEM from Primary to Further and Higher Education. *International Journal of Technology in Education (IJTE), 1*(1), 29-34.

Yang, D. & Baldwin, S.J. (2020). Using Technology to Support Student Learning in an Integrated STEM Learning Environment. *International Journal of Technology in Education and Science (IJTES), 4*(1), 1-11.

	International Conference on	
	Research in Education and Science	
www.icres.net	April 1-4, 2021 Antalya, TURKEY	www.istes.org

Instructional Content Design on the Cultural Geographical History of Miniature Art

Merve Görkem Zeren-Akbulut

Ondokuz Mayis University, Turkey,   https://orcid.org/0000-0002-7704-4031

Abstract: The third goal-achievement in the "Global Environment, Regions and Countries" unit of the 11th grade geography curriculum includes the goal-behavior of "To be able to analyze the spreading areas of Turkish culture in terms of regional characteristics". In the geography curriculum rearranged by the Republic of Turkey Ministry of National Education in 2018, the recommended approach to be followed in gaining the stated goal-behavior is explained with the statement "The main tangible and intangible elements representing Turkish culture are presented in relation to the space through examples. With an approach that takes into account the context-based perspective suggested in the geography curriculum, this paper aims to support the acquisition of knowledge content and cognitive process dimensions and to develop instructional content to transform these dimensions into goal-behaviors of the goal-achievement of "To be able to explain the cultural geographical history of Turkish arts of printmaking and miniature in relation to space". Based on the stated aims and arguments, firstly, the importance of Uighur painting art, which is known to have reached maturity between the 8th and 13th centuries with the empowerment of the classical style based on strong pattern drawings, has been evaluated in terms of the intra/intergenerational transmission of *intangible cultural heritage (ICH)* and art history. Later, the Uighur graphic style, which is known to continue the traces of the old Turkish traditions and its origins are based on rock paintings, in other words the Uyghur line element; it is interpreted in the context of the themes used in the dominant compositions in the spaces where the style finds living space. This research is a content analysis research built in qualitative research design. Content analysis is one of the techniques frequently used in research in social sciences. The literature document of the research consists of the geography curriculum and the research works prepared by using Chinese annuals and Western sources.

Keywords: UNESCO, Integrating ICH in cultural geography teaching, Miniature art, Analysis of educational objectives, Instructional content design

Introduction

Goal-achievements are the main determinants that form the starting point for content/experience, material, method, strategy and assessment-evaluation processes, which are among the other elements of the curriculum and guide the learning process. To define in detail all the dimensions of goal-achievements in order to realize

effective learning and to determine the level of realization of goal-achievements; it is very important to express it as observable and measurable behavioral changes (Demirel, 2020: 115-120). Context-based approach; it is an approach based on the association of goal-behaviors with real life, constructing them and thus becoming permanent (Ahmed and Pollitt, 2007: 204). When and particularly where did cultural elements, practices and beliefs arise? This question is intended to be explained in lesson programs developed with a context-based approach in the field of landscape geography teaching. In addition, other questions aimed to be answered are as follows: How did cultural elements, practices and beliefs spread to other areas over time and how did they change and be transmitted from the past to the present? The reason for adopting this approach which deals with the changes over time; it reveals cultural integration and cultural diffusion defined as the spatial expansion of ideas, practices and beliefs. Another reason for the adoption of this approach is that it provides an understanding of the spatial patterns reflected in the landscape that the cultural groups have shaped with the raw materials the world provides them. If the spatial similarities and variations in culture are to be understood and explained, it is necessary to go back to the past with a historical perspective in order to find the answers. Because culture is conditioned to time and it cannot be studied without a time dimension (Tümertekin and Özgüç, 2019: 121).

In this paper, within the framework of the historical analysis approach suggested to be followed in the implementation of the geography curriculum, it is aimed to support the teaching/acquisiting of knowledge and value dimensions of the goal-achievement "To be able to explain the cultural geographical history of Turkish arts of printmaking and miniature by associating with space" and to develop an instructional content design to transform them into goal-behaviors. In line with the stated purpose, answers to the following questions were sought in this research:

1. Regarding the Uighur graphic style in which the traces of the old Turkish traditions are continued and whose origins are based on petroglyphs; what are the themes reflected in the dominant compositions in the spaces where the style is kept alive?
2. What are the behavioral definitions of the revised Bloom taxonomy categorized according to the dimensions of knowledge and cognitive processes of the third acquisition in the "Global Environment, Regions and Countries" unit of the 11th grade geography curriculum?
3. Which under sub-headings can be presented the instructional content design that support the acquisition of the knowledge and cognitive process dimensions of the third acquisition in the "Global Environment, Regions and Countries" unit of the 11th grade geography curriculum?
4. What is the importance of the intergenerational transmission of the living heritage represented by Uyghur arts of printmaking and miniature in terms of human heritage and art history?

Method

This section contains information about the approaches followed and the processes performed in the process of ensuring the validity and reliability of the literature document, which is used to form the research design and

express the theoretical and methodological background of this research.

Research Design and Procedures

This research is a content analysis research constructed with the historical analysis approach in qualitative research design. The process carried out in the content analysis approach includes the stages of organizing, analyzing, categorizing, evaluating through analytical notes and recording the data in the literature document (Marshall and Rossman, 2006: 156; Uysal, 2020: 162). In this research, it is aimed to examine the message, intention, motivation and experiences that are intended to be given in the literature document within a certain historical context during the content analysis process. In this sense, an approach that comes from the logic of historical analysis research, which looks at the cultural geographic past and refers to the socio-cultural background in the historical texts that constitute the basic data sources, has been followed. Historical analysis studies are not only aimed at discovering the past (Seixas and Morton, 2013: 4). Therefore, in this research, it is also aimed to relate the past with the present and the future.

Analysis of the Validity and Reliability of the Literature Document

In researches based on the analysis of the content of the historical document, it is very important to clearly define the research focus. Therefore, deciding which of the hundreds of documents and materials to be selected and used is an intense and complex process, and this decision has a critical value (Bowen, 2009: 28). In this context, in the first stage of the literature review, the perspective proposed for the acquisition of of the third goal-achievement in the 11th grade geography curriculum rearranged by the Republic of Turkey Ministry of National Education (MOE, 2018) in the 2018-2019 academic year, was examined. With an approach that takes this point of view into consideration, the goal-behavior "To be able to explain the cultural geographic history of Turkish arts of printmaking and miniature by associating with space" was written in this research. Later, instructional content was designed to support the acquisition of knowledge and cognitive process dimensions of the written goal-behavior.

The fact that the academic works in the literature document are prepared in line with scientific principles, provide accurate information, represent the mentioned time and place at a high level, and are supported by evidence show that these works are reliable (Mohajan, 2018: 37). In the second stage of the literature review within the framework of the internal reliability study of the research, the research works prepared by using Western sources and Chinese annals written by expert researchers who have important contributions in the definition and development of the research subject in theoretical and methodological terms were determined. Then, the data obtained from the main works specified in the following stages were examined by critical reading method and categorized and evaluated for use in the registration stage. The data obtained from the basic works used as a source in the research provided information about the cultural geographical history of Turkish arts of printmaking and miniature for a long period of 20 000 years. In this context, the data obtained from the literature document contributed to the external validity of the study in terms of having a quality that provides

data to researchers who want to prepare similar instructional content designs in the category of longitudinal researches (Neale, 2021: 45-69).

Results

In this section, the results obtained during the research process are presented by categorizing them under subheadings. The results include the processes of writing behavioral definitions of goal-achievement in the knowledge and cognitive dimension categories selected as the analysis unit of this research and constructing the instructional content by using the source works that form the literature document to support the acquisition of written goal-behavior expressions.

Creating Behavioral Definitions of Goal-Achievement Written as Analysis Unit and Classification According to Its Knowledge and Cognitive Process Dimensions

The unit of analysis is defined as the concept analyzed in a scientific research and constitutes the starting point for the research process. Curriculums are among the most common units of analysis identified in qualitative research (Yıldırım and Şimşek, 2016: 246, 296). The goal-achievement of "To be able to explain the cultural geographical history of Turkish arts of printmaking and miniature in relation to the space" has been determined as the analysis unit of this research. Then, behavioral definitions of goal-achievement, written as analysis unit of this research, were categorized according to the revised Bloom's taxonomy (Anderson and Krathwohl, 2001: 67-68). In the next stage, the instructional content was organized using the literature document to support the acquisition of the written goal-behaviors (Table 1-4).

Table 1. Classification of the Analysis Unit According to Factual Knowledge and Cognitive Dimensions

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
A. Factual Knowledge	**Aa-1.1:**She/he states that the oldest known printmaking art technique is the woodprint.	**Aa-2.2:**She/he gives examples of Pranidhi compositions which are known to be one of the most important religious themes of Uygur classical painting in period between 9th and 13th	**Ab-3.2:** She/he shows the phases of the Uygur painting style on the timeline.	**Ab-4-2:**She/he organizes the style of figurative works depicting humans and animals in the nomadic cultural environment of the Gok-Turk period under the titles of legendary mixed shapes, masks, pictograms,	**Ab-5.2:**She/he points out that Uygur artists make a significant effort to express reality in their paintings while the pre-Uygur artists of East Turkestan tended to portray important figures with a narrative	**Ab-6.3:**She/he illustrates the manuscripts forms used by the Uygurs by drawing a concept map.

IIIICRES

**International Conference on
Research in Education and Science**

istes
Organization

| www.icres.net | April 1-4, 2021 | Antalya, TURKEY | www.istes.org |

centuries from the Murtuk Valley near Turfan.		large-scale figures drawn on the basis of the most characteristic lines, simplified in a style close to the pictogram, tamgas, syllables, half syllables and letters.	covered with fog.
Aa-1.1:She/he states that the pages and books known to be printed with wooden text patterns by the Uygur Turks are accepted as the first examples of Turkish art of printmaking.	**Aa-2.5:**She/he concludes that the Uygur culture originated from North Asia and was influenced by the Chinese and possibly the Tunguzes just before entering the Central Asian civilization.	**Ab-4.3**:She/he points out that religious beliefs had an impact on the origin and development of graphic arts.	

Table 2. Classification of the Analysis Unit According to Conceptual Knowledge and Cognitive Dimensions

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
B. Conceptual Knowledge	**Bc-1.1:**She/he expresses that culture encompasses the characteristic mosaic of lifestyles and dominant belief systems of a group of people living in a specific place at a particular time.	**Bc-2.1:**She/he explains the concept of intangible cultural heritage as practices, representations, narratives, knowledge, skills and related tools, materials and cultural spaces that groups, communities and individuals define as part of their	**Bc-3.2:** She/he draws a semantic map at the center of the concept of cultural geographic history which provides important evidence about the changes in cultural traits over time.	**Bc-4.1:** She/he distinguishes the elements that have visible evidence in the cultural geographical view as tangible cultural heritages, and the invisible elements that give the cultural geographical appearance character as	**Bc-5.2:** She/he evaluates the effects of the landscape of Turfan, Kansu and Karaşar on the emergence of a new style in Uygur painting.	**Bc-6.3:**She/he writes a composition about the Gök-Turks who left very important articles for the Turkish language as well as the Turkish culture and art history.

	cultural heritage.		intangible cultural heritages (living heritage).
	Bc-1.1: She/he defines petroglyphs as scripts and figures brought into the body by painting with red paint on the rock or drawing the stone with a metallic tip in all Turkish cultural circles.	**Bc-2.5:** She/he expresses that there are clear links between and Uygur painting and Ak-Beşim murals in which the technical features of the Toprak-kale fresco tradition are preserved and applied to Buddhist themes.	**Ab-4.3:** She/he explains the dominant colors in the Uygur palette by associating them with reflections of color symbolism arranged according to Chinese traditions.

Table 3. Classification of the Analysis Unit According to Procedural Knowledge and Cognitive Dimensions

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
C. Procedural Knowledge	**Ca-1.1:** She/he states that the pre-Khaganate union of Uygur clans was named differently as T'ieh-le, Kao-ch'e, Töles, Hui-Ho and Pa-ye-ku by British sinologists.	**Ca-2.2:** She/he gives examples of color plates in which real people are depicted with the naturalistic interpretation skill attributed to the Uygurs.	**Cc-3.1:** She/he classifies the distinctive features of Uygur art of printmaking and miniature in the order of the application of the rules determined in the Frayer model.	**Ca-4.3:** She/he argues that Uygur painting, in which important figures are depicted especially with book illustrations, is the forerunner of Seljuk painting.	**Ca-5.2:** She/he evaluates the efforts to register intangible cultural heritage elements as multinational files as in the example of miniature art in the context of strengthening cultural interaction between societies.	**Ca-6.3:** She/he makes a presentation in which the birth, development and characteristics of Uygur painting art are associated with space.

Ca-2.7: He explains the distinctive features of Ak-Beşim painting with a strong linear contour with the red color in the foreground and a vibrant coloring technique as in nomadic Turkish petroglyphs, Gök-Turk miniatures and Uygur art.	**Cc-3.2**:She/he lists chronologically the earliest known forms of printed painting made 20,000 years ago as cave paintings made by engraving on rocks for spiritual purposes, graphical figures and signs on the rock.

Table 4. Classification of the Analysis Unit According to Metacognitive Knowledge and Cognitive Dimensions

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
D. Metacognitive Knowledge	**Da-1.1:** She/he takes note of unfamiliar concepts while discussing that Uygur painting, in which important figures are depicted especially in conjunction with book pictures, is the forerunner of Seljuk painting and ceramic art.	**Da-2.6:** She/he compares the newly learned information about the intangible cultural heritage representing Turkish culture with the previous knowledge.	**Db-3.2:** She/he plans before writing her presentation in which she/he relates the development of Uygur art to space.	**Da-4.1:** She/he explains the difference between the concepts of tangible and intangible cultural heritage through the living evidences of miniature art reflected in the cultural geographical view (landscape).	**Dc-5.1:** When she/he realizes that she does not know some features of the factual/conceptual/procedural and metacognitive knowledge related to the goal-achievement of explaining the cultural geographical history of Turkish arts of printmaking and miniature in relation to the space, she revises these features.	**Db-6.3:** She/he creates open-ended questions organized around the example of miniature art, one of the living heritages representing Turkish culture.

Constructing the Instructional Content Design According to the Subgroups of the Knowledge and Cognitive Process Dimensions of the Revised Taxonomy of the Analysis Unit

A literature review was conducted in order to design a holistic teaching content suitable for the knowledge and cognitive process dimensions of the goal-behavior expressions presented in Tables 1-4. Then, the focus is on the characteristics of cultural, intellectual, spiritual and political fields that change according to the periods and geographical locations in which intangible heritage practices/elements emerged in the example of Turkish arts of printmaking and miniature.

Aa-1.1: What Is The Oldest Known The Printmaking Art Technique?

The research works examined within the scope of the literature research show that the cave paintings, graphical figures and signs on the rock, dated to the prehistoric period in 20.000 B.C. and made by engraving on rocks for spiritual purposes, are the oldest known forms of printmaking. The oldest known printmaking art technique is woodprint. It is noted that there were religious beliefs in the beginning and development of graphic arts, and the first print samples carved into wooden molds were made by Taoist monks in China. The printing process, which continued with the carving of marble molds in the 6th century A.D., continued with the printing of the seal-shaped rings made of wood on the *nuska* made by the Buddhist monks in the 7th century, and then the image and letters were printed in the same mold by carving the wooden molds in the form of relief (İnan Temur, 2011:13-15). The woodprint and paper, which are known to be used in China for the first time, were also used by Uygurs in order to spread Manichean and Buddhist influences and to convey the teachings that war is prohibited. These pages and books, known to be printed with tree text patterns, are considered to be the first examples of Turkish printmaking art. Uygurs who made paper production between the 9th and 10th centuries developed a different method in which they printed texts by creating movable letters one by one from hardwood. Uyghurs used manuscripts in four different forms: These are large, folded in half, stitched books at the fold of the pages, long rolls of paper rolled up, *pothies (pustakas)* secured with wooden bindings and held with twine through holes drilled in the middle of thin long pages and silk pieces. It was preferred that the *miniatures* placed in different areas on the pages should be positioned horizontally according to the text after the text was written in the manuscripts (Tekin, 1993 as cited in Biçer Özcan, 2018: 213-221).

Bc-5.2: What are the Effects of the Landscapes of Turfan, Kansu and Karaşar on the Emergence of a New Style in Uyghur Painting?

Towards the middle of the 7th century, the traces of Greek and Indian culture were faded in Turfan and Kansu paintings and sudden stylistic and technical changes occurred in these paintings. The emergence of the new style coincided with the arrival of the Uygurs in Kansu in 847 and their arrival in Turfan and Karaşar from 856 onwards. The new style that it is an early phase of the classical Uygur painting style, which has many representative works in the territory of the Kocho Kingdom, which reigned in 856 and 1330 A. C., strengthens the argument that these two events are interrelated (Eberhard, 1942 as cited in Esin, 1967: 49). The first stage of

the Uygur painting style was identified in the caves with Uyghur inscriptions in Şorcuk and Kum-tura which are places associated with Western Turks. The painting, which is thought to belong to the group of Şorcuk and Kum-tura in the Turfan region and depicts a Chinese pilgrim with *sgrafitto* technique in 717, is dated to "the "year of the rabbit" according to the Twelve Animal Turkish Calendar. It is possible to date the early phase of the Uygur painting style no later than the beginning of the eighth century or the end of the seventh century (Waldschmidt, 1925: 79).

Ca-2.7: What are the Connections between Uygur Painting and Ak-beşim Murals?

It is known that the Uygur culture originated from North Asia and was influenced by the Chinese and possibly Tunguzes just before entering the Central Asian civilization. Thus, Uygur art reflects a blend of this stated cultural background (Esin, 1967: 50). Besides, Uygur art is another version of the interaction between Altaic and Chinese arts, which Sung-yun calls the Hu style and uses Tabgac (To-pa/Wei) style, which is located in the east of Lou-lan (Rudenko, 1953: 30). It is known that in the development process of Uygur art, especially Western Turkestan has also had an impact. Uygur painting has distinct connections with the Ak-beşim murals, in which the technical characteristics of the Toprak-kale fresco (murals) tradition are preserved and applied to Buddhist themes. The Ak-beşim Temple was built between the 6th and 7th centuries, when the region was under Western Turkish rule and Türgiş coins were found there. Ak-Beşim, which is located in the Balasagun region and was the capital of Türgiş and Kara-khanids, maintained this status until the middle of the Kara-khanid period (11th century) (Esin, 1967: 50). The distinctive features of Ak-beşim painting are the use of a strong linear contour and a vibrant coloring technique in which the red color is at the forefront, as in nomadic Turkish *petroglyphs*, Gök-Turk miniatures and Uygur art. In addition, important figures are depicted in the Uygur style of art. Probably after the 6th century, a new school of Buddhist art developed on the border of the Northern and Western Turkish empires; art movements that take their source from here, Western Turkestan; Northern China and Tun-huang combined with Turfan through Ara-tam and Hami (Stein, 1921: 258).

The style used in frescoes by Uygur Turks who came to Eastern Turkestan in the middle of the 9th century reflects a bold and naturalist expressionism, but has a unique artistic temperament exhibiting surrealistic grotesque qualities and includes figurative elements in unusual shapes and sizes (Le Coq, 1913: 8). The important figures depicted by the artists in small sizes as decorative motifs are remarkable elements in the complex composition of the frescoes in Kızıl. Besides, Uygur frescoes are expressed with a sharp simplicity and monumental dimensions. Uygurs developed and advanced the *Pranidhi* narrative, a theme unique to Uygur art, and *Sukhavati* depictions, many of which originated from Turfan. Sukhavati composition was developed in Turkistan and introduced to China by the Khotanese painter Wei-Ch'ih-Po-Chih-na between 605 and 617. Pranidhi and Sukhavati narratives depicted by Uygur artists are simple and symmetrical compositions derived from the mandala figures believed to be the schematic representation of the universe, *the Gandhara art school*, which was born and developed in and around the Peshawar region and considered the traditional art of the Kushan Emperor and his heirs (Esin, 1969: 6).

Ab-5.2: What are the Knowledge and Practices Transmissed between Generations Unique to the Performance of Uyghur Arts of Printmaking and Miniature?

Uygur painters are known to have different goals than their predecessors. While Eastern Turkestan pre-Uygur artists tended to portray important figures with a narration covered with fog; it is noteworthy that Uygur artists made a significant effort to express reality in their paintings. In Uygur painting, every personality is depicted with its personal features except for the sacred figurative elements whose characteristics should be traditionally depicted. Although paper patterns are in use, they have lost their importance in the vigorous hands of Uygur draughtsmen. The strong linear design exhibited in black ink which is extremely sensitive to the characteristics of every shape has been the most important element that solidifies the skeleton of the expressionist Uygur painting; some modeling were tried in contour drawing which reminded the curvolinear designs of nomadic art. In addition to these modelling, there are also models using concentric double and triple contour lines with graded transitions from black to red and sepia (dark brown) in the Toprak-kale style. The surfaces were filled with important pictograms in the manner of a nomadic metal work. The graphic decorations were sometimes made using a paper paste and sometimes a reed pen made of three wood, as Kashgari put it, on a piece of paper. Unlike Chinese calligraphers, Uygur artists preferred to use pencils instead of brushes. It is known that the Uygurs sometimes carved the ground of the mural in order to prepare for the gilded relief ornamentation (Le Coq, 1913: 16).

After the designs were completed, the colors were applied; instead of the thick paste application applied in previously established schools in Eastern Turkestan and Kansu, inscriptions and pictograms were made visible by using the method in which bold and vibrant ink drawings were covered with a transparent glaze-like colour solutions (Waldschmidt, 1925: 8). Vivid, bright and variable-colored opaline surfaces were produced with the glazing method which is the distinctive feature of Uygur painting art. Besides, the best pigments in connection with sculpting were prepared in Toyuk. The process of determining the color intensity of figurative elements by categorizing them according to the value attributed to them is unique to Uygurs. Thus, the main themes were brought to the fore with a lively coloring method. The face of Buddha and some important personalities has been made clear by bright shading and glazing method. Bright shading followed the traditional method applied in Miran; the white light effect was not used to highlight important elements (Pelliot, 1923: 159).

The favorite color of the nomadic Turkish painting is red and it is the dominant color tone of the Uygur palette with its blue-green undertones. The colors in the Uygur palette are reflections of a color symbolism in which cosmic hues are arranged according to Chinese traditions. These colors are red, blue-green, yellow, black and white. Earthly colors are made up of brownish yellow (oily) and earthly tones. Colors subject to aquatic elements are likened to the halo of the moon. Fiery elements are in flame color, atmosphere is violet in color. The sky is blue. Murals and book paintings by Manichaean Uygur artists have witnessed the use of rare pigments in bright ultramarine tones (Mahler, 1959: 102). Uygurs also applied the practice of gilding with leaf gold and dipping them in gold solution. The reddish yellow ochre was mixed with gold water resulting in a stronger effect than the lustre of gold. The tone of the contour transitions applied on the leaf gold was softened

with a reddish paint. According to Chinese sources, brown and black ink was used in drawing elegant lines and pictograms on gilded surfaces and nephrite (jade) was used in polishing gold surfaces with a method unique to Kocho. There are also designs painted by Uyghur artists on wooden surfaces covered with a thin layer of clay (Esin, 1967: 53).

The book paintings of Turfan and Tun-huang, presented with manuscripts in Runic or Uygur Turkish before the period when Turkish was spoken in Turfan, are dated to the seventh century. Although the *miniatures* presented with Turkish texts are partially or completely attributed to the Turks, some of the manuscripts have been associated with non-Turkish descendants who previously lived in the region. In connection with the Manichean period book paintings, it is possible to say that the Basmıl Turks who were Manichean, lived in Kocho before the Uygurs. Kocho's illustrated manuscripts in Runic Turkish have a Manichean content Similar to the mural painting technique, a careful ink drawing on which colour glaze is applied is used in Uygur book paintings. Curvolinear modelling was avoided in book paintings. The contours are shaded in a traditional style; the illuminated surfaces are precisely covered with *pictograms* using a technique unique to Kocho painters (Stein, 1928: 1082).

While the paper made by Uygurs of Turfan has a rough surface, it was known that the paper made by the Uygurs in Sha-chou near Tun-huang was of finer quality (Andrews, 1935: 26 as cited in Esin, 1967: 53). In the Uygur *bahşis*, who must have combined the arts of calligraphy and painting, black or red ink was used for drawing and text. Kocho ruins contain numerous inkpots, ink stones and pens made of bamboo. It is thought that the printing technique using wood blocks was first applied by Buddhist monks in order to reproduce Buddhist texts and depictions. The earliest known specimen from the Uygur period found at Tun-huang in 969 represents an advanced stage of this technique. There are many Uygur wood prints stamped in black or red (Le Coq, 1913: 40). However, it is possible to state that the Uygur painting, which included many Lamaist themes in the period after the 13th century, lost its classical perfection and underwent a formal transformation in which the drawings were mechanically repeated.

Ca-4.3: What are the Figures and Themes Unique to Turkish Customs, Lifestyle and Mythology Depicted in Uyghur Book Paintings and Miniatures which are the Forerunners of Seljuk Arts of Painting and Ceramic?

It is known that some compositions and themes were occured simultaneously in Kocho, Tun-huang and Wan-fo-hsia in the age of the Uighur Kingdoms of Kocho and Kansu (Stein 1921: 23). The tent composition overturned due to a storm is similarly depicted in Ch'ien-fu-tong and Wan-fu-hsia. There are more similarities between Kocho and Kansu murals of the Uighur period. Buddha's composition of mourning in the Kocho mural is almost identical to the Ch'ien-fu-tong mural depicting a sorrowing statesman slashes his face with a knife according to Turkish custom. Old monk figures frequently depicted in Pranidhi scenes in *Bezeklik Cave Temples* were also found at Ch'ien-fu-tong (Gray, 1959: 57). The most important holy figure represented in the Uyghur Kocho painting is *Vaisravana*, who is represented as a Central Asian warrior with armor made of leather and a horsetail knot in her hand, and is revered as the warrior king from heaven. It is known that another theme frequently used

in Uygur painting art is the *dharmapala Acala* which stands out in East Asian Buddhism. The Uygur king is represented in a book painting as a warrior devoted to Manichaeism. Figures in the form of animals rise from among the flames of the depictions of hell in the paintings. Zoomorphic headed figures rise from among the flames of the scenes of infernal in the paintings. The multi-headed and multi-armed deity figure borrowed from Indian sculptures is also among the elements that are painted and reproduced in Uygur painting (Le Coq, 1913: 40).

Figures unique to Turkish mythology are frequently encountered in Uygur painting. In a mural found in Bezeklik Cave Temples, the legendary Altay ironmonger was represented with the inscription *ol temürcü* in Turkish beside Mount Sumeru. The guardian genii of the animal calendar were also depicted on Bezeklik murals along with Turkish inscriptions. The *tuğ*, belonging to the Gök-Turk dynasty, with a wolf head placed on it, constitutes another element represented in the Uygur painting art. It is known that the Central Asian portrait painting started in the Turkish period.

In Uygur painting, real people were depicted with the naturalistic interpretation skill attributed to Turks instead of donor portraits in which imaginary characters worshiping and praying side by side were depicted and included in the composition. It is possible to say that the people of Kocho who regularly progress during the religious procession are depicted in Uygur murals. These figures are honorable Uygur princes, elderly men with long robes, thin, white hair and beards, portly middle-aged men with double pointed beards and the young men with the rank of "Inal" depicted in short coats. The carefully selected clothes of all the mentioned figures are depicted with patterned silk robes or flap riding coats in which objects in their daily use are fastened to Turkish metallic belts with thin straps. The faces of the princesses are decorated with shades of red and painted in chalky white; her hair was carefully combed and polished with lacquer and decorated with flowers, hairpins, needles, transparent covers and headdresses.

The princesses are depicted in red and gold brocade dresses with long sleeves that allow hiding their hands gently folded over their breasts, in accordance with palace traditions (Le Coq, 1913: 38 as cited in Esin 1967: 55-56). Another category depicted in Uyghur painting is clergymen. The older monks, some of whom are depicted with blue eyes are highlighted by their devotion to their religion, their lean bodies and pale faces. The faces of the young followers are expressed enthusiastically. Manichean figures, believed to have been chosen by God to be sent to heaven, are depicted in white draped robes on frescoes in the Kocho Temple. A book painting depicts Uygur princes and princesses attending in the sermon of Manichean priests (Le Coq, 1913: 21-27).

Patterns and landscapes made of bright colours, which are a part of daily life, have been faithfully mirrored in Uygur painting art. While painters perform their arts skilfully; mourning and worshiping people from different lands, especially the Brahmans, are portrayed according to their unique characteristics. Horses, camels and other animals have been depicted in the heraldic style of naturalistic or old steppe art by artists who have the power to see fine details and have a nomadic life experience in their upbringing. It is accepted that Uyghur painting, in which important figures are depicted especially in connection with book paintings, is the forerunner of Seljuk

ICRES

International Conference on
Research in Education and Science

www.icres.net | April 1-4, 2021 | Antalya, TURKEY | www.istes.org

istes
Organization

painting and ceramic art (Esin, 1967: 56). Although it is known that it was depicted in the Islamic cultural environment in 1436, the last known work of the Uygur painting art, which is technically and stylistically associated with the Uygur painting tradition, is the *Miraçname* written by *Malik Bahşi* in Uygur Turkish and prepared in the *Herat*, including 61 miniatures (İnal, 1995: 120).

Conclusion and Discussion

This research is a retrospective content analysis research constructed with the historical analysis approach (Menard, 2008: 3-13) in qualitative research design. In this paper, an approach that comes from the logic of historical analysis, looking at the cultural geographic past and referring to the socio-cultural background in the historical texts that constitute the main data sources, has been followed. The analytical process followed in the research includes the steps of finding, reading, categorizing, evaluating and saving the data in document sources. In the document review process, it was aimed not to summarize the document related to the research subject, but to analyze the content of the document and to examine the message, intention and motivation in the document within a certain historical context.

Within the scope of the results, considering the knowledge and cognitive process dimensions indicated by the goal-achievement of "To be able to explain the cultural geographical history of Turkish arts of printmaking and miniature by associating with the space", which is determined as a research unit, goal-behavior expressions were determined. Instructional content was designed to support the acquisition of goal-behaviors classified according to the revised Bloom taxonomy (Amer, 2006: 213-230).

The written goal-behavior statements were classified gradually, and tables were created containing the factual, conceptual, procedural and metacognitive subgroups of the knowledge dimension and remember, understand, apply, analyze, evaluate and create categories of the cognitive process dimension. Categorization of the instructional content designed within the scope of this paper according to the dimensions of knowledge and cognitive processes of the revised Bloom taxonomy can provide a conceptual framework, especially for geography and history teachers who are new to their profession and teachers in other subjects, encouraging them to develop a more complete approach to learning goals.

Results of this paper can inspire active teachers who explore ways to develop the basic links between obtained answers about mental habits and the instructional content, and encourage their students to learn to live and work together in peace so that they can overcome the problems likely to be encountered in the next decades. Instructional content designed within the scope of this paper can contribute to the normative dimensions of the hybrid content designs, which stand out in the idea of updating the 21st century program (Buckingham Shum and Crick, 2016: 6), as they bring together the common points of thematic study areas such as global citizenship education, geography education, history education and cultural heritage education.

Recommendations

The Uygur painting art which started in the borders of China, developed in Central Asia for six centuries and spread in time and place, has managed to reach the present day from Seljuk period Konya and Ottoman Istanbul. The instructional content designed within the scope of this paper includes the living nature of miniature art reflected in its cultural geographic past, which started its adventure with Uygur murals and took its place in the pages of the book with its extraordinary vibrancy, artistic and technical originality in later periods. In the religious-themed miniatures of Uygur manuscripts, Uyghur princes and clergymen are depicted according to a hierarchical position indicated by colors. In the murals with social content, the cultural traces of the Uyghur geography from which the Buddhist and Manichaean religions originated were vividly expressed. These traces constitute the most important sources influencing the development of Turkish miniature art (Berkli, 2010: 158). In this context, this paper can shed light on young researchers interested in the integration of intangible cultural heritage in education.

In the UNESCO Convention for the Safeguarding of Intangible Cultural Heritage (2003), the concept of intangible cultural heritage defined as practices, representations, narratives, knowledge, skills and related tools, materials and cultural spaces defined as part of the cultural heritage of groups, communities and, if any, individuals; it has a dynamic structure that cannot be considered separately from the material contexts that keep it alive (Pietrobruno, 2009: 227-247 cited in Büyükkayıkçı, 2018: 55). In this paper, the emphasis on understanding the distinction between tangible and intangible cultural heritage concepts may play an important role in eliminating erroneous definitions.

Miniature art has been registered in 2020 in the *UNESCO Representative List of Intangible Cultural Heritage* as Turkey, Azerbaycan, İran and Özbekistan have prepared submitted and registered multinational files. Miniature art is important not only as a cultural heritage that belongs to one country but is shared by multiple countries. As emphasized in the UNESCO Convention for the Safeguarding of Intangible Cultural Heritage, efforts to prepare, submit and register multinational files in the intangible cultural heritage list will undertake very important missions in the axis of cultural interaction between states and societies, the understanding of multidimensional and multicultural citizenship and the awareness of learning to live and work together.

References

Ahmed, A., & Pollitt, A. (2007). Improving the quality of contextualized questions: an experimental investigation of focus. *Assesment in Education: Principles, Policy & Practice,* 14(2), 201-232.

Amer, A. (2006). Reflections on Bloom's Revised Taxonomy. *Electronic Journal of Research in Educational Psychology* 4(8), 213-230.

Anderson, L. W. & Krathwohl, D. R. (2001). *A Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives.* NY: Longman.

	International Conference on	
ICRES	Research in Education and Science	**istes** Organization
www.icres.net	April 1-4, 2021 Antalya, TURKEY	www.istes.org

Andrews, F. H. (1935). *Descriptive Catalogue of Antiquities recovered by Sir Aurel Stein: during his Explorations in Central Asia, Kansu and Eastern Iran.* Delhi: Manager of Publications.

Berkli, Y. (2010). Uygur Resim Sanatının Üslup Özellikleri. [Stylistic Features of Uyghur Art of Painting]. *Atatürk Üniversitesi, Edebiyat Fakültesi, Sosyal Bilimler Dergisi,* 45, 155-166.

Biçer Özcan, Ş. (2018). Uygur Türklerinden Osmanlı Nakkaşlarına Minyatür Sanatının Serüveni [The Adventure of Miniature Art from Uyghur Turks to Ottoman Painters]. *TURAN Stratejik Araştırmalar Merkezi Uluslararası Bilimsel Hakemli Dergisi,* 41, 213-221.

Bowen, G. A. (2009). Document Analysis as a Qualitative Research Method. Qualitative Research Journal 9(2), 27-40.

Buckingham Shum, S. & Crick, R. D. (2016). Learning Analytics for 21st Century Competencies. *Journal of Learning Analytics* 3(2), 6-21.

Demirel, Ö. (2020). *Eğitimde Program Geliştirme/Kuramdan Uygulamaya* [Curriculum Development in Education/From Theory to Practice]. Ankara: Pegem Akademi.

Eberhard, W. (1942). *Çin'in Şimal Komşuları [China's Northern Neighbours]*. Trans. F. Nimet Uluğtuğ. Ankara: Türk Tarih Kurumu.

Esin, E. (1967). *Antecedents and Development of Buddhist and Manichean Turkish Art in Eastern Turkestan and Kansu/The Handbook of Turkish Culture, Supplement to Volume II, Section of the History of Art.* Z.V. Togan (Ed.). İstanbul: Milli Eğitim Basımevi.

Gray, B. (1959). *Buddist cave paintings at Tun-huang.* London: Faber and Faber.

İnal, G. (1995). *Türk Minyatür Sanatı (Başlangıcından Osmanlılara Kadar) [Turkish Miniature Art (From the Beginning to the Ottomans)].* Ankara: Türk Tarih Kurumu.

İnan Temur, G. (2011). *Günümüz Türk Baskı Resim Sanatındaki Gelişmelerin Sanatsal Anlatıma Etkileri [The Effects of The Improvements on Contemporary Turkish Art of Printmaking on Artistic Expression].* (Unpublished master's dissertation). University of Dokuz Eylül, Institute of Education Sciences, İzmir, Turkey.

Le Coq, A. von. (1913). C*hotscho: Fascimile-Wiedergaben der Wichtigeren Funde der Ersten Königlich Preussischen Expedition Nach Turfan in Ost-Türkistan.* Berlin: Dietrich Reimer.

Mahler, J. G. (1959). *The Westerners among The Figurines of the T'ang Dynasty of China/Serie Orientale Rome, XX.* Rome: Istituto Italiano per il Medio ed Estremo Oriente.

Marshall, C. & Rossman, G. B. (2006). *Designing Qualitative Research.* California: Sage.

Menard, S. (Ed.). (2008). *Handbook of Longitudinal Research/Design, Measurement and Analysis.* USA: Elsevier Inc.

Ministry of National Education (MOE). (2018). *Ortaöğretim Coğrafya Dersi (9-12. Sınıflar) Öğretim Programı [Secondary School Geography Lesson (Grades 9-12) Curriculum].* Ankara: TC Milli Eğitim Bakanlığı.

Mohajan, H. K. (2018). Qualitative Research Methodology in Social Sciences and Related Subjects. *Journal of Economic Development, Environment and People* 7(1), 23-48.

Pelliot, P. (1923). *Guide-Catalogue du Musee Guimet/Les Collections Bouddhiques, Expose Historique et Iconographique, Inde Centrale et Gandhara, Turkestan, Chine Septentrionale, Tibet,* par M. J. Hackin. Paris et Bruxelles: Van Oest.

Pietrobruno, S. (2009). Cultural Research and Intangible Heritage. *SOKÜM Sözleşmesi/Yönelimler, Eğilimler ve Eleştiriler [Convention for the Safeguarding of the ICH/ Tendencies, Trends and Critics]* (pp. 53-70). Trans. M. Büyükkayıkçı. M. Ö. Oğuz, E. Ölçer Özünel, A. E. Aral (Eds.). Ankara: Geleneksel Yayıncılık.

Rudenko, S. I. (1953). *The Culture of the Population of the Altai Mountains in Scythian Times.* Moscow & Leningrad: Academy of Sciences USSR Publication.

Seixas, P. & Morton, T. (2013). *The Big Six: Historical Thinking Concepts.* Toronto: Nelson Education.

Stein, M. A. (1921). *Serindia: Detailed Report of Archaeological Explorations in Central Asia and Westernmost China.* Oxford: Clarendon Press.

Stein, M. A. (1928). *Innermost Asia/Detailed Report of Explorations in Central Asia, Kan-su and Eastern Iran (vol.2).* Oxford: Clarendon Press.

Tekin, Ş. (1993). *Eski Türklerde Yazı, Kâğıt, Kitap ve Kâğıt Damgalar [Writing, Paper, Book and Paper Tamgas in Ancient Turks]* İstanbul: Eren.

Tümertekin, E. & Özgüç, N. (2019). *Beşeri Coğrafya/İnsan, Kültür, Mekân [Human Geography/Human, Culture, Space].* İstanbul: Çantay Kitabevi.

UNESCO. (2003). Convention for the Safeguarding of Intangible Cultural Heritage. (2020, February 10). Retrieved from http://ich.unesco.org/doc/src/0009-TR- PDF.pdf

Uysal, F. (2020). Veri Toplama Süreçleri ve Analiz Yöntemleri [Data Collection Process and Analysis Methods] In N. Cemaloğlu (Ed.), *Bilimsel Araştırma Teknikleri ve Etik [Scientific Research Techniques and Ethics]* (pp. 135-174). Ankara: Pegem Akademi.

Waldschmidt, E. (1925). *Gandhara, Kutcha, Turfan.* Leipzig: Klinkhardt and Biermann.

Yıldırım, A. & Şimşek, H. (2016). *Sosyal Bilimlerde Nitel Araştırma Yöntemleri [Qualitative Research Methods in the Social Sciences]* Ankara: Seçkin Yayıncılık.

Post-Colonial Analysis of Sundanese "Disney" Princess – The Process of Negotiation from West to East

Frieda Ilhami Zulaikha

Universitas Perjuangan Tasikmalaya, Indonesia,   https://orcid.org/0000-0001-5888-3780

Rd. Safrina

Universitas Pendidikan Indonesia, Indonesia

Vina Andriany

Universitas Pendidikan Indonesia, Indonesia,   https://orcid.org/0000-0001-8457-4885

Tri Agustini Solihati

Universitas Perjuangan Tasikmalaya, Indonesia,   https://orcid.org/0000-0002-2686-6967

Abstract: Disney princess has a pivotal role in constructing identity, especially for children. One of the first generation of Disney Princess is Cinderella (1950) which was adapted from a fairy tale written by Charles Perrault. However, very little research focuses on identity construction of fairytale in an Asian country that is adapted from Disney Princess. Therefore, this paper describes the how Disney is transformed into Nyi Sarikingking which is a Sundanese version of Cinderella in Indonesia around 1960's. Drawing upon the post-colonial theory, this study focuses on textual analysis of how the identity is constructed by investigating the character, tradition, and values. It also examines the image portrayed in a story. Thus, by comparing the story form the Perrault's sotry as the original version and the Sundanese version, this paper presents a cultural transformation from Cinderella to Nyi Sarikingkin involving the strategy of mimicry which led to hybridity and ambivalent in the process negotiation and resistance in presenting the story.

Keywords: Negotiation, Resistance, Postcolonial, Disney, Cinderella

Introduction

Disney Princesses are popular among children around the world. They successfully convey their intended message to the Disney's lovers. Disney Princesses changes over a period of time. According to England, et al (2011) Disney princess are divided into three generations: 1) the first generation of Disney princesses are Snow White and the Seven Dwarves (1938), Cinderella and Aurora in Sleeping Beauty, 2) the second generation are

The Little Mermaid (1989), Beauty and the Beast (1991), Pocahontas (1995) and Mulan (1998), and 3) the third generation are Princess and the Frog (2009), Tangled (2010), Brave (2012) and Frozen (2013). Moana (2016) also adds to the third generation. Davis (2012) found that the female characters in Disney began to change since 2000. The changes are clearly visible in Brave, Frozen and Moana. These three characters are described as steadfast, independent, strong, smart, and full of self-confidence. The image of a woman like this appeared differently from Disney's first generation. Garabedian (2014) discusses these changes as part of cultural changes in America. The first generation is said to be part of the "first feminist wave". Krolokke celebrate this period as "pre-transition" (cited in Garabedian, 2014). In the late 1960s and early 1970s the definition of gender changed following the second feminist wave known as the period "transition". One of Disney's female characters is Ariel in the film The Little Mermaid. Ariel's character is adventurous, brave and independent marks a change in the image of women. The third feminist wave emerged in the late 90's marked by the appearance of Brave and Frozen in 2012 (Krolokke, 2005).

It attracted researcher to investigate how Disney characters construct the concept women as an innocent, beautiful, helpful person (Giroux, 2010; England, 2011; Azmi, 2016). In addition, Disney also represented power relations that involve ethnicity, gender roles and sexuality (Lugo, 2009; Giroux, 2010; Ajayi, 2011; Wohlwend, 2012). Disney offers a pattern of social interactions in society that children can easily imitate. Children are taught how to behave like a princess or a hero which result in constructing the concept for women and men, for example appearance stereotype. Based on Harringer (2018), 72% of women in Disney characters were shown to be thin and men with muscular body were represented by 76%. The posture of a thin woman was associated with woman's attractiveness. In the end, it is the society who strengthens the legality of the identities of women and men to determine what is considered as a normal. Apart from the concept of the body in Disney story, the concept of white skin is also commonly shown. According to Gregory (2010) nearly all Disney stories carry that message. Even though the character of a black woman finally appears in the story, the power relations between white and black women remains unchanged. The story of Snow White is one of the examples how white skin appears in Disney story. Snow White is described as a young, pure, beautiful, and gentle girl which has a white skin like a snow.

Further, Wohwlend (2009) found that the depiction of women in Disney princesses has the same common thread, which is soft-tempered, beautiful, willing to sacrifice and helping others. Based on Disney's portrayal of the gender concept (Lugo, 2009; Gregory, 2010; England 2011; Giroux, 2011; Davis, 2012; Wohlwend, 2012; Bálint (2013); Garabedian, 2013; Azmi, 2016; Harringer, 2018). The three generations seem to represent a different character of women, yet it still portrayed stereotypical depiction of women which is gentle, and beautiful (Gregory, 2010).

However, not much is known about the evolution of Disney Princess that has been adapted into a fairytale of different country, whether it preserve the same message or not. In Indonesia, we found that Cinderella has been adapted into Nyi Sarikingkin as a Sundanese version. Therefore, this research focused more on the adapted story by investigating how the characters, tradition, and values were portrayed in the story. To investigate whether it

preserve the former story or deconstruct a new story, this research worked under the framework of postcolonial theory.

Postcolonial Theory in Literary Work

As a literary work analysis tool, postcolonial is suitable for literary analysis and criticism of works that depict social life in a colonial setting. Bhabha (1994) argued that postcolonial perspectives come from the Third World and the minorities within the borderline of West, North, and South which influence their ideology. So, it can be seen as a response to and a reflection of "disappointment" critics from the Third World. Young (1995) explains that the most basic goal of postcolonial critique is to reexamine colonialism's past from the perspective of the colonized; to assess colonialism's economic, political, and cultural effect on both the colonized populations and the colonizing powers; and to investigate the process of decolonization; above all, to take part in the goals of political emancipation, such as equal access to material resources, contesting systems of dominance, and articulating political and cultural identities. In other words, the concept of post-colonial provides a useful framework for demonstrating the presence of "colonial legacies" as well as the ideals and symbols associated with them.

This paper focuses on the presence of colonial legacies in Nyi Sarikingkin story that was adapted from Cinderella by referring to Babha's theory about mimicry, hybridity and ambivalent as the process of negotiation and resistance of colonial legacies. According to Bhabha (1994), mimicry is the colonized subject's reaction to the colonizer's cultural interaction with the colonized. While, hybridity is described as a result of cultural exchange that occurs when two cultures collide. When two cultures met, it can either affiliate or resist each other which lead to hybridity, as well as ambivalent. Ambivalent is a concept that describes an emotional, social, cultural, or behavioral condition. The ambivalent state is created by the hybridization of any community (Bhabha, 1994). It creates an environment in which people believe their culture and behaviors belong to "no one's territory." One is the product of the other. As a result, ambivalent is a key feature of hybridity.

Method

The relationship between colonizers and colonized was examined in the context of Homi K. Bhabha's postcolonialism as the result of the negotiation and resistance. I divided the result of them as mimicry, hybridity, and ambivalent in Nyi Sarikingkin's story. This paper does not only consider the colonizer and colonized as a hierarchical relationship in which one party oppresses the other and one party is seen as "us" and the other as "other.". This paper uses figures, events, space, and time settings as units of analysis to see the relationships between elements in the text and to explore the mimicry, hybridity and ambivalent that occur in the text.

Characters are classified and categorized in this study based on whether they are colonizers or colonized. The colonizer is Cinderella's story written by Perrault, while the colonized is Nyi Sarikingkin's story. The

relationship between the characters, the representation of events, and the time and space environment revealed the colonizer-colonized interaction under the framework of postcolonial theory. Postcolonial literary theory investigates colonial literature, concentrating largely on the social dialogue between colonizers and colonizers, which serves as the framework to literary works.

Results

By comparing Nyi Sarikingkin and Cinderella, we then located the aspects that can represent the colonizer and the colonized such as the characters, representation of event or tradition, time and space setting conveyed by the writer. They were categorized as either a negotiation or a resistance against the colonizer which discussed later in the term of mimicry, hybridity, and ambivalence.

Negotiation Process in the Cinderella's and Nyi Sarikingkin's characters

We found that the writer negotiated the identity of West culture through the naming of the characters. We provided you the list of the naming as follows:

Table 1. Naming of the Characters in Cinderella of Perrault and Nyi Sarikingkin

Character's name in Cinderella of Perrault	Character's name in Nyi Sarikingkin
Cinderwench/ Cinderella	Nyi Sarikingkin
Fairy Godmother	Nyi Pohaci Windurarang
Father (Cinderella's father)	Pangeran Pananggeuhan

In Perrault's story the main characters were called Cinderwench by the stepmother because she used to go to chimney and sat in the cinders and ashes. While in Nyi Sarikingkin's story, the name was given since she was born. In Sanskrit, *Kingkin* means a sadness. The Western story was adapted into the local context by using the native language, Sundanese. The main character has the same story line. She was tortured by her step mother and her step sisters. One day, all the villagers were invited to attend a ball in a palace. She was sad because she could not go the party. In Perrault's version, the fairy godmother helped her to go to the party. While, in Nyi Sarikingkin's story, the writer used *Nyi Pohaci Windurarang* to replace the fairy godmother in western culture. In Sundanese culture and traditions, Pohaci is another term for God or *Dewa* (Hindu mythology). Pohaci is a projection of the guardian god in the life of the ancient Sundanese people in the Sundanese spiritual sense. People can ask to meet her, and ask for advice. In Nyi Sarikingkin's story, Nyi Pohaci lives in a mountain named Gunung Pajung. So, the idea of a godmother is a little different. Further, we found that the writer uses more names in Nyi Sarikingkin's story compared to Cinderella's story. One of the example that shows resistance is the name of Cinderella's father. In Perrault's story, Cinderella's father did not have a name and receive a little attention in the story. While in Nyi Sarikingkin's story, the father was named as *Pangeran Pananggeuhan* which has a meaning of a rich family. He was narrated more detail in Nyi Sarikingkin's story as

a handsome, rich, and a wise man who married the best creature, Nyi Sarikingkin's mother. Unfortunately, he could not do anything to set her daughter free from his second wife because he was scared of his wife. The specification of the characters shows the sign of resistance in the process of the appropriation of the story from West to East. We put this naming as the highlight in constructing identity because naming is the symbol of cultural identity (Suleimenova, 2006; Woodward, 2002).

Along with the process of appropriation, affiliation also emerges. Affiliation is categorized as a mimicry which means that Cinderella and Nyi Sarikingkin go with the same story. The affiliation of West was internalized in the concept of women and men position in society. Handsome men and beautiful will suit each other. Although Cinderella also depicted the goodness of the main character, the appearance of her still hold an important role in stirring the story. Cinderella and Nyi Sarikingkin describes best creature as a woman with a pure heart, sweetness, and beauty. There are no ugly women in the story who gained attention in the story of Cinderella and Nyi Sarikingkin. Further, Cinderella and Nyi Sarikingkin go with the same values depicted from the characters that men are the one who have the authority to choose the women. So, we concluded that along with the process of negotiation, resistance and affiliation emerged in the construction of the story.

Negotiation Process in the Cinderella's and Nyi Sarikingkin's events

The process of negotiation from West to East can also be seen from the events or incidents narrated in the story. We found that majority of the events in both of the story were different. It was started from the ball invitation. In Cinderella's story, a fairy godmother helped Cinderella with her magic spell and change pumpkin, and mice into a beautiful horse-drawn carriage. While, in Nyi Sarikingkin's story, the writer replaced a fairy godmother with Nyi Pohaci. Nyi Pohaci did not use her magic to turn something into a coach. She borrowed a horse-drawn carriage from the mythical creatures. Sundanese culture does not acknowledge a fairy. So, the writer negotiates and deconstruct the story based on the local content. Another tradition that was also highlighted by the writer is the ball. To adapt the ball into Sundanese culture, the writer changed it into a feast.

Only the rich people who can join the feast and find their mate. In Sundanese culture, there is no dance party or ball. So, in the feast, the people listen to traditional song contains of words of wisdom. It was held for 7 days and nights. While in Cinderella's story, the ball was held for three days. In Sundanese culture, a feast or big event such as wedding ceremony should be held for 7 days and nights. Along the process of finding their mate for seven days and night at the feast, the young women and men prayed and fasted. In Sundanese culture, people usually fasted to get what they want, the called this as '*puasa mutih*'. Further, the writer adapted the cloth and the glass slippers that was used by Cinderella into *kebaya* (Sundanese traditional costumes) and velvet slippers (See figure 1 below).
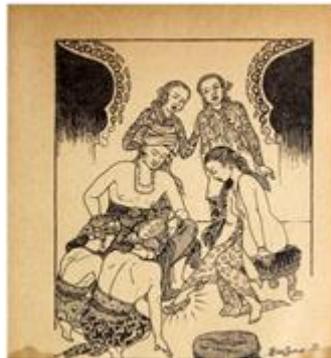
Figure 1. Nyi Sarikingkin put on the shoes

The picture above shows us that the writer draws Cinderella in Sundanese culture. But still the appearance remains the same. She has a pointy nose, long hair, slender body, and beautiful face. The writer attempted to resist the West culture while internalized the values of the main character into the story. It can be categorized as the process of mimicry.

However, there is a unique scene that can be categorized as an internalization of west culture. The rich people who came to the feast were picked up by the horse carriage from the palace. The woman should sit beside the man to show that they were different from the traditional people who believed that women and men should sit separately. It is categorized as the mimicry which can lead into hybridity in which the subject has more than one identity.

Negotiation Process in the Cinderella's and Nyi Sarikingkin's Time and Space Setting

Regarding the time and space setting, we found that they shared similar setting. These two stories happened in a faraway kingdom with no exact time and mystical creature that help the main character. They are both considered as a fairytale in both cultures.

So, it can be concluded that the negotiation in Nyi Sarikingkin's story that was an adaption of Cinderella involves affiliation and resistance. The writer of Nyi Sarikingkin's story attempted to show the reader more about Sundanese culture. That is the way of how the writer resist the West culture. The resistance was shown in the events and the naming of the characters. They were all adapted into Sundanese culture. While mimicry was seen in the values of women and men in the story involving appearance, and role. The writer also chose the similar time and space setting for the story to take place.

Discussion

As you can see from the findings above, in the context of postcolonial, negotiation question the notions of tradition. It inevitably involves historical and global linkages. According to Ting-Toomey (2015) negotiation is

also linked to the transactional exchange in which individuals attempt to claim, question, or endorse their own and others' desired self-image. The negotiation in colonizer and colonized interaction generated hybrid subjects as the previously mentioned findings. From this perspective, identity is inevitably negotiated and reshaped. Bhabha (1994) coined concepts such as hybridity, mimicry, and ambivalence to criticize the postcolonial conditions and marginalized communities. He depicts hybridity as a mechanism by which the alienated subject is allowed to question authoritarian authority in a positive light. Due to encounters between different cultures, the principle of hybridity alters colonial identity, resulting in ambivalence that alters the notion of fixed colonial dominance in one way or another. Hybridity was found in Nyi Sarikingkin story as the way of the writers to show the cosmopolitan situation in Nyi Sarikingkin's story the as the colonized. The intertwined identity between Nyi Sarikingkin as the East and Cinderella as the West resulted in constructing new identity of the subject. It seems that it is borderless and fluid, so it created equality between the majority and minority. It is similar with Bhabha's perspective that the aim of forming the idea of hybridity is to provide equalities to citizens of different nations where superior inferior complexities are prevalent. So, we can conclude that postcolonial perspective offers a strong opportunity to identify colonized citizens in their own words, plays a significant role in deconstructing colonialist binaries, and has a significant influence on bestowing fresh and authentic characteristics on colonized people. In other words, it provides an opportunity for colonized people to rebel against colonial control and create their own territories. However, hybridity can be seen as colonialist way to cover existing diversity while preserving the order to maintain the colonial identity (Ashcroft, et al., 2005). He highlighted that colonizers are constantly rewriting the space in order to deconstruct the colonized identity.

While comparing Cinderella and Nyi Sarikingkin, we found that the writer of Nyi Sarikingkin attempted to establish a site of conflict in the postcolonial space. They attempted to portray this space as a platform of rebellion by enclosing the fluidity that this space contained and that the colonialists refused to acknowledge. As discussed in the findings, the writer resists the West culture by establish his own traditional culture to create Nyi Sarikingkin. Besides resistance, we also found mimicry in the process of transforming Cinderella into Nyi Sarikingkin. The combination of two lead the identity into hybridity and ambivalent.

Discussing Hybridity and Ambivalent in Nyi Sarikingkin's Story

We attempted to describe the explanation for Nyi Sarikingkin's story as a hybrid entity in this section. In Nyi Sarikingkin's story, the characters compromise in order to follow the colonizer's ethics, social structure, supremacy, and faith. So, we can sya that Hybridity is the creation that causes a political shift in the entire system. The time and space setting of Nyi Sarikingkin are similar to Cinderella. Nyi Sarikingkin maintained the colonialism, the writer set the the story in a kingdom which shown how men ruled the nation, created superiors and inferiors in a social structure, and internalized the colonizer's perspective. Hybridity can emerge both as a result of deliberate moments of cultural suppression, such as when colonial powers intervene to consolidate political dominance, and as a result of dispossessing indigenous populations and forcing them to 'assimilate' to new social patterns (Ashcroft, et al., 2006). In one of the scenes in Nyi Sarikingkin's story, the indigenous and poor people were treated as an outdated people and a slave. However, the story still maintained the Sundanese

tradition. Therefore, it is clearly not a single individual, but a combination of the two.

We see this as a link between the colonizer and the colonized. Nyi Sarikingkin's story portrayed a unique blend of West and East culture. It combines Sundanese traditional culture while pertaining the west culture in supremacy and social structure. This hybridity becomes ambivalent which is a complex identity to be described. Ambivalence has the effect of creating tension between the authority and the colonized other. İt created a controversial position. The colonizer and colonized relationship are always ambivalent. Nyi Sarikingkin as the colonized cannot entirely deconstruct the self into the colonizer, so it results in resistance and against the colonizer power and authority. This condition guarantees the hybridization. This hybridization creates an ambiguous situation which make the colonized lose its own authority. Like other colonized people, Nyi Sarikingkin's story learned the values of the colonizer and torn between its native culture and the culture that the West has put on it (Bhabha, 1994).

Conclusion

In conclusion, the writer of Nyi Sarikingkin placed himself as a postcolonial writer who attempted to negotiate the West culture into East culture. We categorized Nyi Sarikingkin as the colonized and Cinderella as the colonizer. During the process of negotiation and interaction between the colonized and colonizer, affiliation and resistance appeared. By analyzing Cinderella and Nyi Sarikingkin, the majority of negotiation process mostly appeared as a resistance. The writer of Nyi Sarikingkin transformed the character, and events of West culture into Sundanese culture. However, the writer still maintained the social structure, and supremacy from the West. So, it can be said that it created a hybridity and ambiguities of portraying the ambivalent in the story. It can be seen as the colonized who loses its power and confirms the power of the colonizer.

Acknowledgements or Notes

References

Ajayi, L. (2011). A Multiliteracies Pedagogy: Exploring semiotic possibilities of a Disney video in a third grade diverse classroom. *Urban Review*, 43(3), 396-413.

Ashcroft, B., Griffiths, G., & Tiffin, H. (2006). *The post-colonial studies reader*. London: Routledge,

Azmi, et al. (2016). Gender and Speech in a Disney Princess Movie. *International Journal of Applied Linguistics & English Literature*, 5(6), 235-239

Bálint, E. (2013) 'The representation of Women in Walt Disney's Productions in the Studio Era'. *AMERICANA, E-Journal of American Studies in Hungary*, IX(2) (Fall)

Bhaba. H.K. (1994). *The Location of Culture*. London: Routledge.

Davis, A. M. (2012). *Good Girls & Wicked Witches. Women in Disney's Feature Animation*. New Barnet: John Libbey Publishing Ltd.

England, et al. (2011). Gender Role Portrayal and the Disney Princesses. *Sex Roles*, 64, 555–567

Garabedian, J. (2014). Animating Gender Roles: How Disney is Redefining the Modern Princess. *Undergraduate Research Journa*l. 2 (1), 22-25.

Giroux, H. A. (2010). Stealing of childhood innocence--Disney and the Politics of Casino Capitalism: A tribute to Joe Kincheloe. *Cultural Studies/Critical Methodologies*, 10(5), 413- 416

Gregory, S.M. (2010). Disney's Second Line: New Orleans, Racial Masquerade, and the Reproduction of Whiteness in the Princess and the Frog. *Journal of African American Studies*, 14 (4), 432-449

Harringer, et al. (2018). Appearance-Related Themes in Children's Animated Movies Released between 2004 and 2016: A content analysis. *Body Image*, 26, 78-82.

Krolokke, C. (2005). *Three Waves of Feminism: From Suffragettes to Girls*. In Contemporary Gender Communication Theories & Analysis: From Silence to Performance (pp. 1-23). California: SAGE Publication.

Lugo, M. K. (2009). Look Out New World, Here We Come? Race, Racialization, and Sexuality in Four Children's Animated Films by Disney, Pixar, and DreamWorks. *Cultural Studies/Critical Methodologies*, 9(2), 166-178.

Suleimenova E. D. (2006). *Archetype of "Ugly Duckling" and Linguistic Identity*. In Language and identity (pp. 15-26). Almaty: Kazakh University.

Ting-Toomey, S. (2015). *Identity Negotiation Theory*. In J. Bennett (Ed.), Sage Encyclopedia of Intercultural Competence, Volume 1 (pp. 418-422). Los Angeles: Sage.

Wohlwend, K.E. (2009). Damsels in Discourse: Girls Consuming and Producing Identity Texts through Disney Princess Play. *Reading Research Quarterly*, 44(1), 57-83

Woodward, K. (2002). *Understanding Identity*. London: Arnold.

Wohlwend, K. E. (2012). 'Are You Guys Girls?' Boys, Identity Texts, and Disney Princess Play. *Journal of Early Childhood Literacy*, 12(1), 3-23.

Young, R. J. C. (1995). *Colonial Desire: Hybridity in Theory, Culture and Race*. London: Routledge

Pandemic COVID-19 and E-Learning in Higher Education: Creative Art Student's Experiences

Victor Pangayan

Universiti Malaysia Sabah, Malaysia, https://orcid.org/0000-0002-3472-0968

Abstract: With the outbreak of the COVID-19 pandemic, higher education's learning environment is shifting toward online education. There are no exceptions when it comes to teaching and studying dance art in institutions. The purpose of this study is to gain a better understanding of the effectiveness of an e-learning system for learning and pedagogical purposes, as well as the students' attitudes toward knowledge sharing. As a result, the research was conducted to ascertain undergraduate students' programs in the field of art (dance and theater) education in Malaysian public universities. A quantitative study was conducted to assess undergraduate students' practices during the semester at Malaysian public universities, with a particular emphasis on student's readiness to adapt the online dance art learning. The study discovered that art students in higher education used social media platform and online networking to strengthen their art performances and technical skills. However, majority of the students showed less readiness to online learning and their experiences participating in it as part of their academic studies.

Keywords: E-learning, Higher education, COVID-19, Performance students, Art education

Introduction

The pandemic of Covid-19 that has engulfed the world today has jolted a country's economic, political, and social systems as a result of the implementation of a movement control order (MCO) or Lock Down (Department of Statistics Malaysia, 2020). Considering the mode of transmission of the Covid-19 epidemic in Malaysia, one of the most effective prevention methods at the moment is to restrict community movement in order to break the epidemic's chain. However, this prevention strategy has had a substantial impact, particularly on the education sector. As a result, teaching and learning methods are shifting toward online learning, particularly at the tertiary level (Atabey, 2021; Hu & Huang, 2022; Kamal et al. 2020; Sia & Adamu 2020; Xhelili et al., 2021). This rapid change has created a new challenge for the tertiary education field, as online teaching and learning approaches have been implemented weakly to date.

The availability of higher education institutions in re-blending the teaching and learning process through online methods is an issue that needs to be seen and investigated further at this moment (Chung et al, 2020, Alqabbani

et al 2020; Widodo et al 2020). The implementation of online teaching and learning methods, or distance education, as recommended by the Ministry of Education Malaysia (MOE), also has an effect on teaching and learning methods in practical courses such as performing arts courses, particularly theatre and dance, at Universiti Malaysia Sabah's Creative Arts Program, Faculty of Social Sciences and Humanities. This has sparked discussions among academics, particularly in the fields of dance and theatre, about the method's quality and effectiveness in terms of knowledge transfer and student acceptance. Additionally, the availability of students to learn this new standard is considered by examining aspects of self-inclination, infrastructure facilities, self-study skills, motivation, technological skills, and perceived usefulness by students.

Significance of the Study

Online teaching and learning methods, also known as e-learning, are the most effective way to ensure that the student learning process continues uninterrupted during a pandemic. This new method is intended to ensure that the educational system continues to operate normally and does not interfere with students' studies. However, the benefits and drawbacks of this new normative educational system must be considered. As a result, the purpose of this study was to gather information about the availability of dance and theatre students in the Creative Arts Program (HA11) on online teaching and learning methods, also known as e-learning, since the Covid-19 pandemic hit the world.

Student experience is an important aspect that needs to be evaluated to help improve the quality of e-learning in universities, which will help strengthen this study. This is the first study to focus on the learning experiences of dance and theatre students in the UMS Creative Arts Program. Furthermore, this study will be conducted in real-time, providing an in-depth understanding of the effectiveness of online teaching and learning, or e-learning, on dance and theatre students of the Creative Arts Program, UMS. This study's objectives are as follows: i) understand the online learning methods of students' choice; ii) assess the level of readiness of students for online learning methods through self-efficacy, subjective norms, experience, perception ease of use, perceived usefulness, and behavioral intention. Besides from that, iii) this study identifies the challenges and values that students face in continuing to use online learning methods or e-learning in the future.

Definition of Creative Arts Studies

The term "Creative Arts" refers to a variety of disciplines and expertise in art fields such as modern and traditional literature, film (documentary, video, and television), music, design art, and even dance and theatre performing arts (Mills 2014; Chen, 2016). The Creative Arts Program (HA11) is one of 11 study programmes offered by the Faculty of Social Sciences and Humanities at Universiti Malaysia Sabah (UMS). The Creative Arts Program is also an interdisciplinary programme that combines three (3) major disciplines, namely writing, theatre, and dance (Undergraduate Prospectus UMS, 2020). This program's curriculum is specifically designed to improve and develop students' balanced skills in the theoretical and practical aspects of art, as well as having high analytical, research, and art perception skills. Aside from that, the programme prepares students to be more

creative and critical both inside and outside of the professional studio as artists, managers, and researchers.

Throughout this study, the term "Creative Arts" refers to current dance and theater students who are studying in the Creative Arts Program (HA11), Faculty of Social Sciences and Humanities, UMS. Dance and theatre students specialise in the performing arts (Rajan, 2012; Bezrucka, 2011). Both of these disciplines, however, have their own areas of expertise and advantages. Both of these disciplines necessitate demonstrations, practical sessions, tutorials, spectacles, discussions, presentations, and field trips as methods of instruction. This clearly shows the importance of practical methods in imparting and receiving knowledge and skills.

Methodology

The research was carried out from April 2020 to December 2020, a period of nine (9) months. The online survey method is one of the methods used, with theatre and dance students from the Creative Arts Program, Faculty of Social Sciences and Humanities, UMS serving as respondents. A total of 29 question items were processed and divided into six (6) important factors to determine students' availability and attitudes toward online teaching and learning methods, or e-learning, during the pandemic. Self-efficacy, subjective norms, experience, perception ease of use, perceived usefulness, and behavioral intention to use are among the six (6) factors considered in achieving the study's objectives. Apart from that, this study examines the factors that contribute to student learning, such as computers, a stable internet connection, and a variety of other factors that may influence their learning process when using online teaching and learning methods, or e-learning. The data collected will be presented in frequency and percentage form to determine students' readiness for online learning and to better understand the obstacles they face, which will provide some insight into how to conduct successful online teaching and learning sessions during the COVID-19 pandemic.

Results

The study surveyed two groups of respondents: dance students (35.5 %) and theatre students (64.5 %). Both groups total 31 individuals and are a special target group because only this group of students participated in practical courses from April to December 2020. The percentage of respondents is summarized in Table 1.

Table 1. Percentage of Respondents

Major Students	Frequency	Percent (%)
Theatre	20	69
Dance	11	31

Self-Efficacy

The total percentage of respondents' feedback to the five-point Likert scale questions is shown in Table 2. The

overall mean value for self-propensity (3.40) was acceptable, indicating that a large proportion of students possessed high levels of confidence and perseverance when confronted with difficulties, and that student performance was unaffected directly by the COVID-19 pandemic. The majority of students (54.8 %) are proficient in using the e-learning platform (SmartV3UMS), and computer self-efficacy (58.1 %) is high among creative arts students.

Table 2. Student Self-Efficacy

	Strongly Disagree	Disagree	Quite Disagree	Agree	Strongly Agree	Mean
I can use the e-learning system (Google Classroom/ SmartV3UMS) without the guidance of others.	3.2%	3.2%	16.1%	**54.8%**	22.6%	3.90
I can use the e-learning system only guided by online instructions as a reference.	0.0%	6.5%	32.3%	**48.4%**	12.9%	3.68
I am able to deal with any technical problems when using the e-learning system.	0.0%	9.7%	25.8%	**58.1%**	6.5%	3.61
I can use the e-learning system even if I have never used the system before.	3.2%	25.8%	**51.8%**	16.1%	3.2%	2.90
I can use the e-learning system at any time.	6.5%	22.6%	**48.4%**	19.4%	3.2%	2.90
Overall mean						**3.40**

Subjective Norm

When subjective norms are considered, the data collection results indicate that the overall mean score for subjective norms is 3.48. This indicates that the student environment has an effect on students' readiness to use online for educational purposes (Table 3), particularly in terms of lecturer idol (61.3 %) and peer influence (51.6 %). To ensure that students are effectively prepared for online learning, lecturers and faculty must play an important role in not only monitoring student engagement in online classes but also modelling changes in educational styles to serve as an example to students, particularly in terms of roles. Students may also feel less stressed if they have the support and good communication of their peers and lecturers to complete assigned tasks.

Table 3. Percentage of students 'subjective norms

	Strongly Disagree	Disagree	Quite Disagree	Agree	Strongly Agree	Mean
My lecturer thought and expected me to use an e-learning system.	0.0%	9.7%	**45.2%**	35.5%	9.7%	3.45
My peers thought and expected me to use an e-learning system	3.2%	6.5%	**51.6%**	32.3%	6.5%	3.32
The management of my University/Faculty thinks and expects me to use the e-learning system.	3.2%	12.9%	38.7%	**41.9%**	3.2%	3.29
Generally, I will do what is expected by the lecturer on the use of e-learning system	0.0%	3.2%	22.6%	**61.3%**	12.9%	3.84
Overall mean						**3.48**

Experience

Students were given the opportunity to express their opinions on various aspects of their online learning experience via the survey form distributed, as shown in Table 4. According to the data collected, the majority of students (58.1%) expressed a high level of satisfaction with the use of computers in class. Meanwhile, 41.9 % and 38.7 % of students, respectively, agreed that they possess ICT skills necessary for conducting online learning, including internet operation, IT equipment, and software skills. However, students majoring in the creative arts (38.7 %) may have difficulty navigating and adapting to the screen display of e-learning platforms, particularly references and reading materials stored in the platform dashboard. Overall, the mean for student experience is 3.32, indicating that the majority of students have a low level of self-involvement, which should be considered by the programme and institution because it indicates students' unwillingness to fully transition to online teaching and learning methods.

Table 4. Percentage of student's experience

	Strongly Disagree	Disagree	Quite Disagree	Agree	Strongly Agree	Mean
I enjoy using computers	0.0%	16.1%	25.8%	**58.1%**	0.0%	3.42
I learned to use the Internet	0.0%	19.4%	29.0%	**41.9%**	0.0%	3.32
I am adept at saving and finding files online	0.0%	19.4%	**38.7%**	35.5%	6.5%	3.29
I enjoy using email	0.0%	16.1%	38.7%	**41.9%**	3.2%	3.32
I know how to upload and download files online	9.7%	12.9%	29.0%	**38.7%**	9.7%	3.26
Overall mean						**3.32**

	International Conference on		
║║║ICRES	Research in Education and Science		**istes** Organization
www.icres.net	April 1-4, 2021	Antalya, TURKEY	www.istes.org

Perceived Ease of Use

Aspects such as ease of use are also included in this analysis. This is because the majority of respondents indicated that they encountered numerous difficulties while implementing online teaching and learning, or e-learning. As displayed in Table 5, the overall mean (2.83) of students reporting on constraints encountered during online teaching and learning or in-progress e-learning. According to the data collected, 48.4 % of students reported that the e-learning system made learning difficult, while 41.9 % reported having difficulty obtaining required information. Additionally, 61.3 % of students reported having difficulty interacting with the e-learning system, and another 61.3 % stated that the e-learning system was not user friendly.

Table 5. Percentage of student's perceived ease of use

	Strongly Disagree	Disagree	Quite Disagree	Agree	Strongly Agree	Mean
The e-learning system simplifies my learning process.	9.7%	29.0%	**48.4%**	9.7%	3.2%	2.68
The e-learning system makes it easy for me to get the information I need.	6.5%	16.1%	**41.9%**	25.8%	9.7%	3.16
Interaction in e-learning system is clear and easy to understand.	16.1%	35.5%	**38.7%**	6.5%	3.2%	2.45
I find that e-learning systems are flexible to interact with.	9.7%	16.1%	**61.3%**	12.9%	0.0%	2.77
It was easy for me to become proficient in using e-learning systems.	6.5%	19.4%	**58.1%**	16.1%	0.0%	2.84
The e-learning system is easy to use.	6.5%	6.5%	**61.3%**	22.6%	3.2%	3.10
Overall mean						**2.83**

Perceived Usefulness

When the perceived use of practical courses is considered, the mean value (2.63) indicates that several factors, as listed in Table 6, have a major impact on respondents' readiness. According to the data collected, the majority of students (35.5%) believe that online teaching and learning techniques, or e-learning, would assist them in completing their assignments more quickly. Additionally, students expressed dissatisfaction with the online teaching and learning method, or e-learning, which helped them increase the effectiveness of learning dance and theatre by 58.1%. Similarly, the factor enhancing the effectiveness of dance and theatre art learning scored 48.4 %, the factor simplifying my learning scored 58.1%, and the factor assisting with practical learning in dance and theatre art courses scored 35.5%.

Table 6. Percentage of perceived usefulness of students

	Strongly Disagree	Disagree	Quite Disagree	Agree	Strongly Agree	Mean
The use of e-learning system to help me complete my tasks faster.	6.5%	35.5%	**35.5%**	19.4%	3.2%	2.77
The use of e-learning system improved my learning performance.	12.9%	19.4%	**58.1%**	9.7%	0.0%	2.65
The use of e-learning system increased my learning effectiveness.	9.7%	29.0%	**48.4%**	9.7%	3.2%	2.68
The use of e-learning system made my learning easier.	9.7%	22.6%	**51.8%**	12.9%	3.2%	2.77
I feel the e-learning system helpful to my learning in courses that require hands-on (practical) a lot.	25.8%	**35.5%**	25.8%	9.7%	3.2%	2.29
Overall mean						**2.63**

Behavioral Intention to Use

The results collected show that behavioral intention to use this online learning method is relatively low, with a mean of 2.64. The majority of students (45.2%) expressed slight interest in utilizing online learning methods for exams and assignment completion. Additionally, 38.7% and 45.7% of students, respectively, expressed low expectations for future use of online learning for dance and theatre courses. Furthermore, the dance and theatre students recorded a 58.1% possibility with not recommending the use of e-learning systems to field peers. Table 7 illustrates this percentage.

Table 7. Percentage of Behavioral Intention to Use of students

	Strongly Disagree	Disagree	Quite Disagree	Agree	Strongly Agree	Mean
I intend to use the e-learning system in preparation for exams and completing assignments	3.2%	32.3%	**45.2%**	16.1%	3.2%	2.84
I plan to use e-learning system in the future.	12.9%	**38.7%**	35.5%	9.7%	3.2%	2.52
I will use the e-learning system more often in the future.	12.9%	29.0%	**45.2%**	9.7%	3.2%	2.52
I would recommend the use of e-learning systems to others.	12.9%	19.4%	**58.1%**	6.5%	3.2%	2.68
Overall mean						**2.64**

ICRES

International Conference on
Research in Education and Science

www.icres.net   April 1-4, 2021   Antalya, TURKEY   www.istes.org

istes
Organization

Discussion

The e-learning method has benefited dance and theatre students by allowing them to continue their education during the COVID-19 pandemic period. In general, the study's findings show that students' preparation for online learning ranges from minimal to moderate, with a large number of them being poorly prepared. Students in dance and theatre arts have shown a low degree of satisfaction with online learning and a low perception of its efficacy. Moreover, the majority of students indicated that they would not pursue online learning in the upcoming semester if given the option. As a result, the low level of readiness may be a result of a variety of factors relating to the infrastructure and instructor training provided.

The most challenging factor for students is internet connectivity (Isa and Latiff, 2020; Chung et al., 2020; Choong, 2020); this is also a barrier encountered in online learning among dance and theatre students of the Creative Arts Program, UMS, particularly those living in rural areas. Students in rural areas (Lee, 2020) will face additional challenges due to inadequate internet connections and limited broadband data. Correspondingly, students face computer hardware issues, as their computing devices are incapable of meeting the demands of online education. Students' economic circumstances are also a significant constraint, particularly for those from low-income families B40 (Free Malaysia Today 2020; Imm, 2021). The majority of dance and theatre students rely on faculty-provided facilities such as studio space, equipment, computer labs, and room. They no longer have access to this facility due to movement control orders (MCOs) and must rely on scarce facility alternatives.

According to the statistical analysis, the major challenges to online learning for dance and theatre arts students during the COVID-19 pandemic period were ease of use and perceived usability. Although students have a high level of computer self-efficacy, they need to improve their fundamental and intermediate computer skills, particularly in order to deal with technical issues such as screen display management of the operations, browsers, application mechanisms, and navigation that they encounter when using e-learning platforms. One of the difficulties for dance and theatre students to immerse themselves in online learning systems seems to be the unconducive and unfriendly platform environment.

Another concern is the behavioral intent of online learning; dance and theatre students prefer face-to-face learning for future education. They find face-to-face learning more comfortable and enjoyable because they receive immediate feedback and input while they are learning. It is also closely related to internet network issues caused by slow internet, which limits live broadcasts of classes in Google Meet, Webex, Zoom, and Microsoft Teams, preventing students from participating in online learning sessions. Internet speed also has an effect on their ability to download content, complete quizzes, and exams as part of their studies.

Conclusion, Recommendation and Future Work

The high level of acceptance, strong infrastructure facilities, the ability of e-learning teaching mode to achieve

learning outcomes, and technical support to support the use of e-learning as a teaching method are all crucial to the learning achievement of dance and theatre students in both theoretical and practical aspects of performing arts. To increase dance and theatre students' readiness, universities should hold more computer skills training sessions to equip both students and lecturers with the tools necessary to be more effective in receiving and delivering online learning content. The university's help desk and technical infrastructure may make it easier for students to receive assistance and referrals to online learning.

Correspondingly, universities' online platform for online teaching and learning must be enhanced with learning environment-appropriate features that enable academics and students to manage resources, obtain information, and actively participate in learning activities. Thusly, strengthening the university platform minimizes the issue of students having to deal with multiple platforms that do not meet the needs of local students. For the better part, the university's primary objective should be to enhance internet connectivity; as reported by Chung et al. (2020), the university's speed and internet system are critical for ensuring more successful learning. Students are permitted to return to university dormitories during a long-term pandemic period. As a result, expanding internet connectivity on campus is essential for fostering a more positive attitude toward and acceptance of new technologies in the educational process.

Satisfaction with online learning also requires additional investigation using various instruments such as interview sessions and factors to improve the platform's suitability for education in terms of display and function, particularly for dance and theatre learning. Alternatively, when developing platforms for e-learning systems, designers, researchers, and students should be consulted in order to arrive at collaborative solutions to the challenges of e-learning for dance and theatre students. Further research on students' academic performance is necessary to determine the efficacy of online education in the field of dance and theatre arts. By raising awareness and guiding art students toward IR 4.0, it is hoped that the study will provide data and information that will assist universities in improving teaching and learning, particularly the flexibility of teaching and learning processes to adapt to changing environments.

Acknowledgment

References

Atabey, D. (2021). COVID-19 from the Perspective of Preschool Prospective Teachers: What Can We Do for Children? International Journal on Social and Education Sciences (IJonSES), 3(1), 82-94.

Bezrucka, Y. (2011). Performing arts/performance arts. In D. Southerton (Ed.), *Encyclopedia of consumer*

culture (Vol. 1, pp. 1080-1081).

Sia, J. and Adamu, A. (2020). "Facing the unknown: pandemic and higher education in Malaysia," *Asian Educ. Dev. Stud.*, vol. 10, no. 2, pp. 263–275, 2020, doi: 10.1108/AEDS-05-2020-0114.

Chung, E., Noor, N. M., & Vloreen Nity Mathew. (2020). Are You Ready? An Assessment of Online Learning Readiness among University Students. *International Journal of Academic Research in Progressive Education and Development*, *9*(1), 301–317.

Choong. P.Y. (2020). ''COVID-19: Impact on the tertiary education sector in Malaysia,'' 'Crisis Assessment,' Penang Institute, Pulau Pinang, Malaysia, Tech. Rep., 2020. [Online]. Available: https://penanginstitute.org/wp-content/uploads/2020/05/IMPACT-ON-THE-TERTIARY-EDUCATION-SECTOR-IN-MALAYSIA.pdf

Isa, K, Latif, A. (2020). "Internet Browsing Trends among Malaysians during Movement Control Order (MCO) Period", International Journal of Emerging Technologies in Engineering Research, Vol. 8, No. 4, 2020.

Alqabbani, S., Almuwais, A., Benajiba, N., & Almoyad, F. (2020). Readiness towards emergency shifting to remote learning during COVID-19 pandemic among university instructors. E-Learning and Digital Media, 1–20. https://doi.org/10.1177/2042753020981651

Widodo, S., Wibowo, Y., & Wagiran, W. (2020). Online learning readiness during the Covid-19 pandemic. Journal of Physics: Conference Series, 1–4. https://doi.org/:10.1088/1742-6596/1700/1/012033

Chen, S. 2016. The Importance of Creative Arts in Early Childhood Education. Novak djokovic foundation [Online]https://novakdjokovicfoundation.org/importance-creative-arts-ece/#:~:text=The%20use%20of%20the%20imagination,drama%2C%20puppetry%2C%20and%20music (20 January 2021)

Mills, H. (2014). The importance of creative arts in early childhood classrooms. Texas Child Care Quarterly, 38(1), 1–3.

Lee, S. (2020). Poor Internet connections, no computers hinder online learning in Sabah. The Star.

Talia. R. (2020). Kajian Kes Impak Perintah Kawalan Pergerakan Kepada Penduduk Malaysia. Jabatan Perangkaan Malaysia.

Undergraduate Prospectus Universiti Malaysia Sabah. (2020). Academic Service Division. [Online] http://bpa.ums.edu.my/index.php/en/undergraduate-prospectus/2019-2020/fakulti/fksw (03 March 2021).

Free Malaysia Today (2020). For poor families, online learning is a drag. (n.d.). Free Malaysia Today (FTM). [Online] https://www.freemalaysiatoday.com/category/nation/2021/01/22/for-poor-families-online-learning-is-a-drag/ (20 March 2021)

Rajan, R. S. (2012). Integrating the Performing Arts in Grades K-5. SAGE Publication.

Imm, N. S. (2021). More support needed for B40 families in online learning. New Straits Times.

Hu, H. & Huang, F. (2022). Application of Universal Design for Learning into Remote English Education in Australia amid COVID-19 Pandemic. International Journal on Studies in Education (IJonSE), 4(1), 55-69. https://doi.org/10.46328/ijonse.59

Xhelili, P., Ibrahimi, E., Rruci, E., & Sheme, K. (2021). Adaptation and Perception of Online Learning during COVID-19 Pandemic by Albanian University Students. International Journal on Studies in Education (IJonSE), 3(2), 103-111.

The Effect of Oil Prices Volatility on Prices in the Domestic Market:

Empirical Evidence from Russia

Svetlana Balashova

Peoples Friendship University of Russia (RUDN University), Russia, https://orcid.org/0000-0003-1797-8825

Abstract: The dynamics of real prices of crude oil in the domestic market and its dependence on world oil prices is examined. The ARDL model approach is used to get the results. It is shown that nominal prices in dollars are strongly related to current word prices although are considerably lower in the domestic market. The difference between the world market price and the local price is mainly export duties. Export duties on oil and petroleum products, in addition to their fiscal function, also perform the function of protecting the domestic market from rising fuel prices. However, the real oil price in the local currency has different dynamics and is less volatile than current dollars prices. Volatility in Brent prices has an additional impact on real domestic prices of crude oil in Russia. Uncertainty in the global oil market causes the uncertainty in revenue flow for the oil-producing companies, which forces them to increase oil prices in the domestic market. Domestic prices dropped sharply in April 2020, but then almost return to pre-pandemic levels although Brent has not. The possible explanation is the increased volatility in the global oil market.

Keywords: Crude oil prices, Volatility, Uncertainty, Russia, Export duty

Introduction

Despite the long-time intention to shift the Russian economic model to more innovative and endogenous (Balashova, Lazanyuk, & Matyushok, 2018), oil and natural gas are major industries in the energy market and play an influential role in the Russian economy (Sergi & Berezin, 2018). Russia is among the top-three largest oil producers in the world together with the United States and Saudi Arabia.

Until 2020, oil production in Russia has been growing for 11 consecutive years. In 2019, Russia set a record for oil production for the entire post-Soviet period – 560.3 million tons of oil and condensate. In 2020, the volume of crude oil and condensate production in Russia decreased by 8.6% compared to 2019 and amounted to 512.76 million tons (https://minenergo.gov.ru/activity/statistic). This value has become the lowest over the past nine years and approached a ten-year minimum: in 2010, it amounted to 512.3 million tons. The main reasons for this drop-down are the decline in demand caused by the pandemic and the OPEC+ deal in April 2020. Although the new OPEC+ deal in January 2021 agreed to raise overall crude output slightly for Russia, the pandemic-related

International Conference on	
Research in Education and Science	
www.icres.net	April 1-4, 2021	Antalya, TURKEY	www.istes.org

risks to demand remain high and call for new scenarios for developing of the Russian oil industry (Ponkratov et al., 2020).

In 2020, more than 53% of the produced oil was refined. In recent years, this share has increased slightly. The price of crude oil in the domestic market differs from the oil price in the world market. The Ministry of Finance and the Ministry of Energy of the Russian Federation have developed mechanisms to prevent an increase in oil prices in the domestic market in the face of rising prices in the world market. Since 2019, the new tax reform of the oil industry has started in Russia. These mechanisms kept crude oil and petrol prices in the domestic market at a lower level during the high export price of oil. But in 2020, crude oil and petrol prices in Russia remained high despite low export prices. This was also a consequence of the tax reform.

However, there is no doubt that the relationship between domestic market prices and global market prices exists. The impact of oil prices on economic performance is widely examined in the literature (see, for example, (Barsky & Kilian, 2004; Guesmi, Jlassi, Atil, & Haouet, 2016; Hamilton, 2008; Hooker, 1999) and many others). The well-known researcher in this field, L.Killian has highlighted a "number of potential determinants of oil price fluctuations, including 1) shocks to global crude oil production arising from political events in oil-producing countries, the discovery of new fields, and improvements in the technology of extracting crude oil; 2) shocks to the demand for crude oil associated with unexpected changes in the global business cycle; and 3) shocks to the demand for above-ground oil inventories, reflecting shifts in expectations about future shortfalls of supply relative to demand in the global oil market " (Baumeister & Kilian, 2016).

This study aims to assess the impact of oil prices volatility in the global market on domestic market prices. The crude oil price governs the petrol price, which in turn has a profound impact on subjective well-being (Prakash, Awaworyi Churchill, & Smyth, 2020). Using the ARDL model, the study shows that the higher the volatility of world crude oil prices, the higher the price for Russian refiners. On the one hand, this is a consequence of the existing taxation system. On the other hand, this reflects the intention of oil companies to minimize the possibility of losses during periods of high uncertainty in the global market.

Methodology

Data Preparation

The period of study is from January 2000 to December 2020 (a total of 252 monthly observations). I used prices for Brent (Europe Brent Spot Price FOB (Dollars per Barrel)) as a benchmark of oil prices in the global market. The source of data is U.S. Energy Information Administration (https://www.eia.gov/dnav/pet/hist/rbrteD.htm), the time series is denoted as *BRENT*.

To assess the volatility of the oil price, a moving standard deviation is used. First, I calculated a series

BRENT_ST as a one-month backwards moving standard deviation of daily prices. Then I converted daily data to monthly data using a standard a high- to a low-frequency method:

$$VOL\_BRENT_t = \frac{1}{n_t} \sum_{j=1}^{n_t} BRENT\_ST_j$$

where n_t is the number of observations in the month *t* from January 2000 till December 2020.

The Russian Federation State Committee on Statistics (here and after Rosstat) measures the domestic oil price as the average purchase price of crude oil for domestic companies. The average purchase price considers the influence of both the price factor and changes in terms of purchase, the ratio in the acquisition of resources with different quality characteristics and different price levels, seasonality, etc. Rosstat provides data on oil prices at a monthly frequency only since 2009 January and before that quarterly. I used a low to high-frequency quadratic conversion method to reconstruct monthly data for the period 2000-2008. Thus, I have a series of nominal oil prices in the domestic market *OIL_NOM_RUB* (rubles per ton of oil). To obtain a measure of the real price of oil, the average purchase price of crude oil for domestic companies was deflated by the consumer price index (CPI). The series is denoted as *OIL_REAL_RUB*.

The next step was to convert prices from rubles to dollars at the Central Bank of the Russian Federation's official exchange rate. To compare prices globally and in the domestic market, I calculated prices per barrel using the ton-to-barrel ratio (1 ton of Urals equals 7.28 barrels). The series is denoted as *OIL_NOM_USD*.

Before building a model, it is necessary to check the properties of time series, namely, to test whether our time series data is stationary or not. I utilized the ADF test (Dickey & Fuller, 1981), the DF-GLS test (Elliott, Rothenberg, & Stock, 1996) to test for unit root, and the KPSS test (Kwiatkowski, Phillips, Schmidt, & Shin, 1992) to test for stationarity.

The goal is to employ computationally simple techniques to narrow down the range of parsimonious models worthy of more detailed further study in the tentative specification phase. Techniques such as the autocorrelation function (ACF) and partial autocorrelation function (PACF) have been widely used. The ACF can help determine the order of differencing needed to make the transformed series stationery and pin down the order of a moving average model for stationary series. The PACF, on the other hand, is useful to help decide the order of a stationary autoregressive model (Greene, 2008).

Model Specification

In this study, I use the ARDL model to assess the impact of world prices and volatility on domestic prices. ARDL models are linear time series models in with both the dependent and independent variables are related not only contemporaneously but across lagged values as well. A general ARDL(p,q1,…,qk) model is given by:

$$y_t = a_0 + a_1 t + \sum_{i=1}^{P} \gamma_i y_{t-i} + \sum_{j=1}^{k} \sum_{l_j=0}^{q_j} \beta_{j,l_j} x_{j,t-l_j} + \varepsilon_t$$

(1)

where ε_n is an error term, a_0 is a constant term, a_1 is a coefficient, associated with a linear trend, γ_i are coefficients, associated with lags of the dependent variable y_t, β_{j,l_j} are coefficients, associated with k (lagged) explanatory variables $x_{j,t-l_j}$. P is the number of lags of the dependent variable and q_j is the number of lags of the independent variable x_j. Parameters of the equation (1) can be assessed using the standard least squares estimation method when the error terms series satisfies the OLS conditions.

In this study, I consider two explanatory variables: the logarithm of nominal prices for Brent and the logarithm of volatility of prices for Brent. The log-log model is used since the coefficients in a *log-log model* represent the *elasticity* of the dependent variable with respect to explanatory variables. The main interest is in intertemporal dynamics of the variables. The choice of P and q_j is based on AIC as it is a standard approach in time series analysis (see, for example, Balashova & Serletis, 2020).

Results

Preliminary Data Analysis

Crude oil prices per barrel back to 2000 is shown on Figure 1, from which the linkage between crude oil prices in the domestic market and the world market is obvious. The correlation coefficient is about 0.87, and we can say that export price is the dominant factor for domestic prices.
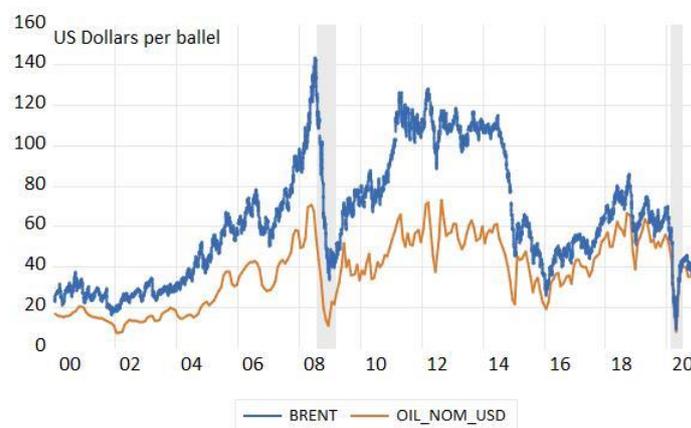

Figure 1. Crude oil prices in the global and Russian market

The shaded areas on Figure1 are periods of recession. There are various methods to determine recession periods and even during global crises different markets may react with a delay (Antonakakis, Chatziantoniou, & Filis,

2017). The global financial and economic crises started in 2007 in the USA, has not affected the Russian economy immediately (Balashova, 2018).

The price for crude oil in the global market reached its peak in the middle of 2008 and then fell like a stone. The same was in the Russian domestic market, although the difference between the highest and the lowest price was not so huge. However, in 2014 the sharp decline of oil prices in the global market was to a certain extent compensated in the domestic market by a sharp fall in the exchange rate (Mironov, 2015). So, the decline in nominal prices in USD in the Russian market was not so severe. That was not the case regarding spring 2020. Due to the COVID-19 pandemic lockdown, oil prices fell in the global and domestic markets almost simultaneously.

However, the relationship between nominal and real prices for crude oil in the domestic market is rather low (see Figure 2).
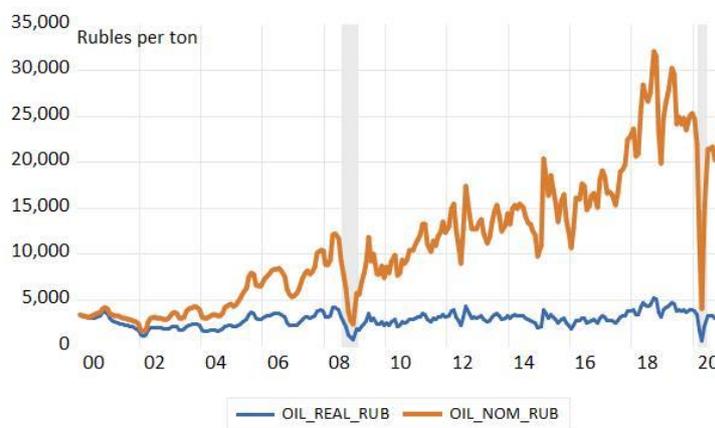

Figure 2. Nominal and real prices for crude oil in the Russian market

To proceed further we need to check our variables for (weak) stationarity. Results are shown in Table 1. It reports *t*-statistics for the ADF and DF-GLS tests and LM-statistics for the KPSS test, and indicate with asterisks if the null hypothesis, H_0, is rejected at a certain level of significance. H_0 assumes time series to have a unit root for the ADF and DF-GLS tests and for KPSS test H_0 is the opposite. It is known that the ADF test has low power to reject H_0 (Cochrane, 1991), so KPSS can help to make a decision in case the ADF test does not reject the null hypothesis.

Based on the ADF, the DF-GLS and the KPSS tests I used the real oil prices and the volatility of the global prices in (log) levels and the prices for Brent and domestic prices in USD in (log) first differences. I examined model (1) for nominal and real oil prices. First, I chose the optimal lag structure based on AIC (Akaike Information Criteria). Then, for the chosen structure of the ARDL model, I estimated the parameters for the whole sample and the span, excluding the period of crises.

Table 1. Unit root and stationary tests

Series	ADF H_0: Unit root		DF-GLS H_0: Unit root		KPSS H_0: stationarity		Decision
	intercept	intercept and trend	intercept	intercept and trend	intercept	Intercept and trend	I(d)
A: Log Levels							
BRENT	-1.71	-1.39	-0.68	-1.14	0.70**	0.40***	I(d), d>0
OIL_NOM_USD	-2.86*	-3.51**	-1.71**	-3.51***	1.22***	0.28	I(1)
OIL_REAL_RUB	-4.0***	-4.86***	-3.3***	-3.55***	0.79***	0.05	I(0)
VOL_BRENT	-5.15***	-3.6**	-4.0***	-5.19***	0.49**	0.28***	I(0)
B: Logarithmic first differences							
BRENT	-11.1***	-11.13***	-9.9***	-10.8***	0.29	0.13*	I(0)
OIL_NOM_USD	-19.2***	-19.2***	-13.***	-3.5***	0.14	0.05	I(0)

Notes. * denotes that H_0 is rejected at 10% level of significance, ** at 5%, and *** at 1%.

For the ADF and DF-GLS regressions, the lag length is automatically selected based on SIC. Critical values are different for different time series because of the different number of observations.

Time series are classified as I(1) or I(0) if at least four out of the six test variations point for this decision.

Results for Nominal Prices

I examined ARDL model (1) where the dynamic regressors are $DLOG(BRENT)$ and $LOG(VOL\_BRENT)$. The selected model is ARDL(4,0,0) as it has the lowest Akaike Information criteria (see Figure 3).
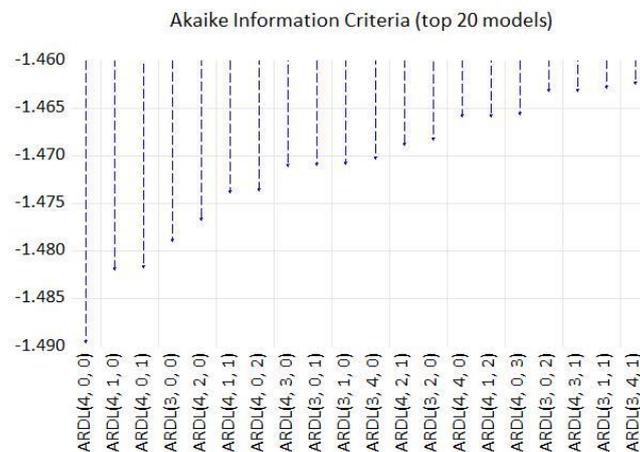

Figure 3. Model selection summary for nominal prices in USD

The results for nominal oil prices in the domestic market are summarized in Table2.

Table 2. Estimation of the ARDL model for nominal oil prices

	2000M03-2020M12	(2000M03-2008M08)	U
		(2009M02-2020M03)	U
		(2020M06- 2020M12)	
DLOG(OIL_NOM_USD(-1))	-0.12***	-0.045	
DLOG(OIL_NOM_USD(-2))	-0.16***	-0.12***	
DLOG(OIL_NOM_USD(-3))	-0.104**	-0.08**	
DLOG(OIL_NOM_USD(-4))	-0.09**	-0.07*	
DLOG(BRENT)	1.37***	1.07***	
LOG(VOL_BRENT)	0.01	0.01	
R^2	0.64	0.52	
AIC	-1.49	-1.72	
N	247	240	

Notes. * denotes that the coefficient is significant at 10% level of significance, ** at 5%, and *** at 1%.

From the results presented in Table2, we conclude that nominal prices for crude oil in the domestic market is susceptible to the dynamic of oil prices in the global market. The corresponding elasticity is 1.37. The changes in domestic prices are contemporaneous to changes in global prices. The coefficient at the volatility of prices for Brent is positive but not statistically significant. Changers of nominal prices in the domestic market in previous periods are negatively impacting current changes. The corresponding coefficients are negative and significant (at least at a 5% significance level). So, one can expect that in times when the global prices are increasing, the prices in the Russian market will increase at a slower pace.

Assessing the ARDL(4,0,0) model for the period 2000M03-2020M12, excluding the recession periods, I obtained almost the same results. The main difference is in the value of elasticity of domestic prices for global prices. We can say that during the expansion phase of the business cycle, the local market is less sensitive to the global market. But in the phase of contraction, the sensitivity increases.

Results for Real Prices

Analysis of real oil prices in the local currency shows a bit different pattern. The selected model base on AIC is ARDL(1,2,0), results presented in Table 3. This shows that the real oil prices contemporaneously correlate with the changes in the benchmark price but depend on lagged values. For real oil prices, the effect of volatility is significant. Even when end-of-the-month Brent prices keep constant, the increase in daily volatility causes the rise in the real oil prices in the domestic market. The results do not alter when recession periods are excluded from the estimation span.

The elasticity of real prices for global prices is 1.14 (0.8 for the sample excluding recessions). However, even a sharp rise in the global price will not lead to the equivalent rise in the local price, as the local price correlates severely with previous values.

Table 3. Estimation of the ARDL model for real oil prices in the Russian market

	2000M02-2020M12	(2000M02-2008M08) U (2009M02-2020M03) U (2020M06- 2020M12)	2000M02-2020M12
$LOG(OIL\_REAL\_RUB(-1))$	0.88***	0.9***	0.86***
$DLOG(BRENT)$	1.14***	0.8***	1.14***
$DLOG(BRENT(-1))$	-0.005	0.02	—
$DLOG(BRENT(-2))$	-0.17**	-0.13**	—
$LOG(VOL\_BRENT)$	0.04***	0.03**	0.05***
R2	0.86	0.87	0.85
AIC	-1.46	-1.84	-1.45
N	251	244	251

In the last column of Table 3, estimation results of the restricted model are presented. The restrictions are imposed on the coefficients at the lag values of Brent prices. The Wald test does not reject these restrictions.

The restricted model can be interpreted in terms of the partial adjusted model. In the partial adjusted model, it is assumed that the expected value of the dependent variable (oil prices in the domestic market in our case) y_t^* is the function the dependent variable(s) (of changers in global markets $x_{1,t}$ and volatility of global prices $x_{2,t}$).

$$y_t^* = \gamma_1 + \gamma_2 x_{1,t} + \gamma_3 x_{2,t} + \varepsilon_t \qquad (3)$$

It then assumed that the actual increase in the dependent variable is proportional to the discrepancy between the expected value and the previous value (see for details in Dougherty, 2006).The actual value then is a weighted average of the current expected value and the previous actual value:

$$y_t = \lambda y_t^* + (1 - \lambda) y_{t-1} \qquad (4)$$

where λ is the speed of the adjustment process.

Substituting for y_t^* from the target relationship, one obtains

$$y_t = \gamma_1 \lambda + \gamma_2 \lambda x_{1,t} + \gamma_3 \lambda x_{2,t} + (1 - \lambda) y_{t-1} + \varepsilon_t \qquad (5)$$

Thus, from the last column of table 3 we get, that $(1 - \lambda) = 0.86$ and the speed of adjustment is equal to 0.14. The coefficients of $DLOG(BRENT)$ and $LOG(VOL\_BRENT)$ give the short-run effect of these variables on real oil prices in the Russian local market but divided by the estimate of λ we get the long-run effect. The long-run effect is much larger.

Discussion

Crude oil prices play a key role in the economy of any country (Elder & Serletis, 2010). For the oil-exporting countries the role is even more significant (Bozkurt, Erdem, & Eroğlu, 2015). Examining the impact of export prices on the prices for domestic companies, it is necessary to account for the existing taxation system. Export duties were introduced back in 1992 and were supposed to be a tool for the government's prompt response to the current market conditions. In the mid-90s, duties were abolished and replaced by excise duties. In 2002, a new tax system was introduced, in particular, the mineral extraction tax (MET) was introduced, and export duties on oil were fixed as a permanent tax institution. This instrument provides for different duties on crude and refined oil, thereby stimulating the export of petroleum products. The size of the export duty varies and, in particular, in some cases was used as an incentive for the development of new fields.

In 2019, the process of reducing export duties began. In principle, export duties, as a tool to protect domestic producers, reduce competitiveness (Volgina, 2020). Changes in the external market and a sharp decline in world prices led to a sharp decrease in the size of customs duties to $ 6.8 per ton. After the leveling of world prices, customs duties returned to their pre-crisis values. From February 2021, the export duty on oil is $ 43.8 per ton. To smooth out the influence of world oil prices on domestic prices in Russia in 2018, a regulatory mechanism was invented, called a damper.

The damper, which entered into force in 2019, is based on the difference between the export price of fuel and the conditional internal price, enshrined in the relevant bill and subject to annual indexation by 5%. If the export price is higher than the conditional one, then the budget compensates the oil companies for part of the difference so that oil refineries can supply fuel to the domestic market at the same prices and at the same time maintain a comfortable margin level. On the contrary, if the export price is lower than the conditional one, then the oil companies must compensate the budget for this difference. This was the case, for example, in 2020, when, due to the COVID-19 pandemic, world oil prices fell below $ 40 per barrel.

Thus, we can conclude that the current tax system plays an important role in regulating crude oil prices in the domestic market. Oil refiners, expecting a decrease in revenues in case of high volatility in the global oil market (due to tax duties including), keep higher oil prices in the domestic market even with a decrease in world prices. On the other hand, the uncertainty in the oil market results in a persistent drop of industrial production in oil-exporting countries (Azad & Serletis, 2020; Balashova & Serletis, 2020; Hou, Mountain, & Wu, 2016; Śmiech, Papież, Rubaszek, & Snarska, 2021). And thus, it can reduce the demand for fuel in Russia and hamper the increase in real prices.

Conclusion

Modelling the impact of the world price and volatility on the domestic price shows that the domestic prices,

both in dollars or in the local currency, increase with the growth of world prices and the volatility of world prices. At the same time, the real price for crude oil is not so volatile, except for crises periods. In times of crises, the domestic price elasticity for the world price rises sharply. In the short run, the impact of volatility on nominal and real prices is not so large. However, the effect is much larger in the long run and keeps prices in the domestic market higher than expected. The study shows that the local market is less sensitive to the global market during the expansion phase of the business cycle. But in the phase of contraction, the sensitivity increases. The results are important for policymakers in adjusting the taxation system.

Acknowledgements

References

Antonakakis, N., Chatziantoniou, I., & Filis, G. (2017). Oil shocks and stock markets: Dynamic connectedness under the prism of recent geopolitical and economic unrest. *International Review of Financial Analysis*, *50*, 1–26. https://doi.org/10.1016/j.irfa.2017.01.004

Azad, N. F., & Serletis, A. (2020). Oil Price Shocks in Major Emerging Economies. *SSRN Electronic Journal*, (403). https://doi.org/10.2139/ssrn.3577378

Balashova, S., Lazanyuk, I., & Matyushok, V. (2018). Growth Scenarios for the Russian Economy. In B. S. Sergi (Ed.), *Exploring the Future of Russia's Economy and Markets: Towards Sustainable Economic Development* (pp. 235–256). London: Emerald Publishing Limited. https://doi.org/10.1108/978-1-78769-397-520181013

Balashova, S., & Serletis, A. (2020). Oil prices shocks and the Russian economy. *The Journal of Economic Asymmetries*, *21*, e00148. https://doi.org/10.1016/J.JECA.2019.E00148

Barsky, R. B., & Kilian, L. (2004). Oil and the Macroeconomy Since the 1970s. *Journal of Economic Perspectives*, *18*(4), 115–134. https://doi.org/10.1257/0895330042632708

Baumeister, C., & Kilian, L. (2016). Forty Years of Oil Price Fluctuations: Why the Price of Oil May Still Surprise Us. *Journal of Economic Perspectives*, *30*(1), 139–160. https://doi.org/10.1257/jep.30.1.139

Bozkurt, Ö. G., Erdem, C., & Eroğlu, L. (2015). Identifying the factors affecting the economic growth of oil-producing countries. *International Journal of Trade and Global Markets*, *8*(2), 97–111. https://doi.org/10.1504/IJTGM.2015.069421

Cochrane, J. H. (1991). A critique of the application of unit root tests. *Journal of Economic Dynamics and Control*, *15*(2), 275–284. https://doi.org/10.1016/0165-1889(91)90013-Q

Dickey, D. A., & Fuller, W. A. (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. *Econometrica*, *49*(4), 1057. https://doi.org/10.2307/1912517

Dougherty, C. (2006). *Introduction to econometrics*. Oxford University Press.

Elder, J., & Serletis, A. (2010). Oil Price Uncertainty. *Journal of Money, Credit, and Banking*, *42(6)*, 1137–

1159. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=908675

Elliott, G., Rothenberg, T. J., & Stock, J. H. (1996). Efficient Tests for an Autoregressive Unit Root. *Econometrica*, *64*(4), 813–836. https://doi.org/10.2307/2171846

Greene, W. H. (2008). *Econometric Analysis*. (P. Education, Ed.), *Journal of the American Statistical Association* (6th ed., Vol. 97). Pearson Prentice Hall. https://doi.org/10.1198/jasa.2002.s458

Guesmi, K., Jlassi, N. B., Atil, A., & Haouet, I. (2016). On the influence of oil prices on financial variables. *Economics Bulletin*, *36*(4), 2261–2274.

Hamilton, J. D. (2008). Oil and the Macroeconomy. In S. Durlauf & L. Blume (Eds.), *The New Palgrave Dictionary of Economics*. London: Palgrave Macmillan UK. https://doi.org//10.1057/978-1-349-95121-5_2119-1

Hooker, M. A. (1999). Oil and the Macroeconomy Revisited. *Finance and Economics Discussion Series*, *1999*(43), 1–23. https://doi.org/10.17016/FEDS.1999.43

Hou, K., Mountain, D. C., & Wu, T. (2016). Oil price shocks and their transmission mechanism in an oil-exporting economy: A VAR analysis informed by a DSGE model. *Journal of International Money and Finance*, *68*, 21–49. https://doi.org/10.1016/J.JIMONFIN.2016.05.004

Kwiatkowski, D., Phillips, P. C. B., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root: How sure are we that economic time series have a unit root? *Journal of Econometrics*, *54*(1–3), 159–178. https://doi.org/10.1016/0304-4076(92)90104-Y

Mironov, V. (2015). Russian devaluation in 2014-2015: Falling into the abyss or a window of opportunity? *Russian Journal of Economics*, *1*(3), 217–239. https://doi.org/10.1016/j.ruje.2015.12.005

Ponkratov, V., Kuznetsov, N., Bashkirova, N., Volkova, M., Alimova, M., Ivleva, M., … Elyakova, I. (2020). Predictive Scenarios of the Russian Oil Industry; with a Discussion on Macro and Micro Dynamics of Open Innovation in the COVID 19 Pandemic. *Journal of Open Innovation: Technology, Market, and Complexity*, *6*(3), 85. https://doi.org/10.3390/joitmc6030085

Prakash, K., Awaworyi Churchill, S., & Smyth, R. (2020). Petrol prices and subjective wellbeing. *Energy Economics*, *90*, 104867. https://doi.org/10.1016/j.eneco.2020.104867

Sergi, B. S., & Berezin, A. (2018). Oil and Gas Industry's Technological and Sustainable Development: Where Does Russia Stand? In *Exploring the Future of Russia's Economy and Markets* (pp. 161–182). Emerald Publishing Limited. https://doi.org/10.1108/978-1-78769-397-520181009

Śmiech, S., Papież, M., Rubaszek, M., & Snarska, M. (2021). The role of oil price uncertainty shocks on oil-exporting countries. *Energy Economics*, *93*, 105028. https://doi.org/10.1016/j.eneco.2020.105028

Volgina, N. (2020). Global Value Chain Research: The Role of International Organisations. *International Organisations Research Journal*, *15*(2), 255–285. https://doi.org/10.17323/1996-7845-2020-02-12

Higher Education Institution Faculty Teaching Experience during Quarantine: Challenges and Recommendations

Eatedal Alabdulkreem

Princess Nourah Bint Abdulrahman University, Riyadh, Saudi Arabia

Abstract: The novel coronavirus disease 2019 (COVID-19) has spread rapidly, sending billions of people into lockdown. To protect students and staff members from this contagious disease, universities worldwide have decided to close and replace face-to-face teaching and learning with distance learning programs. This research, therefore, focuses on how this sudden transition has impacted academics in the College of Computer and Information Sciences (CCIS) at Princess Nourah bint Abdul Rahman University (PNU), Saudi Arabia. The study was conducted by interviewing 15% of this college' academic staff members. Questions centered on their experiences shifting from face-to-face teaching to online delivery. The results help to establish what challenges academics have faced during these unprecedented times, as well as what recommendations can be made to ensure online delivery is conducted smoothly so that harmony may return to the processes of university teaching and learning.

Keywords: COVID-19, Outbreak, Pandemic, Education, Universities, Online learning, Distance education, Higher education, Quarantine, Saudi Arabia

Introduction

The novel coronavirus disease 2019 (COVID-19) pandemic has certainly changed the world and will be a defining moment of the century (Chahrour, et al., 2020). The whole world has been forced to adapt to a challenging, different way of living, which involves social distancing (Xiang, et al., 2020). People are now required to stay home as much as possible and to wear personal protective equipment when in public (Spina, et al., 2020) [3]. In light of escalating concerns about COVID-19, educational institutions worldwide choose to close their doors—with many closures beginning on March 20, 2020 ((WHO), 2020). Over 1.5 billion students of different ages were affected by these closures ((WHO), 2020). An increasing number of universities have transitioned rapidly from face-to-face to online delivery in all courses and programs (Bedford, et al., 2020).

Hence, it is not surprising that university closures and the sudden transition from face-to-face to online delivery has raised a considerable number of issues for faculty members and students (Al-Rasheed & Berri, Effective Reuse and Sharing of Best Teaching Practices, 2017). This study, therefore, will emphasize the potential impact

of the COVID-19 outbreak on education and staff members that allow them the ability to continue distance learning successfully. Additionally, though online courses were available prior to the COVID-19 restrictions, and though most university staff members have experience with online teaching, the sudden transition to teaching entirely online within a few days has been a huge challenge. Staff members have found themselves facing issues with teaching, giving assessments, and functioning under increased workloads. They have also been suffering heavy financial and time pressures (Al-Rasheed & Berri, Engineering domain expertise through best practices management: Application to the field of education, 2016) (IESALK, 2020) (Crawford, Butler-Henderson, Rudolph, & Glowatz, 2020). Yet, there are still fewer researches towards the challenges that the higher institutions face through this transition as most of the existing studies concentrate on the effect of the pandemic on the education in general (Affouneh, Salha, & Khlaif, 2020; Atilgan & Tukel, 2021; Bozkurt & Sharma, 2010; Gupta & Goplani, 2020; Hebebci, Bertiz, & Alan, 2020; Kara, 2021; Kibici & Sarıkaya, 2021; Nnebedum, Obuegbe, & Nwafor, 2021; Paudel, 2021;Viner, et al., 2020; Wajdi, et al., 2020; Williamson, Eynon, & Potter, 2020). Therefore, this research will also highlight the challenges faculty members have faced due to the pandemic and will propose recommendations that may return smoothness and harmony to the processes of university teaching and learning. The remainder of the paper is organized as follows. Section II explains the research methodology, and Section III presents the results and the discussion stemming from them. Recommendations are made in Section IV, and Section V concludes the paper.

Significance and Purpose of the Study

The study is both necessary and significant because the current pandemic is a novel situation for higher education institutions globally, and these institutions are desperate to take advantage of each other's experience. The research results and outcomes will help move higher education institutions toward restoring smoothness and harmony to the processes of university teaching and learning.

Research Questions

1. What challenges have the faculty members faced while transitioning from face-to-face teaching to online teaching due to the COVID-19 pandemic?
2. What recommendations do the faculty members have for overcoming these challenges and making online teaching smoother and more successful?

Method

This research was carried out in the PNU CCIS. It followed an analytical descriptive approach to explore the challenges faced, and the recommendations expressed, by the faculty members who have had to shift from face-to-face teaching to online delivery. As the sudden transition from traditional teaching to online delivery is a new situation, the study did not need to gather basic information. Instead, it was necessary to ask questions that

would elicit fruitful answers from participants; these answers could then be more deeply explored via further questions to gain more insight into the situation. Therefore, a qualitative research methodology was employed. Online interviews were conducted with faculty members via Skype to deeply explore the participants' attitudes and opinions, as the research was designed to determine how staff members feel or what they think about the sudden transition situation, as well as what they need to overcome the challenges it presents. 15% of the staff members from the CCIS were randomly chosen. The participants were drawn from various departments and academic ranks. They also had different levels of online teaching experience. This was to ensure that the study results would reflect the realities of most of the staff members.

Study Sample

The study sample was chosen from the three departments in the PNU CCIS: The Computer Sciences (CS), the Information Systems (IS), and the Information Technology (IT) Department. The sample consisted of 25 faculty members from the CCIS, which, as of the 2019–2020 academic year, has 171 total faculty members. Therefore, the participants in this sample accounted for 15% of the entire CCIS faculty. The members of the sample were drawn from various academic ranks-e.g., lecturers, assistant professors, and associate professors. The participants also had varying levels of online teaching experience. They were asked about their opinions of the challenges they have faced during the sudden transition from traditional to online teaching, as well as for any recommendations they might have for overcoming these challenges. All interviews were conducted via Skype because of mandatory social distancing rules. Table 1 below shows the distribution of sample according to department, academic rank, and online teaching experience. This study first assumed that all faculty members who volunteered to contribute were representative of the entire faculty at the PNU CCIS. All participants were also assumed to have completed the semester and witnessed the sudden transition from face-to-face teaching to online delivery, and they were assumed to be honest and open in explaining their viewpoints. Figure.1 shows graphical representation for the distribution of sample according to department, academic rank, and online teaching experience.

Table 1. Sample distribution

Variable	Category	Frequency	Percentage
Department	CS	12	48%
	IS	8	32%
	IT	5	20%
Academic Rank	Lecturer	7	28%
	Assistant Professor	16	64%
	Associate Professor	2	8%
Level of Online	High	5	20%
Teaching Experience	Neutral	18	82%
	Low	2	8%

Figure 1. Sample distribution

Results and Discussion

This section presents the results emerging from the study and discusses the research outcomes. Table.2 shows the most common challenges identified by staff during online delivery. Figure.2 shows the study percentages of each challenge which explain next in detailed:

Missing Personalization of Teaching and Learning

One of the major challenges study participants reported was that the faculty missed the personal aspect of teaching (60%). Educators are required to do much to convey course content to students. This includes knowing when a break is required, when students have stopped actively listening, and how to ensure engagement with the material through questions, exercises, eye contact, body language, or a well-timed joke. All of this requires the physical presence of the lecturer and a suitable number of students. One participant stated: "It was enjoyable in the beginning to try something new, but day after day, I started feeling like I am not teaching; I feel isolated. I am talking to myself at home." Digital delivery removes from lecturers much of the responsibility of customizing their content. This indirectly creates barriers concerning feedback and content development, as students are less likely to be engaged, resulting in them making fewer contributions, which would traditionally be a welcomed addition to the lectures.

Assessments while Social Distancing

The sudden transition from face-to-face to online delivery has negatively impacted assessments and evaluations. 72% of the sampled participants agreed that it is challenging to adequately apply online assessments for a course designed to be delivered physically. Traditionally, assessment types are chosen based on the knowledge being tested, and these decisions are made on a one-on-one basis, depending on the course. During the 2020 pandemic, there has been a shift from tailoring assessments for each course to adopting a "one size fits all" approach due to a sense of urgency to respond to the pandemic and a general panic. It is also difficult to monitor how students take tests online and to ensure that they are not cheating. Although a rapid increase in high

achieving students may sound positive at first, it means that many of those students did not actually earn their grades. On participant stated: "I know students that I have taught for a long time, and I can see an unreasonable jump in their grade. Going digital should not have a positive impact on their grades."

Table 2. Challenges identified during online delivery

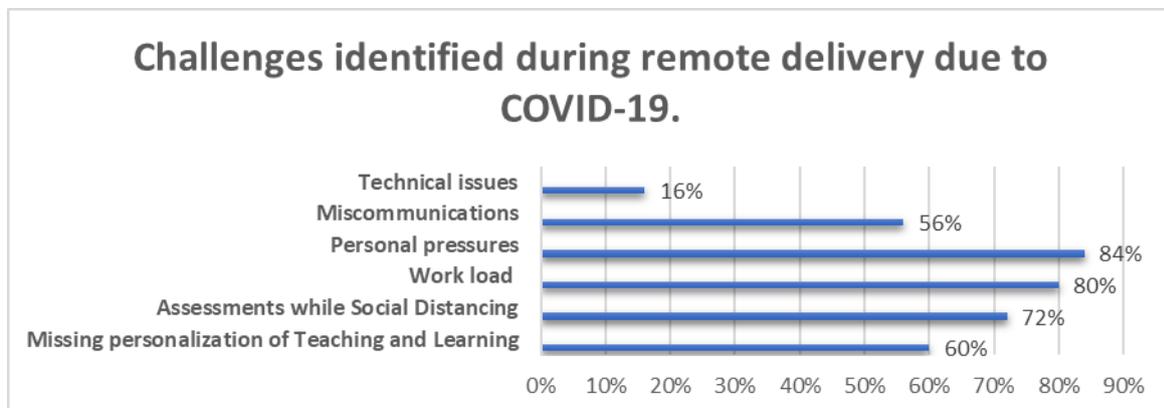| Challenges	No. of Respondents
Missing personalization of teaching and learning	15 (60%)
Assessments while social distancing	18 (72%)
Workload	20 (80%)
Personal pressures	21 (84%)
Miscommunication	14 (56%)
Technical issues	4 (16%)

Number of participants: (N=25)

Figure 2. Challenges identified during online delivery

Excessive Workload

Another big challenge reported was workload (80%) due to the change in delivery type. Lecturers have suddenly been expected to do much more. Slides, for instance, have had to be adapted to be more "distance learning" friendly. Research suggests that it takes more time to prepare and deliver an online class than a face-to-face class. Emails from students have increased drastically, as students have been exhibiting a sense of panic, and miscommunications have become more frequent. This means that lecturers have transformed from being purely educational resources to being general student supporters, guiding and helping them through these challenges. This has undoubtably required much time and commitment. Finally, lecturers have been expected to significantly increase their digital literacy almost overnight. One participant said, "Prior, I had working hours, and now I feel like I work nonstop. My workload in these two months is equal to my work during the whole of last year."

Personal Pressures

The biggest challenge reported by study participants was personal issues (85%). COVID-19 has placed many pressures on academics, especially those who also have caretaking responsibilities. With schools being closed, academics' parental and career responsibilities have been extended to supporting their children with their schoolwork. Considering that their professional duties have also been increased, their free time was lost almost overnight. All this took place while they were also experiencing high levels of uncertainty and concern over themselves and their families. At the same time, they were the leaders of their pupils, and they had to appear calm and collected and had to know all the answers. Some, especially those with larger families, have found it incredibly hard to work and teach from home due to noise. An interviewee said, "While I am teaching, I pray that I won't be embarrassed by the noise in my house." Another major pressure concerns finances. As they have had to make their homes work-friendly places by purchasing a work desk and chair for the home, or purchase a significant amount of technology to accommodate the rapidly increasing needs of all household members. Suddenly, siblings can no longer share a computer, as their lessons take place at the same time.

Miscommunication

During times of uncertainty, such as the COVID-19 pandemic, people in management positions are looked to for guidance and for setting directions. It has been agreed that academics understand the complexity of the current situation and that there is no precedent for the current crisis. With that being said, academics view management much like students view academics. This means that academics must receive clear communications, must feel that the management has their best interests in mind, and must see clear and direct actions being taken swiftly and smoothly. A criticism presented by 56% of the sample is that it has been difficult to keep up with guidelines, which have kept changing as the climate of the pandemic oscillates. Academics have been receiving emails intended to update them with newly established decisions. However, because all updates have come via email, newer correspondences have voided older ones. This has confused the final messaging and contributed to miscommunications. Additionally, although management has been quick to respond, it has still been difficult to clearly see what decisions have been made, when, and why. These factors have added to the uncertainty academics feel during the crisis. One interviewee stated: "I started to get confused as to what guidance I should follow and this led to me browsing my emails for a long time to ensure that I found the most recent guidance."

Technical Issues

16% of the participants have faced technical issues, especially with internet connectivity. It has not been easy for networks to cope with the sudden extra load, and broadband speeds have been slowing due to the increasing number of people using the web at the same time. Loading asynchronous lectures is another issue, as it now takes longer than it did before the pandemic. Only 16% of the sample complained about technical issues, because the Support Team was ready to help immediately. All parties agreed that their technical support needs

were met, even outside of working hours. This was due to the rotation system, which has ensured that a Support Team technician is online 24 hours per day. To describe this, an academic said, "Whenever I emailed them, they responded, even late at night. Do they not sleep…?"

Conclusion

The sudden and complete transition of all courses to online teaching in the PNU CCIS was challenging. Even though online courses were available prior to COVID-19, and though most staff members had experience in delivering them, they had a few concerns, including: not being able to personalize their teaching as they could in the traditional environment; the credibility of exams; the heavy workload; and the stress and psychological pressure of the transition. To help reinstate harmonious atmospheres in higher education institutions, staff members must be empowered by the university offering them training sessions, giving them more decision-making power over assessment types, providing counselling for both students and staff members, increasing transparency between management and staff, and prioritizing staff and students who need to physically be at the university when the doors reopen. It is important to keep reviewing these factors through surveys and questionnaires to measure satisfaction. Universities across the world must continue to conduct research during this ever-changing situation to clearly grasp what areas require improvement and extra resources.

Recommendations

Empowerment of Academics

This research demonstrates that, during the COVID-19 crisis, academics are being seen as figureheads for their students, and they have naturally picked up more responsibilities. However, academics have been given very little decision-making power; instead, they are stuck between unsatisfied students and ever-changing policies from management. This has increased their demotivation and reflected onto their efforts to tailor course content for online learning.

Additionally, lecturers have had no say in the types of assessments applied in the online versions of their courses. This seems absurd, considering that the lecturers have the greatest connections with their students. Moreover, customary "exam conditions" cannot be replicated in the online environment. Students are now being trusted not to cheat. As expected, some will not adhere to the rules, causing an unusual positive curve and an improved set of results post-COVID-19. This has been seen more frequently among students who have had to adopt assessment types with which they are unfamiliar.

Continuous Training

The COVID-19 crisis is a once-in-a-lifetime conundrum, a point on which all participants in this research

agreed. That said, there seems to be a clear shift of opinions and outlooks between academics with and without technical experience. This clearly shows that, with more training, it is likely that all academics will be more at ease and ensure consistent, high-quality instruction. Making these investments will help address more than one of the previously established concerns. Due to the unexpected abruptness of switching to online education, academics' lack of training was understood this term. However, this will likely not be satisfactory to students in the 2020–2021 academic year. This training should be held during the summer. The staff members will be more relaxed, and this will make it easier for them to understand and practice the training sessions.

Student Engagement

Students' lack of engagement has made academics feel less motivated to teach. To ensure students are engaged, it is important to create more interactive lessons through encouraging virtual group work (with support from programmers). Additionally, when possible, class sizes should be made smaller to facilitate more personal interactions between students and the teacher. In practice, this means that a class of 50 students, which meets for an hour, should be split into two classes of 25 students, which meet for 30 minutes and are followed by additional work to test student knowledge.

Management

COVID-19 has tested local, national, and international leadership worldwide, so it is no surprise that there is room for improving the university's management. Some participants believed that the risk of the virus should have been managed and planned for by the university months in advance, and, if such planning was implemented, there was a lack of communication, which increased ambiguity amongst colleagues. It is commonly believed that, if transparency of planning and decision-making had been publicly provided, or if its confidentiality had been extended to the academics, they would have felt more assured. On the other hand, it is also believed that, when organizations overshare unnecessary details with staff members, it opens management to unconstructive and often distracting criticism, which adds no value. This tends to be avoided during crises, when it is important to balance what information is circulated.

Welfare

Due to the current circumstances, it was necessary to deeply consider the health of academics and staff members—especially their mental health. Counselling should be provided for both students and staff. Ensuring that staff members are well is essential to providing students with the best experience possible. It is also important for students to have access to these services—first, to ensure that they are able to focus on their educations and, second, so that this responsibility does not fall to the academics, who have no experience in dealing with this.

Return to Campus

It is likely that the return to campus will be completed in stages. It will be important to closely prioritize who returns when. First, staff members who have disabilities which prevent them from working efficiently at home, or those for whom working at home is detrimental to their health, must be identified early and prioritized. These should be followed by staff members who are struggling because they have large families, lack quiet workspaces, or are affected by anything else that would hinder the quality of the instruction they provide. Finally, staff members who simply prefer working at the university should return, followed by everyone else coming back into the physical education environment.

References

Akash Gupta و ،Mala Goplani .(2020) . Impact of COVID-19 on educational institutions in India .*Purakala with ISSN 0971-2143 is an UGC CARE Journal,* 661-671.

Amal Al-Rasheed و ،Jawad Berri .(2016) .Engineering domain expertise through best practices management: Application to the field of education *7 2016* .*th International Conference on Information and Communication Systems (ICICS), pp. 133-138. IEEE* .Irbid, Jordan.

Amal Al-Rasheed و ،Jawad Berri .(2017) .Effective Reuse and Sharing of Best Teaching Practices .*Computer Applications in Engineering Education*.178-163 ،(2)*25* ،

Aras Bozkurt و ،Ramesh C. Sharma .(2010) .Emergency remote teaching in a time of global crisis due to CoronaVirus .*Asian Journal of Distance Education*.(1)*15* ،

Atilgan, D. & Tukel, Y. (2021). Social capital and satisfaction with life during the COVID-19 pandemic: A case study on coaches. *International Journal on Social and Education Sciences (IJonSES), 3*(2), 342-359. https://doi.org/10.46328/ijonses.185

Ben Williamson ،Rebecca Eynon و ،John Potter .(2020) .Pandemic politics, pedagogies and practices: digital technologies and distance education during the coronavirus emergency .*Learning, Media and Technology*.114–107 ،(2)*45* ،

Hebebci, M. T., Bertiz, Y., & Alan, S. (2020). Investigation of Views of Students and Teachers on Distance Education Practices during the Coronavirus (COVID-19) Pandemic. *International Journal of Technology in Education and Science (IJTES), 4*(4), 267-282.

IESALK .(2020) .*COVID-19 and higher education: Today and tomorrow* .UNESCO.

Joseph Crawford ،Kerryn Butler-Henderson ،Jürgen Rudolph و ،Matthias Glowatz .(2020) .COVID-19: 20 Countries' Higher Education Intra-Period Digital Pedagogy Responses .*Journal of Applied Teaching and Learning (JALT)*.(1)*3* ،

Juliet Bedford ،Delia Enria ،Johan Giesecke ،David L Heymann ،Chikwe Ihekweazu ،Gary Kobinger . . . ،Lothar H Wieler .(2020) .The Lancet Journal .*COVID-19: towards controlling of a pandemic*-1015 ،(10229)*395* ، .1018

Kara, S. (2021). An Investigation of Visual Arts Teachers' Attitudes towards Distance Education in the Time of COVID-19. *International Journal on Social and Education Sciences (IJonSES), 3*(3), 576-588. https://doi.org/10.46328/ijonses.246

Kibici, V. B. & Sarıkaya, M. (2021). Readiness Levels of Music Teachers for Online Learning during the COVID 19 Pandemic. *International Journal of Technology in Education (IJTE), 4*(3), 501-515. https://doi.org/10.46328/ijte.192

Mohamad Chahrour ،Sahar Assi ،Michael Bejjani ،Ali A. Nasrallah ،Hamza Salhab ،Mohamad Fares و ،Hussein H. Khachfe .(2020). A bibliometric analysis of Covid-19 research activity: A call for increased output . *Cureus.*(3)*12* ،

Muh Barid Nizarudin Wajdi ،Iwan Kuswandi ،Umar Al Faruq ،Zulhijra Zulhijra ،Khairudin Khairudin و ، Khoiriyah Khoiriyah .(2020). Education Policy Overcome Coronavirus, A Study of Indonesians . *EDUTEC: Journal of Education And Technology.*106-96 ،(2)*3* ،

Nnebedum, C., Obuegbe, A. S., & Nwafor, H. E. (2021). Assessment of Schools' Reopening after COVID-19 Closures. *International Journal on Studies in Education (IJonSE), 3*(2), 86-91.

Paudel, P. (2021). Online Education: Benefits, Challenges and Strategies During and After COVID-19 in Higher Education. *International Journal on Studies in Education (IJonSE), 3*(2), 70-85.

Russell M. Viner ،Simon J. Russell ،Helen Croker ،Jessica Packer ،Joseph Ward ،Claire Stansfield . . . ،Robert Booy .(2020). School closure and management practices during coronavirus outbreaks including COVID-19: a rapid systematic review . *The Lancet Child & Adolescent Health.*(" .)

Saida Affouneh ،Soheil Salha و ،Zuheir N. Khlaif .(2020). Designing Quality E-Learning Environments for Emergency Remote Teaching in Coronavirus Crisis . *Med Sci.*3-1 ،(2)*11* ،

Stefano Spina ،Francesco Marrazzo ،Maurizio Migliari ،Riccardo Stucchi ،Alessandra Sforza و ،Roberto Fumagalli .(2020). The response of Milan's Emergency Medical System to the COVID-19 outbreak in Italy . *The Lancet 395* ،(10227)e49-e50.

Stephen Sussman و ،Lee Dutter .(2010). Comparing student learning outcomes in face-to-face and online course delivery . *Online Journal of Distance Learning Administration.*11-6 ،(4)*13* ،

World Health Organization (WHO) 29) .May, 2020 .(*WHO Coronavirus Disease (COVID-19) Dashboard*.

Yu-Tao Xiang ،Yuan Yang ،Wen Li ،Ling Zhang ،Qinge Zhang ،Teris Cheung و ،Chee H. Ng .(2020). Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed . *The Lancet Psychiatry.*229-228 ،(3)*7* ،

Investigation of Toxic Effects of Putrescine A. Determination of Ld$_{50}$ Level of Putrescine with Intraperitoneal Applied to Mice

Ali Nazmi Can Doğan

Göle State Hospital, Turkey

Dinçer Erdağ

Kafkas University, Turkey

Abstract: In this study, it was aimed to calculate the LD50 level of putrescine administered intraperitoneally to mice. Putrescine is synthesized from the arginine by bacteria in the body and in the intestines after death. It can also be obtained synthetically. In this study, 20±2 g male rats belonging to the Mus musculus albino breed were used. Mice were divided into 7 groups, each consisting of 10 groups. During the experiment, ad libitum was fed with standard diet and tap water. Solutions of putrescine were prepared with 500, 600, 700, 800, 900, 1000 and 1100 mg/5 mL commercial saline respectively. Each group was ip administered from the prepared solution at 1500, 1800, 2100, 2400, 2700, 3000 and 3300 mg/kg dose (0.3 mL volume) respectively. Animals were monitored twice a day and those who died within 14 days were noted. The LD50 value of putrescine was calculated using the Behrens-Kerber method. As a result of the study, the LD50 dose of putrescine in mice was determined as 2175 mg/kg in intraperitoneal administration. It is suggested that these findings should be taken into consideration in their studies with putrescine.

Keywords: Polyamine, Putrescine, Mouse, LD$_{50}$

Putresinin Toksik Etkilerinin Araştırılması A. Intraperitoneal Yolla Farelere Uygulanan Putresinin Ld$_{50}$ Düzeyinin Belirlenmesi

Özet: Bu çalışmada intraperitoneal yolla farelere verilen putresinin LD$_{50}$ düzeyinin hesaplanması amaçlandı. Putresin, ölümden sonra vücutta bağırsaklarda bulunan bakteriler tarafından arjininden sentezlenen bir poliamindir. Sentetik olarak da üretilebilir. Bu çalışmada Mus musculus albino ırkına ait 20±2 g ağırlığında erkek fareler kullanıldı. Fareler, her grupta 10 adet olacak şekilde toplam 7 gruba ayrıldı. Deney süresince *ad libitum* olarak standart diyet ve çeşme suyuyla beslendi. Putresinin sırasıyla 500, 600, 700, 800, 900, 1000 ve 1100 mg/5 mL ticari serum fizyolojikle çözeltileri hazırlandı. Her gruba sırasıyla hazırlanan çözeltiden 1500,

1800, 2100, 2400, 2700, 3000 ve 3300 mg/kg dozda (0,3 mL hacimde) intraperitoneal yolla uygulandı. Hayvanlar günde iki kez takip edildi ve 14 gün içerisine ölenler not edildi. Ölüm sayıları göz önüne alınarak putresinin LD_{50} değeri Behrens-Kerber yöntemi ile hesaplandı. Araştırma sonucunda intraperitoneal uygulamada putresinin farelerde LD_{50} dozu 2175 mg/kg olarak belirlendi. Putresin ile yapılan çalışmalarda bu dozun göz önüne alınması önerilmektedir.

Anahtar kelimeler: Poliamin, Putresin, Fare, LD_{50}

Giriş

Alifatik yapılara amin grubunun girmesi ile oluşan bileşiklere biyojen aminler denir. Bunlar diamin, triamin ve tetraamin gibi yapılarda olabilirler. Trimetilamin ve histamin monoamin, putresin ve kadaverin diamin, spermidin triamin ve spermin tetraamin yapısındadır (14, 21, 27). Putresin, bir biyojen amin olup kimyasal yapısı 1,4-diaminobütandır. Ölümden sonra bağırsaklardaki bakteriler tarafından arjininden sentezlenir (17). Putresin sentezleyen bakteriler arasında *E. coli, Salmonella spp., Morganella morganii* gibi enterobacteriaceaealar ve bazı gram-pozitif bakteriler (*Lactobacillus brevis, Lactobacillus saerimneri*) bulunur (5). Putresin arjininden iki farklı yolla sentezlenir. (i) Arjinin, arjinin dekarboksilaz enzimi ile agmatine çevrilir. Agmatin iminohidroksilaz enzimiyle N-karbamoilputresine, daha sonra da putresine dönüşür. (ii) Arjinin, ornitine çevrilir. Ornitin, ornitin dekarboksilaz enzimi ile putresin ve karbondioksite dönüştürülür (5, 14, 17). Poliaminlerin sentezinde S-adenosil metiyonin dekarboksilaz ve spermidin/spermin N1-asetil transferaz gibi enzimler de görev alır. Bu enzimler, hormon ve trofik faktörler tarafından uyarılmaktadır (13). Ornitinden putresin üreten gram-negatif enterobakteri ve psödomonadlarda 2 bitişik gen tarafından kodlanan dekarboksilasyon sistemi bulunur. Bu genler ornitin dekarboksilaz enziminin sentezini kodlayan speC ve transmembran substrat/ürün değiştirici proteinini kodlayan potE'dir. Bakteriler putresini sentezledikten sonra bir antiporter protein sistemi ile putresini dışarı atarlar (5, 25).

Biyojen aminler daha çok deniz ürünlerinde oluşurlar. Protein içeriği yüksek olan et, süt, yumurta ve ürünlerinde fazla miktarda bulunurlar (5). Biyojen aminler; kokmuş et, et ürünleri, kadavra, ağız ve vajinaya kokusunu verir (17). Tüm yiyeceklerde ve gastrointestinal kanalda önemli miktarlarda bulunurlar (25). Rat beyninin gramında 10 nmol'den daha az miktarda putresin bulunur. Rat dalağının gramında ise 44 nmol düzeyindedir. Spermidin ve spermin rat kasında 70 nmol/g, dalağında 1600 nmol/g düzeyinde bulunur. Ratların salgı organları 5000-9000 nmol miktarında spermidin taşımaktadır (27). Taze kaplan karidesinde normal putresin düzeyi 10-20 mg/kg kadardır (15). Neoplastik gibi patolojik durumlarda hücrelerarası sıvı ve idrarda poliamin, bakteri, kandida ve trichomonia kaynaklı vajinal enfeksiyonlarda vajinal akıntıda putresin ve kadaverin düzeyi artar. Keza, et, balık gibi gıdalar bozulduklarında biyojen amin seviyesi yükselmektedir (21).

Prokaryotlarda putresin ve spermidin, bunlara ek olarak ökaryotlarda spermin bulunur (26). Poliaminler hücrelerin bölünme ve çoğalmasında görev alır (yokluğunda ökaryotik hücrelerde büyüme durur, prokaryotlarda

yavaşlar). Büyüme faktörü oldukları düşünülmektedir. Doku onarım ve yenilenmesini desteklerler (2, 5, 13, 15, 17, 21, 23-25, 27). Gen ekspresyonu, nükleik asit sentezi, protein sentezi, membran bölünmesi ve stabilizasyonu, doku onarımı ve hücre içi sinyal yolları ve iyon kanallarının düzenlenmesinde rol alırlar (5, 15, 24). Polikatyonik olan poliaminler, anyonik fosfolipidlerle etkileşime girip zara bağlı enzimlerin, metabolik, ozmotik ve oksidatif stresin düzenlenmesinde görev alırlar (5, 24). Besin azlığında ATP'nin sentezine katılırlar (5). Süksinat üreterek enerji üretimine yardımcı olurlar (2). Alkali olup sitoplazmada asitlere karşı tampon görevi üstlenir (5). Antioksidan etkilidirler (23). Gastrointestinal sistemden emilen agmatin, hepatik ensefalopatinin patogenezinde ve korunmasında rol oynayabildiği düşünülmektedir (25).

Bakteriyel toksin, mikotoksin ve biyojen amin kaynaklı gıda zehirlenmelerine rastlanmaktadır. Biyojen aminlerin fazla alınması canlılarda akut veya kronik zehirlenme yapar (5). Yüksek miktarda putresin taşıyan kaplan karideslerinin tüketilmesi sonucu bulantı, kusma ve ishal gibi belirtiler ortaya çıkar. Bazı bireylerde alerji yapabilir (15). Ratlara 1,4-diaminobütan 100 mg/kg dozda periton içi (pi) yolla verildikten sonra lokomotor hiperaktivite ve ıslak köpek sallanmaları, 150-200 mg/kg (pi) dozda verilenlerde ise kordinasyon eksikliği, atoni ve sedasyon görüldüğü bildirilmiştir. Ratlara 150 mg/kg'a doza kadar intraperitoneal (ip) yolla verildiğinde ölüm görülmediği belirtilmiştir (3). Oral yoldan 180 mg/kg dozda ratlar günlük olarak verildiğinde yan etki oluşturmamaktadır. Ancak ratlara 2000 mg/kg dozda oral yolla verildiğinde akut zehirlenme yapmaktadır (17).

Putresin çeşitli araştırmalarda kullanılmaktadır. Ancak letal ve toksik dozlarıyla ilgili veri ve çalışmalar yeterli değildir. Araştırmalarda putresinin ortalama letal dozu ile ilgili bilgilere gereksinim duyulmaktadır. Bu çalışmada putresinin farelerde ip yoldan akut ortalama letal dozunun araştırılması amaçlanmıştır.

Materyal ve Metot

Kafkas Üniversitesi Hayvan Deneyleri Yerel Etik Kurulu'nun (KAÜ-HADYEK) 24.08.2013 tarih ve 2017/81 sayılı kararı ile bu çalışmanın yapılması uygun görülmüştür. Putresin Sigma (P7505) firmasından temin edildi. Steril serum fizyolojik kullanılarak yoğunlukları 500, 600, 700, 800, 900, 1000 ve 1100 mg/5 mL olan putresin çözeltileri hazırlandı.

Araştırmada Mus musculus albino ırkına ait 20±2 g ağırlığında erkek fareler kullanıldı. Fareler, her grupta 10 adet olacak şekilde toplam 7 gruba ayrıldı ve deney süresince standart diyet ve çeşme suyuyla *ad libitum* olarak beslendi. 1. gruba 500 mg/5 mL'lik çözeltiden (1500 mg/kg), 2. gruba 600 mg/5 mL'lik çözeltiden (1800 mg/kg), 3. gruba 700 mg/5 mL'lik çözeltiden (2100 mg/kg), 4. gruba 800 mg/5 mL'lik çözeltiden (2400 mg/kg), 5. gruba 900 mg/5 mL'lik çözeltiden (2700 mg/kg), 6. gruba 1000 mg/5 mL'lik çözeltiden (3000 mg/kg), 7. gruba 1100 mg/5 mL'lik çözeltiden (3300 mg/kg) ip yolla 0,3 mL injekte edildi. Hayvanlar günde en az iki kez kontrol edildi ve 14 gün içerisinde ölenler gruplara göre kayıt altına alındı. Gruplarda ölen hayvan sayıları göz önüne alınarak LD_{50} düzeyleri Behrens-Kerber yöntemi (12) kullanılarak hesaplandı.

Bulgular

Deney gruplarında ölen hayvan sayıları ve putresinin maksimum ve minimum letal dozları tespit edildi. Elde edilen sonuçlar Tablo 1'de görülmektedir. Ölüm sayıları dikkate alınarak Behrens-Kerber yöntemi ile LD_{50} düzeyleri uygulanan yola (ip) göre hesaplandı.

Tablo 1.1. Behrens-Kerber yöntemine göre ip yolla uygulanan putresinin LD_{50}'sinin hesaplanması.

Hayvan sayısı (N)	Doz (mg/kg)	Ölen hayvan sayısı	A	B	A x B
10	3300	10	9	300	2700
10	3000	8	6	300	1800
10	2700	4	6	300	1800
10	2400	8	7	300	2100
10	2100	6	5,5	300	1650
10	1800	5	3,5	300	1050
10	1500	1	0,5	300	150

Yönteme göre LD_{50}'nin hesaplanmasında aşağıdaki formül kullanıldı.

A: Birbirini izleyen iki gruptaki ölen hayvanların aritmetik ortalaması

B: Birbirini izleyen iki grup arasındaki dozların farkı

N: Gruptaki hayvan sayısı

LD_{100}: Bütün hayvanları öldüren doz

$$LD_{50} = LD_{100} - \frac{(A \times B) \text{ Toplamı}}{N}$$

Tablo 1'deki değerler formüle uygulandığında putresinin ip yol ile LD_{50}'si: A x B'nin toplamı olan 11250, 10 bölündüğünde 1125 değeri elde edildi. LD_{50}: 3300-1125 = 2175 mg/kg olarak hesaplandı.

Tartışma ve Sonuç

Putresin, ilk kez 1800'lü yıllarda bakterilerden elde edilmiştir. Mantarların da sentezleyebildikleri bildirilmektedir (1, 11, 19). Putresin hücre büyümesi, farklılaşması ve amin deposu oluşturmada görev alır. Hayvansal gıdalarda bulunur (10, 26, 29). Gıdalardaki düzeyleri gıdaların bozunma durumunu göstermektedir. Gıdalarla vücuda fazla alınması zehirlenmelere neden olmaktadır. Bu nedenle çeşitli analiz yöntemleri geliştirilmiştir. Karideslerde putresinin analizi yüksek performanslı sıvı kromatografisi, gaz kromatografisi, iyon kromatografisi, kütle spektrometrisi, ultraviyole spektroskopisi ve floresans spektroskopisi ile yapılmaktadır (15). Gıda ürünleri ve vücut sıvılarında biyojen aminleri ölçmek için iyon mobilite spektrometresi (IMS)'den de yararlanılabilmektedir (21).

Biyojen aminlerin bitkilerdeki etkileri üzerine çalışmalar yapılmaktadır. Ekzojen olarak verilen poliaminler, klorofil kaybını önlemektedir. Proteaz aktivitelerini inhibe etmektedir. Tuzun toksik etkisinden bitkileri korumaktadır (4, 16). Bitkilerde poliaminler protein sentezini ve dolayısıyla çimlenmeyi aktive eder. *Phaseolus vulgaris*, *Phaseolus mungo*, *Pisum sativum* ve *Zea*'da çimlenme sırasında poliamin (spermidin ve spermin), protein ve RNA seviyeleri arasındaki bir korelasyon olduğu bulunmuştur. Arjinin dekarboksilaz inhibitörü α-diflurometilarginin ve ornitin dekarboksilaz inhibitörü α-diflorometillornitin, ayçiçeği tohumlarının çimlenmesini geciktirmektedir (4). Ozmotik stres pirinç yapraklarında putresin birikimini, su stresi prolin birikmesini artırmaktadır. Ozmotik stresin indüklediği putresin seviyeleri, D-arginin ve metilornitin tarafından düşürülmektedir (7). NaCl'e dirençli pirinç çeşitlerinde spermidin ve spermin seviyelerinin arttığı bildirilmiştir (4). Putresin (0,1 mM) ve benziladenin (0,05 mM), buğdayın anten kısmına püskürtülüp, su stresine maruz bırakıldığında kontrole göre verimin arttığı belirlenmiştir (16).

Putresin gibi poliaminlerin etkileri insan ve hayvanlarda görülen çeşitli hastalıklarda çalışılmaktadır. Hiperarjininemi, argininaz eksikliğinden kaynaklanan ve üre döngüsünün bozulmasıyla seyreden kalıtsal bir hastalıktır. Arginin ve amonyak birikimi, kusma, uyuşukluk, spastik dipleji ve zihinsel ve fiziksel geriliğe neden olur. Hiperarjininemili 4 yaşında bir erkek çocukta günlük oral ornitin takviyesi ile idrarda putresin miktarının arttığı belirlenmiştir. Bunun nedeni mitokondriye ornitin alınmasının bozulmuş olması ve ekstramitokondriyal ornitin metabolizmasının hızlanmasına bağlanmıştır. İdrarda poliamin atılımı, kanser hastalarında hızla büyüyen dokudaki yüksek poliamin sentezi nedeniyle gerçekleştiği bildirilmektedir (22). Aroclor 1254 ile muamele edilmiş bıldırcınlardan elde edilen karaciğer mikrozomlarında 4C-putresin ve histaminin deaminasyonunda görev alan diamin oksidaz (DAO) aktivitesinde bir azalma görülmüştür. Bu ve mikrozomal enzimlerin indüksiyonunun putresin konsantrasyonunda azalma yaptığı tespit edilmiştir (18).

Ruiz-Cano ve ark. (26) poliaminlerin bebeklerin gelişiminde rol oynayabileceğini ileri sürmektedir. Putresinin bazı çalışmalarda kolon kanserinde tümörlü hücre miktarını artırdığı bildirilmektedir (9). Bu bulguları, ornitin dekoarboksilaz enzim inhibitörlerinin kolon kanseri riskini düşürmesi desteklemektedir (9, 29). Takao ve ark. (28) yaptıkları çalışmada ornitin dekarboksilaz enzim ihibitörlerinin (diflorometilornitin) hücrelerin büyümesini azalttığını bildirmişlerdir. Ancak artan putresin düzeyinin apoptozu indüklediği ve proliferasyonu azalttığı da ileri sürülmektedir (9, 10). Doğan ve ark. (9) yaptıkları çalışmada 3-MC injeksiyonundan bir ay sonra verilen (12 ay süreyle) putresin ve sisteaminin (sistemin + putresin % 0,1'lik konsantrasyonlarda içme suyuyla, 1 mg 3-MC/0,2 mL susam yağı ile sc) fareleri kansere karşı kısmen de olsa koruduğunu belirlenmişlerdir. Yaptıkları başka bir çalışmada farelere içme suyuyla % 0,1 oranında 3-MC injeksiyonuyla (1 mg 3-MC/0,2 mL susam yağı ile sc) aynı zamanda verilmeye başlanan ve 7 ay verilen putresinin tümör oluşum oranını azalttığını tespit etmişlerdir (10). Anti-poliamin antikorunun, civciv embriyo hücrelerinin yüzeyine sıkıca bağlandığını ve kompleman varlığında L ve BHK Py hücrelerini parçalayabildiği bildirilmiştir. Putresinin, fare nöroblastom hücrelerinin belirli spesifik yüzey proteinlerine kovalent olarak bağlanabildiği gösterilmiştir (8). İzole villous enteroksitlerinde, insan kolon adenokarsinomu CaCo-2 ve LoVo hücre hatlarında ve kültürlenmemiş farklı duodenal kript hücrelerinde (IEC kültüründe) putresinin sodyumdan bağımsız bir mekanizma hücre içine alındığı rapor edilmiştir. Diaminin, LoVo ve CaCo-2 hücrelerinin apikal kısma göre bazal bölümde daha fazla

biriktiği tespit edilmiştir (13). Agmatinin hücrelere alım mekanizması SK-MG-1 insan glioma hücre hattında araştırılmıştır. [14C] Agmatin, 4°C'de nonspesifik, 37°C'de ise enerji harcanarak spesifik olarak hücrelerde biriktiği tespit edilmiştir. Fentolamin, klonidin, 1,3-di (2-tolil) guanidin, histamin, putresin, spermin ve spermidin, spesifik [14C] agmatin birikimini önlerken, kortikosteron, desipramin, O-metilizoprenalin, sirazolin, moksonidin, L-arginin, L-lisin, verapamil, nifedipin önlememiştir (25).

Putresinin insan ve hayvanlarda antibakteriyel ve antiparaziter amaçla kullanımı için çalışmalar yapılmıştır. Bakteriler putresini süksinata kadar parçalarlar. Deamine edip, açığa çıkan aminleri amonyak ve azot oksitlerine çevrirler. Oluşan toksik metabolitler bakterilere zarar verebilir. Doğan ve ark. (11) tarafından yapılan çalışmada biyojenamin düzeylerinin artması bazı bakterilerin (*B. subtilis*) üremesini baskıladığını tespit etmişlerdir. Putresine, *G. lamblia*, *Trichomonas vaginalis* ve *Entamoeba histolytica* gibi anaerobik parazitlerde yüksek seviyelerde bulunur. Ornitin dekarboksilaz enziminin irreversibl inhibitörü olan ve kanser kemoterapisi için geliştirilen DL-a-diflorometilornitinin tripanomlarına karşı etkinliği araştırılmıştır. Uyku hastalığını tedavi etmede kullanılmaktadır. Aynı ilacın *G. Lamblia*'nın *in vitro* büyümesini inhibe ettiği de gösterilmiştir. Putresin analoğu, 1,4-diamino-2-butanonun (DAB) anaerobik *Tritrichomonas foetus*'un ve *T. cruzi* büyümesini inhibe ettiği ileri sürülmektedir (23).

Yapılan araştırmalarda biyojen aminlerin patofizyolojik olaylarda görev alabileceği bulgularına rastlanmıştır. Sepsis nedeniyle ölen hayvanların karaciğer ve plazmalarında 6 ve 24 saatlerde putresin düzeyinin yükseldiği tespit edilmiştir (2). Poliamin biyosentezi, iskeminin ornitin dekarboksilazın indüklenmesi nedeniyle serebral iskemi başlamasından sonra memeli beyninde arttığı tespit edilmiştir. İskemide ornitin dekarboksilazı inhibe eden terapötiklerin uygulanması beyinde poliamin birikimi önleyerek iskemik beyin hasarının gelişmesini önlemektedir. Beyin iskemisi, beyin poliamin oksidaz aktivitesini indükleyerek putresinde sitotoksik etkili 3-aminopropanal'in sentezini artırır. Bu madde beyinde nöron ve glialarda birikerek hücre ölümüne sebep olur. 3-aminopropanal, kaspaz 1'e bağlı sinyal yolunu aktive ederek glial hücrelerde apoptoza aracılık eder. Poliamin oksidaz aktivitesinin inhibe edilmesi, 3-aminopropanal oluşumunu önler ve sıçanlarda kalıcı serebral arter tıkanmasından sonra görülen serebral hasar oluşumunu azaltır. Bu durum poliaminlerin beyin iskemisi, miyokard enfarktüsü ve tümör nekrozu gibi hastalıkların patogenezinde etkili olabileceğini düşündürmektedir (20). 8-Metil-8-asetilenik putresin (MAP), ornitin dekarboksilazın irreversibl inhibitörü olup 1,500 mg/gün dozda verildiğinde böbrek yetmezliği yaptığı gözlenmiştir. Bu nedenle diğer sitotoksik ilaçlarla birlikte kullanırken dikkatli olunması gerektiği önerilmektedir (6). Yapılan bir çalışmada allil alkol ve CCl_4 verildikten sonra ortaya çıkan karaciğer hasarına karşı putresinin (100 mg/kg rat) hepatoprotektif etki yaptığı tespit edilmiştir (24).

Putresinin yan, toksik, letal ve yeni alanlarda faydalı etkilerinin çalışılması için terapötik, toksik ve letal dozlarının bilinmesini zorunlu kılmaktadır. Putresinin olumlu veya olumsuz etkileri, alınan dozu ile yakından ilişkilidir. Bu araştırma sonucunda putresinin farelerde LD_{50} dozunun intraperitonal uygulamada 2175 mg/kg olarak belirlenmiştir. Sonuç olarak bu dozun putresin ile yapılacak çalışmalarda değerlendirilmeye alınması önerilmektedir.

References

[1]. Ampranyn, K., Rose, M.T., Kecskes, M., Pereg, L., Nguyen, H.T., Kennedy, R.I. (2012). Plant growth promoting characteristics of soil yeast (Candida tropicalis HY) and its effectiveness for promoting rice growts. Applied Soil Ecology. 61: 20-299.

[2]. Andreis, D. T., Khaliq, W., Neugebauer, S., Kiehntopf, M., Singer, M. Tissue and plasma putrescine levels in non-survivors of sepsis in a fluid-resuscitated rat model of faecal peritonitis. Intensive Care Medicine Experimental 2015, 3 (Suppl 1):A 616. http://www.icm-experimental.com/content/3/S1/A616. 12.01.2021.

[3]. Anon. (2012). Conclusion on the peer review of the pesticide risk assessment of the active substance 1,4-diaminobutane (putrescine). EFSA Journal. 10 (1): 2516, 33 pp. 10.2903/j.efsa.2012.2516

[4]. Benavides, M.P., Aizencang, G and Tomaro, M. L. (1997). Polyamines in *Helianthus annuus* L. during Germination under Salt Stress. J Plant Growth Regul. 16: 205–211

[5]. Benkerroum, N. (2016). Biogenic Amines in Dairy Products: Origin, Incidence, and Control Means. Comprehensive Reviewsin Food Scienceand FoodSafety. 15: 801-826.

[6]. Carmichael, J., Cantwell, B. M. J. Harris, A. I., Buamah, P. K., Hodson, A. W. and Skillen, A. W. (1990). Assessment of renal toxicity by urinary enzymes in patients receiving chemotherapy with 8-methyl-8-acetylenic-putrescine. Cancer Chemother Pharmacol 26: 65- 66.

[7]. Chen, C.T., Ching Kao, C.H. (1993). Osmotic stress and water stress have opposite effects on putrescine and proline production in excised rice leaves. Plant Growth Regulation 13: 197-202.

[8]. Chen, K. Y. (1084. Transglutaminase catalyzed incorporation of putrescine into surface proteins of Mouse neuroblastoma cells. Molecular and Cellular Biochemistry. 58: 91 97.

[9]. Doğan, A., Aksu, P., Erdağ, D., Özcan, K. and Doğan, E. (2014). Farelerde 3-metilkolantrenle indüklenen fibrosarkoma üzerine sisteamin, putresin ve sisteamin-putresin kombinasyonunun etkileri. Kafkas Univ Vet Fak Derg 20 (19): 11-17.

[10]. Doğan, A., Kılıçle Aksu, P., Erdağ, D., Doğan, A.N.C., Özcan, K and Doğan, E. (2016). The protective effects of cysteamine, putrescine, and the combination of cysteamine and putrescine on fibrosarcoma induced in mice with 3-methylcholanthrene. Turkish Journal of Veterinary and Animal Sciences. 40 (5): 575-582.

[11]. Doğan, A., Otlu, S., Büyük, F., Aksu, P., Tazegül, E., Erdağ, D. Sisteamin, putresin ve sisteamin-putresin kombinasyonunun bazı bakteriler üzerine etkileri. Kafkas Univ Vet Fak Derg. 18 (6): 1015-1019, 2012.

[12]. Doğan, A. Veteriner Toksikoloji. Eser Basım Yayın Dağıtım Matbaacılık, Erzurum. 2016.

[13]. Dumontier, A. M., Brachet, P., Huneau, J. F. and Tome, D. (1992). Transport of putrescine in the isolated rabbit intestine. Pfligers Arch. 420: 329–335.

[14]. Erdag D, Merhan O, Yildiz B, (2019). Biochemical and Pharmacological Properties of Biogenic Amines, Biogenic Amines, Charalampos Proestos (Ed.), InTech, DOI: 10.5772/intechopen.81569.

[15]. Gumpu, M. B., Nesakumar, N., Sethuraman, S., Krishnan, U. M., Rayappan, J. B. B. (2006).

Determination of Putrescine in Tiger Prawn Using an Amperometric Biosensor Based on Immobilization of Diamine Oxidase onto Ceria Nanospheres. Food Bioprocess Technol. 9: 717–724.

[16]. Gupta, S., Agarwal, V.P., Gupta, N. K. (2012). Efficacy of putrescine and benzyladenine on photosynthesis and productivity in relation to drought tolerance in wheat (Triticum aestivum L.). Physiol Mol Biol Plants. 18 (4): 331-336.

[17]. https://en.wikipedia.org/wiki/Putrescine, 3.1.2021.

[18]. Ignesti, G., Perretti, M. and Buffoni, F. (1988). Induction and quail liver diamine oxidase (histaminase). Part I: Interference of spermidine synthase on the diamine oxidase activity assay using putrescine as substrate. Agents and Actions, 25 (1-2): 37-42.

[19]. Ioannidis, N.E., Sfichi, ., Kotzabasis, K (2006). Putrescine stimulates chemiosmotic ATP synthensis. Biochim Biophys Acta. 1757: 821-828.

[20]. Ivanova, S., Botchkina, G. I., Al-Abed, Y., Meistrell M., Batliwalla, F., Dubinsky, J. M., Iadecola, C., Wang, H., Gregersen, P. K. ., Eaton, J. W. , Tracey, FK. J. (1998). Cerebral Ischemia Enhances Polyamine Oxidation: Identification of Enzymatically Formed 3-Aminopropanal as an Endogenous Mediator of Neuronal and Glial Cell Death. J. Exp. Med. 188 (2): 327–340.

[21]. Karpas, Z., Litvin, O., Cohen, G., Mishin, J., Atweh, E., Burlakov, A. (2011). The reduced mobility of the biogenic amines: trimethylamine, putrescine, cadaverine, spermidine and spermine. Int. J. Ion Mobil. Spec. 14: 3–6.

[22]. Kato, T., Sano, M., Mizutani, N. and Hayakawa, C. (1987). Increased Urinary Excretion of Putrescine in Hyperargininaemia. J. Inher. Metab. Dis. 10: 391-396.

[23]. Maia, C., Lanfredi-Rangel, A., Santana-Anjos, K. G., Oliveira, M. F., De Souza, W., Vannier-Santos, M. A. (2008). Effects of a putrescine analog on Giardia lamblia. Parasitol Res. 103: 363–370.

[24]. Mbonifor, J. N., Francis E. Chigbo, F. E. and Mehendale, H. M. (2000). Polyamine Protection Against Chemically Induced Hepatotoxicity. International Journal of Toxicology, 19: 391-400.

[25]. Molderings, G. J., Bönisch, H., Göthert, M., Brüss. M. (2001). Agmatine and putrescine uptake in the human glioma cell line SK-MG-1. Naunyn-Schmiedeberg's Arch Pharmacol. 363: 671-679.

[26]. Ruiz-Cano, D., Perez-Liames, F., Zamora, S. (2012). Polyamines implications for infant health. Arch Argentinos De Pedietria. 110 (3): 244-250.

[27]. Seiler, N. Pharmacological properties of the natural polyamines and their depletion by biosynthesis inhibitors as a therapeutic approach. pp 107-108. In Salmon J.A. et al., (Eds): Progress in Drug Research / Fortschritte der Arzneimittelforschung /Progrès des recherches pharmaceutiques. Birkhäuser Verlag Basel, 1991.

[28]. Takao, K., Rickhag, M., Hegardt, C. Oredsson, S., Persson, L. (2006). Induction of apoptotic cell deat by putrescine. Inter J Biochem Cell Biol 38, 621-628.

[29]. Vargas, A.I., Wertheim, B.C., Gerner, E.W., Thornson, C.A., Rock, C., Thompson, P.A. (2012). Dietary polyamine intake and risk of colorectal adenomatous polyp. Am J Clin Nut. 96 (1): 133-141.

"As Soon as I Turned Off the Camera, We Jumped to Help": Nonverbal Communication of Croatian TV Journalists in Coverage of Sudden Crises Events

Iva Habulan

University "North", Croatia

Zeljka Bagaric

University "North", Croatia, ![ORCID icon] https://orcid.org/0000-0002-4085-8736

Abstract: Media narratives, frames and the manner of sudden-onset crises events' coverage strongly influence the audience's perception and understanding of situation and their behavior. Nonverbal communication of broadcasters transfers important information related to viewers' formation of impressions. That is why the journalists strive to hide the nonverbal cues. During 2020, Croatia was hit, along with COVID 19 pandemics, with 2 devastating earthquakes. At the same time, formal education of journalists in Croatia does not include syllabi aimed to develop knowledge and skills for disaster journalism. This small explorative study aims to explore nonverbal cues of Croatian journalists during the live TV breaking news on COVID-19 breakthrough and earthquake in Zagreb, in comparison to their non-crisis reporting. A quantitative analysis using software ELAN was conducted on a deliberate sample of video clips. The obtained results show that nonverbal cues were moderately and expectedly frequent. Speech fluency was within the normal rate, with natural breathing pauses included and the use of fillers appropriated to the spontaneous speech. The analyzed nonverbal cues pattern does not differ depending on the reporting context which suggests that nonverbal communication skills need to be improved. Absolutely unbiased journalism may not be possible, but in order to achieve the neutrality standard, nonverbal communication competence should be incorporated both into curricula and into the journalist code of ethics.

Keywords: Broadcast journalism, Disaster reporting, Formal education, Neutrality, Nonverbal communication

Introduction

Nonverbal communication complements what has been said, and when using it we express our attitudes and feelings towards the topic we are talking/speaking about. Although nonverbal cues such as looks, grimaces, and various body parts movements are only a small part of communication in general, they complement the verbal aspect of communication. Nonverbal communication is extremely important in the media because journalists are

people whose task is to convey all objective information to people. An appropriate amount of relevant and truthful information makes it easier to understand the environment, thus eliminating uncertainty with the recipient. Although the media does not determine what people will think (Cohen, 1963), thematic frames and media narratives that publicly present a crisis situation greatly influence the formation of public opinion, as well as the opinion of official bodies (Hromadzic, 2014; Jansen, 2012; Vasterman et al. 2005). Consequently, the responsibility of communicators in mass media is great. Therefore, if, in addition to performing a quality informative task, a journalist is able to, with his entire communication, convince people affected by crisis situation, and by doing so he can also convince the rest of the public, that the situation is under control and that all actions and events take place according to contingency plans, while at the same time sending them a reassuring message, such a journalist is well acquainted with professional standards and is at the same time highly socially responsible (Perinic, 2010; Karlsson, 2010; Coleman and Wu, 2006). However, neutrality in crisis situations is not always possible precisely because news about crisis situations is always very emotionally charged, especially when it comes to human lives (Barovic, 2011).

Nonverbal Communication

Communication can be verbal and nonverbal. In verbal communication, we exchange messages with words, and it includes both speaking and listening. Nonverbal communication is an integral part of everyday communication and it includes various conscious and unconscious (Andersen, 1998) hand and foot movements, facial gestures, poses and similar; it greatly contributes to expressing emotions and affects how something is said. For example, it is almost innate for us to smile when talking about a happy event, and when giving instructions on direction it is almost certain that hands will follow our words, in other words we will show the person which direction to take. Verbal communication is largely accompanied by nonverbal communication which helps the interlocutor to accept the message in a certain way (Bogcev, 2018; Coleman & Wu, 2006). According to Mehrabian Communication Model 7-38-55 (Mehrabian, 1972), which was based on research into the importance of verbal and nonverbal messages in human communication, in the overall impact of one message, seven percent belongs to the speech part, i.e. words, thirty-eight percent to the voice part, i.e. a tone of voice, modulation and other sounds, and as much as fifty-five percent to that which is unsaid. Nonverbal behaviour is important for creating impressions on the interlocutor. Positive expressions are associated with judgments of greater credibility and it has been proved they show the speaker's reliability or persuasiveness, his integrity and good character, while negative expressions show the opposite (Coleman & Wu, 2006). By studying eye, eyebrow, and mouth movements, we can learn more about what the speaker actually thinks and feels on certain topics (Etuaho, 2012).

Paralinguistic and Extralinguistic Cues

Nonverbal communication is divided into paralinguistic, which refers to voice, and extralinguistic (i.e., non-linguistic) involving body movements (Skaric, 1988; Farnvald, 2011). Paralinguistic means are rhythm, intonation, volume, colour and voice speed as well as pauses, noises when speaking, crying, laughing and

shouting (Vuletic, 2007; Skaric, 1988). Timbre creates an impression of a person - for example, the level of education, intelligence, occupation or social characteristics of that person. Likewise, it highlights the person's current emotional state - a moderate or calm voice usually shows how calm, harmonious, sensitive and similar to that the person is. Nasal voice is a sign of rejection, but also of sensations such as touch, taste and smell. On the other hand, trembling / voice trembling is related to excitement, insecurity or fear (Vukic, 2015: 8). Volume depends on a person's situation, but it also shows his personality. Quiet speaking is associated with intimacy (for example friendship), calmness, lack of self-confidence, sadness or even fear, while a stronger voice is associated with aggression, anger, superiority, and the similar. Speech rate or tempo is measured by counting spoken syllables per second. A slow tempo means sadness, displeasure, or boredom, while a fast tempo means speaker's surprise, excitement, or joy. It is important to note that tempo also includes pauses - the pause happens on its own, i.e. it is not accompanied by other paralinguistic means, while the rhythm and volume happen at the same time. Pause is defined as the absence of verbal speech; however, it plays a major role in speech. Pauses can be an indication of correcting a mistake in a sentence, they can stand where the speaker carefully chooses the words to be spoken. A pause can be a punctuation (equal to a point in a sentence) or a respiration (taking a breath during speech) and can be an indication of whether a speech is spontaneous or learned. (Vukic, 2015: 9; Skaric, 1998).

Extralinguistic cues is the name for parts of nonverbal communication that are present during speech, but are not the speech itself. There are adapters, emblems, illustrators and regulators (Skaric, 2008: 18). According to Vukic (2015), adapters include movements, that is acts that warn the interlocutor/audience of the speaker intention to begin/continue his speech, and these cues have so far taken on certain meanings. Emblems include, for example, coughing before starting a speech as a sign for the beginning of the speaker's speech to which the audience must pay attention. Emblems are considered to be learned nonverbal cues that are not globally universal, i.e. such cues can differ from culture to culture. Such nonverbal cues include, for example, certain head movements that are typical of a culture or part of the population on a continent or in a country. Illustrators are type of nonverbal cues that refer to a wide group of pictorial nonverbal cues. Illustrators include gesture pictographs (drawing by hand in the air), ideographs (gestural analysis of concepts), spatial illustrators (showing the size or arrangement of things), cinematographers (action described by gesture and movement) and conductors (gestural support of speech, e.g. tempo). Likewise, onomatopoeic sounds are considered to be illustrators. Regulators are nonverbal cues that serve to hold back or interrupt communication, often to hold the attention of the viewer/interlocutor/audience. Regulators include long pauses, i.e. complete interruption of speech for a certain period in which the speaker, for example, carefully observes the interlocutors, and then the speaker continues the speech by emphasizing an important fact (Vukic, 2015: 10).

Nonverbal cues are also divided into kinesic cues, gestures and facial expressions, communication by sight or touch, proxemics, chronemics and territorial behaviour. However, these signs are divided into two larger groups - kinesic and proxemic cues (Vukic, 2015: 10). Kinesic cues include all body movements as a whole or parts of the body, i.e. facial expressions and gestures, while proxemic cues indicate the spatial behaviour of an individual, i.e. they refer to conveying a message about yourself and your attitude to an interlocutor or audience.

Therefore, spatial behaviour includes the position of an individual's body, physical distance from the interlocutor or the audience and territorial behaviour (Vukic, 2015: 10). Gestures are considered to be all forms of movement most often performed using hands or fingers. Those also include movements of other body parts such as legs and head. Although all conscious and unconscious body part movements are considered to be gestures, they do not include unintentional movements that cannot be influenced by the speaker (such as tics). Gestures are not universal or globally equal, so they differ depending on the culture (Vukic, 2015: 11). Facial expression, that is, facial mimics, is an indispensable part of nonverbal communication and therefore, of communication in general. Since it is a person's face that distinguishes it from others, it is considered to be one of the most expressive parts of the body. Mimics includes movements of facial muscles and movements of eyes, eyelids, eyebrows, chin, forehead and nose. Mimics often occurs and can encode independently in relation to verbal expression. For example, moving the eyebrows upwards is a sign of an affirmative response that does not always have to be accompanied by a vocal response (Vukic, 2015: 12).

Professional and Communication Competences of Journalists

Journalism is an occupation in which collected and processed information of interest, to at least some part of the public, is presented to the audience in form of meaningful news through available media - newspapers, television, radio, Internet portals and similar. A journalist should have formal education, be eloquent, have a pleasant voice, broad knowledge of various fields, be calm, have developed social and communication skills. In the process of mediating information to the audience, the accuracy, credibility and truthfulness of the information that need to be conveyed, in a way that will be interesting, relevant and timely to the audience, is extremely important. Above all, information should be conveyed primarily in a neutral way, so that the audience could get an objective picture of the event/news, and so that they could make their own position/judgment in certain situations and determine their behaviour accordingly.

Journalistic Ethics

In his work, a journalist must respect the fundamental human rights of a person, his privacy and dignity, especially in reporting on crisis situations, traffic accidents and all those situations where the dictate of commercialism, sensationalism or emotion might override the rules of journalistic ethics. (Deavours, 2020, Pisonic, Babić, 2017; Perinic, 2010). Journalistic ethics is an extremely important component of journalism. The basic setting of a journalist should be the protection of an individual and his rights. Great attention should be paid to the type of content published in the media, not only to protect the identity and dignity of victims but also to prevent security or other threats to other people, i.e. traumatizing vulnerable people with violent content. In Croatia, in addition to legal regulations, journalists are obliged to adhere to the rules of *Honour Codex of Croatian Journalists.* Although some media in crisis situations are guided by the "public interest" in publishing content from the "crime pages", the journalist's job as a public worker includes social responsibility in preserving the welfare of individuals but also in maintaining public order and peace, so as not to cause panic or contribute to increased state of fear and concern of the public.

Media Reporting in Crisis and Sudden Crisis Situations

Crisis is a perception or experiencing of an event or situation as an intolerable difficulty that exceeds the person's current resources and coping mechanisms. (James & Gilliland 2001:26.27). Crisis communication is a form of communication whose main task is to prepare or guide individuals affected by a crisis so that the crisis would have a positive outcome with as few negative consequences as possible (Holy & Borcic, 2018; Plenkovic, 2015). Sudden crises are crises that happen unexpectedly and quickly - sudden crises include traffic accidents, earthquakes, deaths, dam bursts, sudden floods, public health crises, terrorist attacks and more. Sudden crises are often predictable (if a natural or environmental disaster occurs, for example), but the public is not informed in time to take the necessary precautions for evacuation, for example. They occur very abruptly and cause a large number of victims precisely because people are not ready to evacuate in such a short period of time, or at least take refuge in a safe place from the one affected by a crisis (Wei et al, 2010; Tomic & Milas, 2006).

The main task of the media is to convey the message to the target audience, so the media is one of the main links in successful crisis communication management. The outcome of a crisis situation can be positive or negative in relation to public. A positive outcome is when public remembers a crisis situation only as one of life experiences; on the other side, a negative outcome is when public remembers a crisis situation as a great tragedy which affected them or people close to them, or even the whole world. The example of Katrina Hurricane from 2005 represents a negative outcome of that particular crisis situation, even though the event was expected and announced given the natural disasters that preceded in that area. The damage was huge, and the hurricane left behind 1,833 victims. Crisis communication completely failed. Cole & Fellows (2008: 213) believes that in order for a crisis situation to have a positive outcome, crisis communication through the media and official gazettes should first warn people of a possible impending crisis, and then offer the audience courses or free preparation classes for proper action in such situations.

The media is the main information source that citizens should trust in any crisis situation. They present basic information without leaving room for speculation or rumours. At the same time, they bring the first information about the situation and instructions on how individuals should behave in a particular crisis situation. Karlsson (2010) states that mainstream media continue to play a key role in crisis communication because they continue to dominate as the main sources of credible information. In the context of crisis communication, participatory journalism results in news media losing some control over what is published as news, and it also loses control over the context in which the news is presented, as it allows its users to comment and report uncritically and unethically on crisis events. This should be taken into consideration when attempting to determine the characteristics of overall media reporting (Plance, 2012). However, media portrayals of disasters may influence public understanding and acting in accordance to a crisis situation (Sorribes & Cortiñas Rovira, 2011). Accurate media coverage can reduce or limit confusion, fatalism or public panic (Van der Meer & Verhoeven, 2013). Overall broadcaster's communication is able to convince people that the situation is under control, all the measures are taken as planned. Journalists can send a reassuring message to the media audience (Gao, 2018; van der Meer et al., 2017). Otherwise, the media contribute to the negative crisis outcome and exploit the crisis

scenario: they seek sensation; they deny access to rescue services, affect the secondary victimization of victims, or even create new syndromes, such as the so-called World Trade Centre syndrome (Cao et al. 2020; Tierney, Bevc, & Kuligowski, 2006; Vasterman et al, 2005).

TV Broadcasting

Television should be a combination of all codes and laws related to the media. Television is the medium in which the visual part of the news is the predominant one. Therefore, in television journalism, image is more important than sound. That is why the (TV) journalists strive to hide the nonverbal cues. When creating content for television, it is important to keep in mind that individuals do not react equally and that audiences perceive the same news in different ways. Miller & Lehsner (2007: 28) considers that "one of the reasons why news could influence how people cognitively process television news is the desire to acquire knowledge about current events. The second reason is explained evolutionarily, when attending new and potentially threatening events in the environment was considered a matter of survival."

Live broadcasting is extremely important, especially in crisis situations. Audiences will believe more the news transmitted directly from the scene, and so television (as a medium and as a separate unit) will achieve greater viewership, popularity and access to information than official bodies (such as police, firefighters and crisis headquarters). Various studies have also shown that in a crisis, TV is becoming the dominant medium. „Apparently, individuals who used radio, print media and the web during normal times relied on TV to a greater degree in the months following the crisis, and the leading force in this change was the perception of threat. It is clear that TV is the medium of choice in a national crisis, and this preference is not simply the result of habit" (Wilson, 2004: 354; Althaus, 2002). Gao (2019) encourages television companies: … "broadcast, let the audience feel the most direct timeliness, integration and reality. Even after the shortest editing of the news, the audience will inevitably question their authenticity, due to the commercial characteristics of TV media. (Gao, 2019: 928). In addition, it has been proven that people find it easier to deal with the truth and clear factuality of the actual event ... even in 9/11-related events. It is lack of clarity and confusion not accuracy that makes persons uneasy (Scanlon & Hunsberger, 2011).

Education of Journalists in Croatia

For the purposes of this paper, curricula on a total of 5 Croatian universities/polytechnics that offer journalism studies were analysed. A search of valid study curricula and individual courses' curricula found only one subject related to crisis situations within the program of the Faculty of Political Science, University of Zagreb. However, as this course does not state learning outcomes, it cannot be determined with certainty that it includes teaching units regarding the acquisition of communication skills for reporting in sudden crisis situations. Therefore, generations of Croatian journalists and other media experts could not develop within their formal education communication skills focused on controlling nonverbal communication. Given the recent devastating earthquakes that hit Croatia as well as the uncertainty regarding the consequences of the duration and further

course of the SARS-CoV-2 pandemic and the impact that the so-called new normal reality has on our lives, there is a clear need to introduce appropriate higher education teaching content. The purpose of that would be to strengthen the communication and professional competences of future journalists for quality media work within *disaster journalism*. In a broader sense, journalists' higher education in Croatia needs to embrace features of instructional design which may serve as a transdisciplinary theoretical framework for the establishment of a new supplementary education programme for journalists in order to strengthen their professional and communication competences (Bagaric, 2021).

Method

Aims and Objectives

In the mentioned theoretical framework, this paper wants to investigate some nonverbal features of Croatian journalists in the initial live television reporting on sudden crisis situations, in 2 points of measurement (1. COVID-19 pandemic and 2. earthquake in Zagreb on March 22, 2020), where some functionalities of ELAN analytical software will be used. The general goal of the paper is to establish the features of recorded paralinguistic means and nonverbal cues in the initial media television reporting on crisis situations, in relation to the nonverbal features of everyday media reporting. Using specific goals, we would like to investigate whether some features of nonverbal communication affect the achievement of basic media reporting goals in (sudden) crisis situations and the journalists' communication competences. Based on the set purpose and goals, the following research questions were defined:

RQ1. What are the most common extralinguistic cues in the observed examples?

RQ2. What are the metric features of pause (silent pauses, breathing and filler shaped pauses) in speech in selected examples?

RQ3. Can we assess the communication competences of journalists in relation to the situational context, stress level and task preparation?

Sampling

AV sample

We used as analysis units, for research conducted in this paper, a deliberate sample of 12 video clips in total from reporting on sudden crisis situations in Croatia. The sample consists of live coverage broadcast by three Croatian national television stations - Croatian Radio and Television (HRT), RTL and NovaTV. A sample of video clips related to *Case 1* and *Case 2* was collected from the official website of the public Croatian Radio and Television (https://www.hrt.hr/hrt/o-hrt-u/) (HRT), which has a branched infrastructure network: three national radio stations, 8 regional radio stations and 8 regional centres, and four terrestrial television programs that can also be watched via the Eutelsat 16A satellite. According to the research of the Agency for Electronic

Media (AEM) for 2020, HRT holds the second place in the ranking of the most viewed Croatian television channels. AV content samples related to Case 3 and Case 4 were collected from the official NovaTV social network pages (https://novatv.dnevnik.hr/). NovaTV is the first commercial television with national concession that started broadcasting in 2000. According to AEM data, NovaTV was in 2020 on the first place according to television program viewership. RTL is the second commercial television that got a concession in Croatia (https://www.rtl.hr/). It started broadcasting in 2004, and most of the content broadcasted on RTL is of entertainment-educational character. According to AEM data for 2020, RTL ranks third in terms of viewership ratings. Cases 5 and 6 were collected from the official RTL network website.

Journalists' Sample

In the journalists' sample of those who report in the first measurement point- the first confirmed case of COVID-19 on 25 February 2020 in Croatia is reported by the following journalists: RI (HRT), DG (NovaTV) and MD (RTL). In the journalists' sample of those who report in the second measurement point - after the earthquake, the journalists who reported were AJ (NovaTV), PV (HRT) and IR (RTL). In the HRT sample, in Case 1 and in the first measurement point, RI, an experienced journalist dealing with health issues, most often appeared live. For the second measurement point (Case 2), the reporting of PV, a long-time presenter and author of several show cycles, who sometimes reports live, was analysed. In NovaTV sample, in the first live measurement point, in Case 3, DG reports, a television journalist for NovaTV news program. The second measurement point covers Case 4 and the reporting of AJ, a long-time journalist known for live reporting. MD is an experienced RTL journalist who reports live in the first measurement point in Case 5. IR is an RTL journalist, who mostly reports live, and covers the second measurement point in the RTL journalists' sample (Case 6).

Methods of Data Collection and Processing

During analysis unit sampling, AV clips were taken from the available informative content of live reporting broadcast by the three most viewed Croatian television stations (NovaTV, HRT and RTL). Given the sudden crisis situations, two measurement points were defined: the first confirmed case of COVID-19 in Croatia on 25 February 2020. (first measurement point) and the devastating earthquake that occurred in Zagreb on March 22, 2020 (second measurement point). 22 March 2020 In the selection of AV material, in addition to the defined measurement points, the main criterion was the availability of AV material. Audio-visual materials were downloaded from the official pages (social networks) of certain television companies. Analysis units were cut into 30 second segments. Following that, sampling of video clips from reporting in non-crisis situations was dome, which consists of video clips from shows on daily, or "more casual" topics, or from studio reports that the journalists prepared in advance for. A control AV sample of daily news was obtained, which collected reference metrics that were used to compare journalists reporting in relation to the reporting context. The basic settings for the analysis of individual nonverbal elements were determined based on a study of available literature. For the

	International Conference on		
ICRES	Research in Education and Science		**istes** Organization
www.icres.net	April 1-4, 2021	Antalya, TURKEY	www.istes.org

purposes of this paper, hand movements and eyebrow raising (extralinguistic cues) as well as metric properties of speech (speed and fluidity), and pauses as paralinguistic elements, were studied.

Eyebrow movements proved to be a very important part of nonverbal signalling in broadcasting news, so they were used not only for rhythm, but also to emphasize syllables, words, or even longer speech pronunciations. Fillers refer to pauses in which an empty space is filled between words when the speaker thinks about the next word (in such pauses the phrases "um" and "uh" are used); a pause for breathing is one during which the speaker takes a breath or exhales; a silent pause refers to a pause that marks the end of a sentence (serves as a period); while a wrong beginning refers to a pause that occurs after the speaker has used the wrong word and is followed by a correction of the incorrect word. A hand movement is considered to be any movement of one hand from the other hand, or that of a microphone held by a journalist during reporting. The hand movements were analysed, the so-called *conductors* which emphasize certain parts of sentences, and by doing so the speech looks more convincing and natural.

Data processing was performed using the ELAN audio and video annotation tool. ELAN (EUDICO Linguistic Annotator) is a computer software produced by *Max Planck Institute for Psycholinguistics (The Language Archive)* in the Netherlands. The software has several purposes, one of which is conversational analysis of video and audio recordings. This software was chosen because it is user-friendly, contains a variety of useful options, it is adaptable to our needs, and it is free. Additionally, the decision to use this program was a result of numerous positive user reviews, as well as free instructions for using the program.
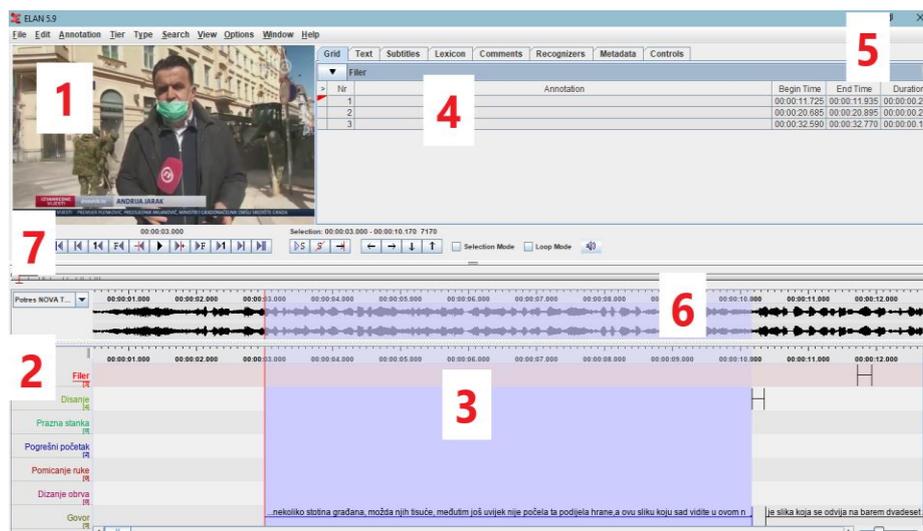

Figure 1. The initial interface of ELAN- Linguistic Annotator computer program

Source: Adapted according to Aljukic, B. (2015). Language and gender differences in media discourse: a conversational analysis of television interviews. Dissertation. Osijek: Faculty of Humanities and Social Sciences, Josip Juraj Strossmayer University of Osijek
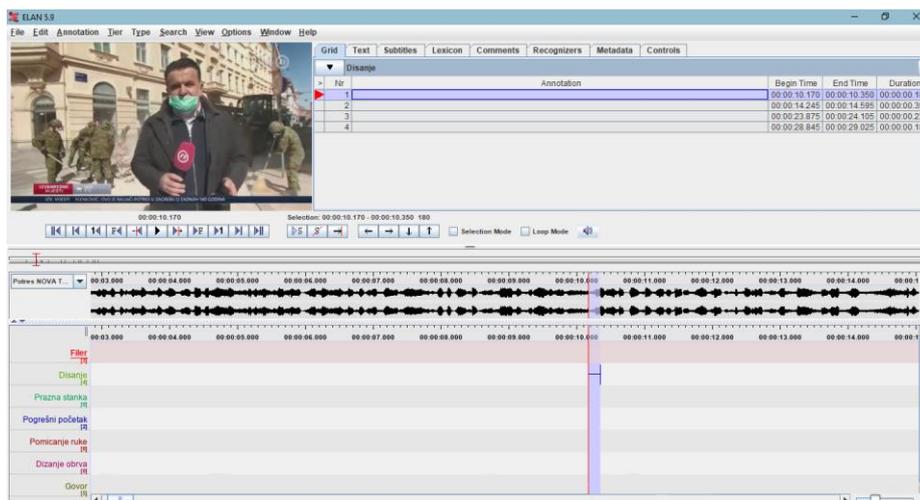
Figure 1: Example of ELAN segmentation

Source: Authors

The basic functionalities of ELAN tool include segmentation, annotation and transcription. In the data processing, the segmentation was first performed on a sample of AV clips (Figure 2). Segmentation is a name for determining the duration (segment; share) of a feature in the audio-visual recording analysis that is enabled on a slider displaying the shape of a sound wave. The annotation in ELAN software refers to associating the name (in this case) of nonverbal features with the time period in which that feature occurred. When analysing audio-visual content in ELAN, the features that will be specifically observed and recorded during the entire analysis are determined. An annotation of the kinetic elements was performed (Figure 3) and the pause (Figure 4), and then the transcription of an individual journalist's speech was done.
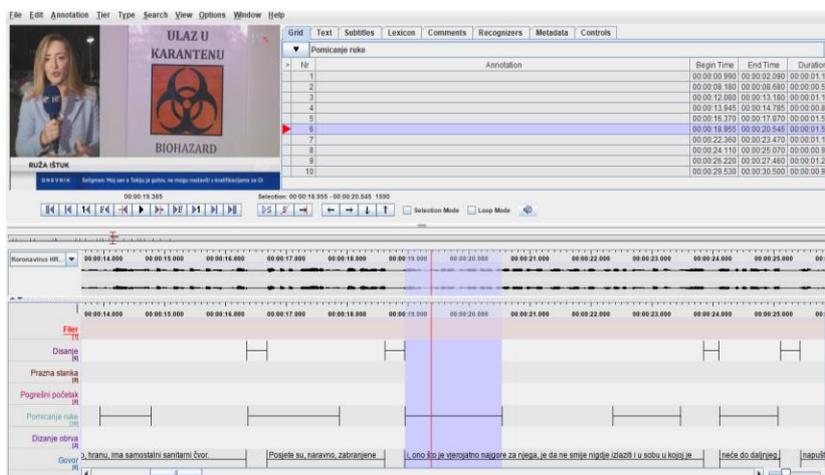

Figure 3. Example of an annotation "Hand movement" - First measurement point (RI)
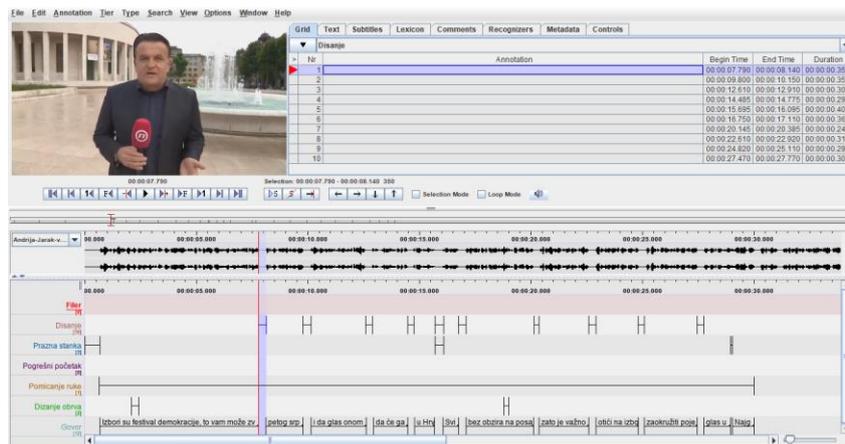
Figure 4: Example of one of the annotations "Breathing" - Second measurement point (AJ)

Transcription of audio-visual content refers to the written presentation of spoken text by the observed speaker in the analysed video. In other words, content transcription means writing the text that the speaker utters.
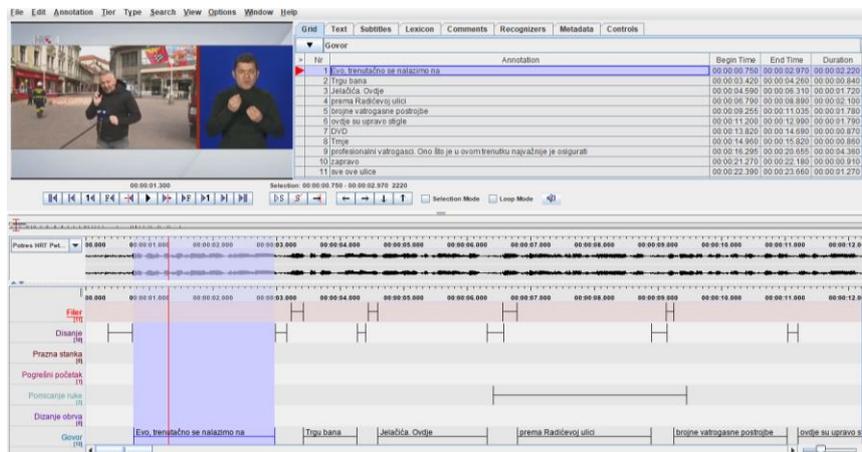

Figure 5: Example of speech transcription in reporting - First measurement point. (PV)

After the speech transcription, we analysed the nonverbal cues used by the journalists while reporting. Given the very large amount of analytical material obtained, individual functionalities will not be further illustrated with appropriate tabular representations of the obtained metric values. All interested readers can be provided with a detailed insight into the working material by e-mailing the corresponding author.

Conversational Analysis as Uncritical Method

Conversational analysis is a speech analysis that includes elements of both verbal and nonverbal communication elements. CA enables the analysis of all aspects of speech, whether it concerns one or more people. The goal of conversational analysis is to study the ways in which participants in a speech or conversation react (verbally and nonverbally) to each other and how they establish mutual communication (Aljukic, 2018). Conversational analysis is actually the analysis of language while it is being used. It is important to note that conversational

analysis is used in everyday use, with the aim of determining some of the speech features. Among these features the structure of speech, orderliness, fluidity and similar can be included, for example. Critical conversational analysis refers to the analysis of verbal and nonverbal speech in conjunction with other humanities and social sciences. For example, critical conversational analysis provides the context, totality of social, historical, cultural facts, and relationships behind the frequency of the speaker's use of certain gestures given the cultural background the speaker has. On the other hand, uncritical conversational analysis refers to a simpler form of communication analysis in which speech itself is analysed without explaining why a gesture occurs more frequently in one speaker than in another (Billig, 1999). Therefore, the AV content samples used in this paper were analysed regardless of the context, or the background cultural facts in which the material was created. In order for a conversational analysis to be complete, a person analysing a speech or a conversation must focus on all movements as well as the speaker (together with his interlocutors) and on all linguistic and paralinguistic speech or conversation features (Aljukic, 2015). Likewise, an attempt was made to determine the difference by comparing the characteristics of journalists' non-verbal communication in relation to the reporting context.

Ethical Notes and Methodological Limitations

Since this is a publicly available digital material, it was not necessary to ask for the respondents' consent for the purposes of this research. We would like to emphasize that the AV content sample was not selected in order to damage the reputation of journalists or the media, and each annotation, segmentation and transcription corresponds to the individual analysed segments. Methodological limitations in the research conducted in this paper primarily relate to the successful application and adaptation of the computer program ELAN's functionality to working environment needs. For example, the ELAN software does not have the ability to measure volume. Therefore, it was impossible to study the speaking volume in selected cases. On the other hand, ELAN software offers various other possibilities such as measuring time (as well as recording time periods) in milliseconds, which is very important for the objectives of this paper. Furthermore, the restriction applies to intentional and relatively small video/audio recording sample. Greater difficulties in the sampling process were caused by the fact that not all target recordings were publicly available; those that were did not all meet the quality criteria for conducting the analysis. It should also be noted that the student was not allowed to use specific AV segments (that lasts less than one minute) free of charge. Likewise, some journalists did not respond to either the student's or the mentor's request for cooperation regarding the acquisition of reference material. In addition, it was not possible to include a number of local broadcasters in the analysis - which might result in different findings - because they do not store or publish published videos of specific reporting at sudden crisis measurement points that were analysed in this study.

Results

Case 1. RI (HRT) journalist - Both Points of Measurement

Table 1. Nonverbal features, frequency and average duration - First measurement point (RI)

Nonverbal features	Number of feature appearances	Average duration (ms)
Filler	1	120
Breathing	6	258.3
Silent pause	0	-
Wrong beginning	0	-
Hand movement	10	1091
Raising eyebrows	2	485

A software analysis in ELAN (Table 1) on HRT news program video clip lasting a total of 30 seconds showed that the journalist RI used a pause in form of a filler only once for 120 ms, while breathing shaped pauses occurred a total of six times. Pauses in form of a wrong beginning as well as silent pauses did not occur, which indicates that the journalist was prepared for the speech and briefed on content of the text to be spoken in front of the camera. As to nonverbal cues, the journalist raised her eyebrows twice (lasting 500 and 470 ms), and moved her hand ten times, most often in the speech rhythm during the enumeration.

Speech rhythm is calculated by counting syllables per second. RI's verbatim text of the 30 second video clip that was analysed is the following: *"A younger man, as confirmed to us here in the hospital, is in good general condition, has some respiratory problems, but the doctors hope that he will stay well. He was placed in isolation, he receives medication there, he has, of course, food, he has independent sanitary facilities. Visits are, of course, forbidden and what is probably the worst thing for him is that he is not allowed to go out anywhere and he cannot leave the room he is staying in until further notice. What was also confirmed to me a little while ago here in the hospital is that it is still ... "*The number of syllables in the spoken text lasting 30 seconds amounted to 182, which means that the speech rate in this case is 6.1 syllables per second.

Table 2. Nonverbal features, frequency and average duration - Second measurement point (RI)

Nonverbal features	Number of feature appearances	Average duration (ms)
Filler	3	166,67
Breathing	6	273,33
Silent pause	0	-
Wrong beginning	0	-
Hand movement	6	3815
Raising eyebrows	2	1010

An analysis in ELAN (Table 2) found that breathing pauses were used six times in this case, which corresponds to the previous case. The journalist used filler shaped pauses only three times. There was no wrong sentence

beginning, nor was there a silent pause. Regarding nonverbal cues, eyebrow raising is used twice for an average duration of 1010 ms. On the other hand, the hand movement occurred as many as six times and lasted for a longer time. The journalist is calmer in this case, speaks more slowly compared to the previous case and uses more breathing pauses. The verbatim text that RI says in this case is the following *"As you can see, the girls are behind my back, in just two months after the surgery they have doubled their weight and are making great progress. What I have to point out of course is their parents are not here at the moment as they have two other little children, but the girls are in safe and caring hands of the medical staff here at the KBC neonatology. I must definitely mention that the girls are facing another procedure in which doctors have to close their abdominal walls and how they ... "* The number of syllables in spoken text is 172, which amounts to 5.7 syllables per second. Therefore, the speech in this case is slower compared to the reporting case by the same journalist in a crisis situation.

Case 2. Journalist PV (HRT) - Both Measurement Points

Table 3. Nonverbal features, frequency and average duration – First measurement point (PV)

Nonverbal features	Number of feature appearances	Average duration (ms)
Filler	11	274.55
Breathing	10	289
Silent pause	0	-
Wrong beginning	1	730
Hand movement	3	2400
Raising eyebrows	0	-

The software analysis (Table 3) established that the journalist PV took a breathing pause ten times in total during the reporting from Ban Jelačić Square on earthquake that had just occurred. Vlahov used filler pauses as many as eleven times, most often the particle "uh". There is no silent pause in this video clip, but the journalist uses a pause after saying a wrong word in duration of 730 ms. From nonverbal cues, the journalist uses the hand movement three times in the rhythm of speech, i.e. he uses it for explanation. The journalist does not raise his eyebrows during the speech.

The verbatim text that PV says during the reporting is the following *"We are here at Ban Jelačić Square, here towards Radićeva Street many fire brigades have just arrived, DVD Trnje, professional firefighters, what is most important at this moment is to secure, in fact, all these streets, which are - on which a lot of material from buildings has already collapsed, but ... "* It can be concluded from the meaning of the sentence spoken by the journalist that the speech was not prepared in advance but that it took place spontaneously during the recording. The number of syllables in the text is 131, i.e. the speech rhythm is 4.36 syllables per second.

Table 4. Nonverbal features, frequency and average duration– Second measurement point (PV)

Nonverbal features	Number of feature appearances	Average duration (ms)
Filler	2	310
Breathing	5	332
Silent pause	1	740
Wrong beginning	1	120
Hand movement	0	-
Raising eyebrows	0	-

In the video clip analysis (Table 4), journalist PV uses a breathing pause five times in total, while the fillers are used only twice and, in both cases, they are used immediately after the breathing pause. The journalist uses once a pause to correct a speech error that lasts 0.12 ms, while sentences are joined instead of using silent pauses. Interestingly, hand movement during speech and raising eyebrows are not used at all during speech, and the reason for this is the fact that the journalist holds papers with notes and has no need to emphasize words or parts of sentences with his hands.

Verbatim speech is as following *"Economic growth and the fight against poverty in Croatia depend on establishment of an independent judiciary, the protection of property rights and the rule of law. We are talking about what has been done in the protection of property rights with N. S., co-founder of the International Leaders Summit- who is waiting for us on Skype in Jerusalem, Israel ... Mrs. S., good afternoon. Croatia ranks one hundred and twenty out of one hundred and forty countries in terms of judicial independence. How do you comment on that? "* The spoken text consists of 166 syllables in total, which means that the speech rate is 5.53 syllables per second. The text spoken by PV in calm studio recording is slower, the sentences are meaningful and each of them forms a unit. The journalist is calm, there are more breathing pauses.

Case 3. Journalist DG (NovaTV) - Both Measuring Points

Table 5. Nonverbal features, frequency and average duration – First measurement point (DG)

Nonverbal features	Number of feature appearances	Average duration (ms)
Filler	9	164.44
Breathing	8	226.25
Silent pause	0	-
Wrong beginning	0	-
Hand movement	2	12800
Raising eyebrows	0	-

A software analysis (Table 5) found that the journalist DG used a breathing pause as many as eight times in a 30-second video clip, and that pause was followed by a filler pause nine times. The journalist never used a pause to mark the end of a sentence, neither a still pause after a misspelled text. Of all the nonverbal cues, the journalist does not use eyebrow raising, but he does move his hand in the rhythm of the speech during almost the entire 30 second speech. V

erbatim text - DG: *"... of healthcare Beroš here today at a Government conference, but in practical terms it does not mean much given the information we heard, which was presented yesterday, at least when it comes to borders there will be intensified surveillance actually of all who come to Croatia, and who stayed or came from the area where the virus was detected, especially from Northern Italy, here was the first man from the state inspectorate who said that he had already sent additional teams of sanitary inspectors to the borders ... "* The number of spoken syllables in this text amounts to 179. Therefore, the speech rate in this example is 5.97 syllables per second.

Table 6. Nonverbal features, frequency and average duration– Second measurement point (DG)

Nonverbal features	Number of feature appearances	Average duration (ms)
Filler	0	-
Breathing	5	360
Silent pause	1	410
Wrong beginning	0	-
Hand movement	7	3708.6
Raising eyebrows	0	-

A software analysis (Table 6) found that the journalist DG used a breathing pause five times in total during this video clip. Also, the breathing pause serves twice as a pause for speech interruption (silent pause) which marks the end of the sentence. The journalist uses rhythmic hand movements to emphasize words or parts of sentences during almost the entire length of the video clip. In this example, there is no pause at the wrong beginning of the sentence, nor is there any eyebrow raising. The verbatim of the text spoken by DG in this case goes as follows: *"Party members, as independent candidates, can go to the polls if they collect five hundred signatures. About one hundred and sixty-eight political parties, as many as are registered in Croatia, can run in the election. Lists must be submitted by midnight on June 16. When the fourteen-day process is complete, the state election commission has two days to check all lists. With the submission of the list for St. Mark's Square, everyone who wants to run must have a special account through which they will finance the campaign ... "* This text consists of 163 syllables - the speech rate is 5.43 syllables per second, which is slower than live reporting from the first measurement point.

Case 4. Journalist AJ (NovaTV) - Both Measuring Points

Table 7. Nonverbal features, frequency and average duration – First measurement point (AJ)

Nonverbal features	Number of feature appearances	Average duration (ms)
Filler	3	200
Breathing	4	235
Silent pause	0	-
Wrong beginning	2	235
Hand movement	0	-
Raising eyebrows	0	-

The analysis (Table 7) established that the journalist AJ took a breathing pause only four times while reporting live from the scene of the earthquake in Zagreb on March 22, 2020. Two out of four breathing pauses were accompanied by a filler. Regarding other types of pauses, the journalist uses the pause twice due to a wrong beginning lasting an average of 0.32 ms. The journalist does not raise his eyebrows to emphasize the words in the sentence, nor does he use nonverbal cues such as moving his hands since he is holding an object in his hands that prevents him from doing so.

The verbatim of the text that the journalist speaks is as follows: *"... several hundred citizens, maybe thousands of them, however the distribution of food has not started yet, and this picture that you see now in our report is an image that is taking place at twenty points in Zagreb at least at this moment. The Croatian army this intersection of Teslina and Gajeva streets here, that is a huge piece of the facade, but also the supporting wall, that is parts of the roofs have caved here. And now they are trying to do it - clean it, trying to move it so that the roads could be washed later, unfortunately there are several buildings - evacuated during ... ",* and it contains a total of 145 syllables. The speech rate in this video clip is 4.83 syllables per second.

Table 8. Nonverbal features, frequency and average duration– Second measurement point (AJ)

Nonverbal features	Number of feature appearances	Average duration (ms)
Filler	0	-
Breathing	10	319
Silent pause	3	390
Wrong beginning	0	-
Hand movement	1	29360
Raising eyebrows	2	265

The analysis (Table 8) found that the journalist AJ moved his hand continuously for 30 seconds in a calmer

television report on elections in order to emphasize sentences or facts. He did not use fillers during his speech, and he used a silent pause three times in total at the end of sentences. He used his breathing pause ten times. He also once raised his eyebrows to emphasize and convince the public of the need to go to the polls. The wrong beginning of the sentence did not happen.

Verbatim of AJ's speech: *"Elections are a festival of democracy, it may sound like a cliché to you, but it is true and that is why it is very important that every citizen of this beautiful country goes to the polls on July 5 and votes for whomever he thinks would best represent him at the Croatian Parliament. We are all, regardless of the work we do, a part of this country's identity, so it is important to perform your civic duty, go to the polls, circle the list, circle the name of an individual for who you want to have the voice in the Croatian Parliament. The worst option is ... "*The speech contains 167 syllables, so the rhythm of AJ's speech in this case is 5.67 syllables per second.

Case 5. MD (RTL) Journalist - Both Points of Measurement

Table 9. Nonverbal features, frequency and average duration- First measurement point (MD)

Nonverbal features	Number of feature appearances	Average duration (ms)
Filler	1	150
Breathing	4	242.5
Silent pause	1	80
Wrong beginning	0	-
Hand movement	2	1350
Raising eyebrows	0	-

Video clip analysis (Table 9) found that the journalist MD used a breathing pause four times in reporting, while she used fillers only once. She also used a complete pause only once, as the end of a sentence. She moved her hands only once for the purpose of emphasizing (she brought her hand closer to her body), and the raising of her eyebrows did not occur within the 30 seconds observed in the video clip.

Verbatim of the text that the journalist spoke in those 30 seconds observed is ... *hospital "Fran Mihaljevic", there are five people in isolation, depending on the development of the situation, they will be quarantined or released home - according to the latest information, the infected young man is feeling well, he is getting all the necessary medical care - once again here in the hospital, but from Crisis centre they are calming the public, they say that there is no reason to panic, and as we unofficially find out, in the largest Croatian hospital, KBC ... ".* The spoken text contains 139 syllables in total, which amounts to 4.63 syllables per second.

Table 10. Nonverbal features, frequency and average duration – Second measurement point (MD)

Nonverbal features	Number of feature appearances	Average duration (ms)
Filler	9	187.78
Breathing	5	374
Silent pause	0	-
Wrong beginning	0	-
Hand movement	0	-
Raising eyebrows	3	460

The analysis (Table 10) showed that the journalist MD used fillers more often (nine times), and a breathing pause was used as many as five times. Hand movements are also subtler, almost non-existent. In other words, the journalist just brings her forearm closer to her body to emphasize certain words. She doesn't use a silent pause to finish a sentence at all. The journalist raises her eyebrows three times in this video clip case. In this video, the verbatim spoken text is as follows: *"Well, tomorrow is in front of Dubravka Šuica certainly one of the most important days in her career. It could be seemed that she was under pressure today when she was not ready to answer journalists' questions, which already suggests to candidates to refrain from any interviews before the hearing. She will be heard before the competent committees tomorrow. The main committee is the Constitution one - questions will be asked for departments, for ...* "The text contains 143 syllables, so the speech rate is 4.76 syllables per second.

Case 6. Journalist IR (RTL) - Both Measurement Points

Table 11. Nonverbal features, frequency and average duration – First measurement point (IR)

Nonverbal features	Number of feature appearances	Average duration (ms)
Filler	2	225
Breathing	5	212
Silent pause	0	-
Wrong beginning	1	110
Hand movement	5	1422
Raising eyebrows	0	-

The analysis (Table 11) found that the journalist IR in the analysed video clip uses the filler only once, and he does not use complete pauses to separate the sentence at all. Breathing pauses occurred a total of five times over the 30 second video clip duration, and a pause due to a wrong start occurred only once. The nonverbal cues that the journalist used more were hand movements (three times), and he did not raise his eyebrows even once. The verbatim of the analysed speech is as follows *"According to what I heard from Mr. P. K. this morning as soon as we went out on the field, he said that in fact the people whose task is to assess the statics of buildings and the*

damage immediately on the spot will be the ones to send the information when the citizens can return. I met a large number of citizens who are actually interested in that. When they can return to their homes- that information has not yet arrived. We saw here in Đorđićeva street a few of these people who are actually assessing ... ". Although the journalist does not compose meaningful sentences, that is he does not complete them, he still does not make pauses due to the wrong sentence beginning. The number of syllables in the spoken text is 169, which means that the speech rate is 5.63 syllables per second.

Table 1. Nonverbal features, frequency and average duration – Second measurement point (IR)

Nonverbal features	Number of feature appearances	Average duration (ms)
Filler	0	-
Breathing	5	170
Silent pause	1	1020
Wrong beginning	0	-
Hand movement	8	2010
Raising eyebrows	4	187.5

The analysis (Table 12) showed that in this video clip the journalist IR uses a breathing pause three times and these are the only pauses he makes (paralinguistic means) in that recording. Nonverbal cues such as hand movements (as many as six times) and raising eyebrows (as many as five times) are predominant in the video clip. Hand movements are used to help maintain the speech tempo. The verbatim of the spoken text in the last example is as follows *"... an hour and a half longer than anticipated the measures were being tuned up - we did not find out what these specific measures would be, but we learned that they would be implemented in three phases: that there would be a first phase 27 April, after that May 4 and then May 11, and most importantly, the Prime Minister stressed that the goal of these measures is to preserve the economy, but not to jeopardize the result brought to us by these well-made restrictive epidemiological measures. Let's listen to what the Prime Minister said a few minutes ago."* This speech contains a total of 171 syllables - so the speech tempo is 5.7 syllables per second.

Table 13. Metric analysis of the paralinguistic elements – comparison regarding the reporting context

Broadcaster	Pause (crises clip)	Pause (non-crises clip)	Speaking rhythm (crises clip)	Speaking rhythm (non-crises clip)
1 (RI)	7	9	6.1	5.7
2 (PV) m	21	9	4.36	5.53
3 (DG) m	17	6	5.97	5.43
4 (AJ) m	9	13	4.83	5.67
5 (MD)	6	14	4.63	4.76
6 (IR) m	8	6	5.63	5.7

By taking a look at Table 13 and the measured metric values of speech rhythm based on the number of syllables per second that the journalists say, the speech fluency and speech speed when reporting, taking into consideration the context, were determined. Journalists in the cases researched speak at an average rate of 4.41 syllables per second, and none of them exceeds the normal speech tempo limit. From that we can conclude that the smallest number of syllables per second is spoken by PV in his earthquake reporting (4.36 syllables per second), and the largest number of syllables per second is spoken by Ms. RI in the reporting on the first COVID 19 case in the Republic of Croatia (6.1 syllables per seconds). The structure and frequency of the fluency breaking element in the observed cases is based on moderate, not long pauses. The filling pauses (fillers) are surprisingly short in all the previously observed cases.

Discussion

Based on all the obtained results, it was shown that the observed kinetic elements of nonverbal communication, as well as paralinguistic means appearing in speech, were moderately and as expectedly frequent. Our journalists in almost all cases use their hands to support the speaking rhythm, except in situations when they hold an object in their hands (papers or a microphone) which prevents them from moving their hands. Silent pauses are the least used from the category of paralinguistic means. They should normally be used to separate sentences, but as it is not natural in everyday speech for complete pauses to appear after each sentence (Skaric, 2008), this result is expected. Although in some cases it seems that journalists (especially in crisis reporting) are less prepared and more out of breath during speech, by researching the speech rate and the speech construction we concluded that their speech rate certainly belongs within normal rate limits. According to Pletikos (2006), the normal speech rate with pauses included (calculated by counting spoken syllables per second) for the Croatian language corpus varies between four to seven syllables per second. However, the average number of syllables per second of a speech in Croatian Dnevnik amounts to 6.7. It is interesting to note that the journalists in the researched cases spoke in an average rate of 4.41 syllables per second, and neither of them surpassed the normal speech rate limit.

The most commonly used elements of nonverbal communication in the observed cases are hand movement as well as the breathing pause and the filler pause. Speech fluency is within the normal speech rate, with breathing pauses included which are also natural and the use of fillers in speech that was not previously prepared because it is related to reporting in a sudden crisis situation. There is very often hand movement in the speech rhythm that subconsciously helps the journalist to pronounce the text more naturally. The pause in these cases most often played the role of a pause that allowed the journalist to take a breath, and was often accompanied by a filler to give the journalist room to think about the next word. Although, based on the results obtained from the analysed sample of Croatian television companies, it could be concluded that journalists cope professionally and properly in sudden crisis situations. Given the established fact they received insufficient formal education, the question arises whether this depends on previous professional or life experience. We should not disregard the experiences of reporting from the war period in our country, in which some of the journalists participated. On

the other hand, the journalists from the analysed sample could have, in some form, additionally invested in their professional and/or communication competences, which, among other things, reflected on mostly well-done reporting in sudden crises.

However, the fact that the communication competences in the journalists' sample from the analysed cases do not differ much depending on the reporting context - nonverbal features when reporting in sudden crisis situations do not differ too much compared to the reporting sample of everyday situations, except in a slightly larger number of breaks when reporting in crisis situations - indicates their communication skills should be improved. It can be concluded that even in situations that are not stressful for them, that is, the situations that enable them preparation in advance, they do not pay attention to nor do they have complete control over the elements and cues of their own nonverbal communication. Regarding some analytical parameters of the conversational journalists' analysis in the observed sample, the journalists' sample in this study is very small and does not allow us to draw usable conclusions. Although the data obtained indicate that in noncrisis reporting male journalists, on average, pronounce more syllables than their female counterparts (RI and MD). This could be related to research by Yuan, Liberman, Cieri (2006) according to which males tend to speak faster than females. The difference between them is, however, very small, only about 4 to 5 words or characters per minute (2%), though it is statistically significant.

Conclusion

Research on nonverbal communication suggests that nonverbal elements and cues are at least as important or influential as the verbal content of a message. This is because when verbal and nonverbal messages contradict, viewers tend to believe more in the nonverbal signal. It is important for communicators to focus on movements. Communicators should be aware of the fact that eye, eyebrow and lip movements respond to the inner mood and emotional aspects regarding that what is being said. In the context of public safety and quality information giving, the behaviour of journalists when reporting in sudden crisis situations is very important.

Based on the live reporting recordings, we noticed that the journalists reacted appropriately professionally when reporting, regardless of the stress level they were - perhaps - facing. This level of stress was somewhat evident in the fluency element (through more frequent pauses and rarely less meaningful sentences). However, we believe that journalists with their calm reporting did not negatively affect the feelings of fear and uncertainty in media audience due to the newly occurred crisis. However, the results of the software conversational analysis conducted on this journalists' sample seem to indicate to the need for improving their communication skills in terms of mastering their own nonverbal signalling. Absolutely unbiased journalism may not be possible to achieve. Nonetheless, in order to achieve neutrality standards in information giving and social responsibility it is necessary to include strengthening of the journalists' nonverbal communication competences through formal higher education as well as through the journalistic code of ethics.

Acknowledgements

References

Althaus, S. L. (2002). American news consumption during times of national crisis. Political Science & Politics, 35(3), 517-521.

Aljukic, B. (2015). Language and gender differences in media discourse: a conversational analysis of television interviews. Dissertation. Faculty of Humanities and Social Sciences, Josip Juraj Strossmayer University of Osijek

Aljukic, B. (2018). ELAN Linguistic Annotator i svojstva stvarne konverzacijske interakcije. Proceedings from the Sixth International Conference at the Faculty of Foreign Languages: Language, Literature and Technology, 21-36 https://www.academia.edu/37546148/.

Andersen, P. (1998). Nonverbal Communication: Forms and Functions. McGraw-Hill Humanities/Social Sciences/Languages.

Bagaric, Z. (2021). Inclusive Journalist Education in Croatia: Transformative Potential of Media. Proceedings of the 3rd International Conference on Future of Social Sciences. Diamond Scientific Publishing. 44-55. https://www.dpublication.com/wp-content/uploads/2021/02/22-1072.pdf.

Barovic, V. (2011). Objektivnost, novinarska etika i izvještavanje u kriznim situacijama., Medijske studije, 2(3-4), 118-127. https://hrcak.srce.hr/87882.

Billig, M. (1999). Freudian Repression: Conversation Creating the Unconscious. Cambridge University Press.

Bogcev, M. (2018). Govor tijela, uloge i značenja neverbalne komunikacije u poslovnom komuniciranju. [Body language, role and significance of nonverbal communication in business communication]. Final paper. Medimursko veleuciliste u Cakovcu. https://urn.nsk.hr/urn:nbn:hr:110:564365.

Cao, Q. Hu, W.; Zhou, S.; Luo, B.; YU, Y..; Liao, S. S.; Zhao, J. L. & Lau, R. Y-K. (2020). The Role of Media Coverage on Pandemic Containment: Empirical Analysis of the COVID-19 Case. PACIS 2020 Proceedings. 162. https://aisel.aisnet.org/pacis2020/162.

Cohen, B. (1963) The Press and Foreign Policy, Princeton University Press.

Cole, T. W. & Fellows, K. L. (2008). Risk Communication Failure: A Case Study of New Orleans and Hurricane Katrina. Special Issue: Communication Issues Related to Hurricane Crises. 211-228, https://doi.org/10.1080/10417940802219702.

Coleman, R. & Wu, H. D. (2006). More Than Words Alone: Incorporating Broadcasters' Nonverbal Communication into the Stages of Crisis Coverage Theory - Evidence From September 11th. Journal of Broadcasting & Electronic Media, 50(1), 1-17, DOI: 10.1207/s15506878jobem5001_1.

Deavours, D. (2020). Written All Over Their Faces: Neutrality and Nonverbal Expression in Sandy Hook

Coverage. Electronic News. https://doi.org/10.1177/1931243120954855.

Etuaho, O. (2012). Behind the smile: a study of British and American news presenters' non-verbal communication. University of Jyväskylä, https://jyx.jyu.fi/bitstream/handle/123456789/37716/1/.

Farnvald, S. (2011). Neverbalna komunikacija voditelja informativnog programa. [Nonverbal communication of speakers in informative program]. Master's Thesis. Filozofski fakultet u Zagrebu. http://darhiv.ffzg.unizg.hr/1505/1/.

Gao, S. (2019). Media Competitiveness of Live TV News. Advances in Social Science, Education and Humanities Research, 378. 927-931. https://www.researchgate.net/339275329.

Holy, M. & Borcic, N. (2018). Analysis of The Croatian Crisis Communication Academic Discourse. Living in Crisis Mode: Time to reconsider definition, meaning and practice? Communication Management Forum 2017. Proceedings: Living in crisis mode: Time to reconsider definition, meaning and practice? 363-380. https://bib.irb.hr/datoteka/949933.

Hromadzic, H. (2014). Medijska konstrukcija društvene zbilje: socijalno-ideološke implikacije produkcije medijskog spektakla. [Media Construction of Social Reality. Social and Ideological Implications of Production of Media Spectacle]. AGM.

James, R. K., & Gilliland, B. E. (2001). Crisis intervention strategies. Brooks/Cole Thomson Publishing Co.

Jansen, S. C. (2012). Walter Lippmann: A Critical Introduction to Media and Communication Theory. Peter Lang Inc., International Academic Publications.

Karlsson, M. B. (2010). Participatory Journalism and Crisis Communications: A Swedish Case Study of Swine Flu Coverage. Observatorio Journal, 4(1), 201-220. https://www.academia.edu/3551683/.

Mehrabian, A. (1972). Nonverbal communication. Aldine-Atherton.

Miller, A.& Leshner, G. (2007). How Viewers Process Live, Breaking, and Emotional Television News. Media Psychology, 23-40. DOI: 10.1080/15213260701300915.

Perinic, J. (2011). Javno mnijenje kao subjektivna značajka krizne situacije: Utjecaj medija i službi za odnose s javnošću na javno mnijenje. [Public opinion as a subjective trait of a crisis situation – the influence of the media and public relations services on public opinion]. Dissertation. Filozofski fakultet u Zagrebu, https://www.bib.irb.hr/800959.

Pisonic Babic, J. (2017). Mediji i izvještavanje u kriznim okolnostima: terorizam i rat. Final Paper. [Media and Reporting during a Crisis: Terrorism and War]. Sveučilište u Zagrebu, Hrvatski studiji. https://urn:nbn:hr:111:993694.

Plance, D. (2012). Breaking News: The Role Of The Media In Disasters. West Virginia University Press. https://www.researchgate.net/publication/293683615.

Plenkovic, M. (2015). Krizno komuniciranje. [Crisis Communication] Media, culture and public relations, 6(2), 113-118. https://hrcak.srce.hr/149016.

Pletikos, E. (2008). Akustički opis hrvatske prozodije riječi. [Acoustic description of Croatian word prosody]. Dissertation. Sveučilište u Zagrebu, Filozofski fakultet. https://bib.irb.hr/datoteka/337326. .

Scanlon, J. & Hunsberger, A. (2011). Dealing with the Dead in Disasters: A Professional and International Process. The Brown Journal of World Affairs 17(2), 99-111.

Skaric, I. (1988). Temeljci suvremenog govorništva. [The foundations of modern oratory]. Školska knjiga.

Skaric, I. (2008) Hrvatski izgovorni identitet. [Croatian Pronunciation Identity]. Govor/Speech: časopis za fonetiku, 24(2) 79-90.

Sorribes, C. P. & Cortiñas Rovira, S.(2011). Journalistic Practice in Risk and Crisis Situations: Significant Examples from Spain. Journalism, 12(8) 1052-1066. DOI: 10.1177/1464884910388233.

Tierney, K., Bevc, C., & Kuligowski, E. (2006). Metaphors Matter: Disaster Myths, Media Frames, and Their Consequences in Hurricane Katrina. Annals of the American Academy of Political and Social Science, 604, 57–81. https://doi.org/10.1177/0002716205285589.

Tomic, Z. & Milas, Z. (2007). Strategija kao odgovor na krizu. [Strategy as crisis response]. Politička misao, 44(1), 137-149 https://hrcak.srce.hr/20151.

Van der Meer, T. G. L. A., Verhoeven, P., Beentjes, J. W. J. & Vliegenthart. (2017). Disrupting gatekeeping practices: Journalists' source selection in times of crisis. Journalism 18(9), 1107-1124.

Van der Meer, T.G. L. A. & Verhoeven, P. (2013). Public Framing Organizational Crisis Situations: Social Media Versus News Media. Public Relations Review 39(3), 229–231 DOI: 10.1016/j.pubrev.2012.12.001 .

Vasterman, P., Yzermans, J. & Dirkzwager, A. J. (2005). The Role of the Media and Media Hypes in the Aftermath of Disasters. Epidemiologic Reviews,27(1), 107-114. DOI: 10.1093/epirev/mxi002.

Vukic, A. (2015). Odnos paralingvističkih sredstava i neverbalnih znakova u komunikaciji. [Relation of paralinguistic elements and nonverbal signals in communication]. Master's thesis. Sveučilište J. J. Strossmayera u Osijeku, https://urn.nsk.hr/urn:nbn:hr:142:632919.

Vuletic, B. (2007). Lingvistika govora. Zagreb: FF press. https://hrcak.srce.hr/173453.

Wei, J., Zhao, D., Yang, F., Du, S. & Marinova, D. (2010). Timing crisis information release via television. Disasters, 34(4), 1013-1030. DOI: 10.1111/j.1467-7717.2010. 01180.x

Wilson, L. (2004). Media Dependency During a Large-Scale Social Disruption: The Case of September 11. Mass Communication and Society, 7(3), 339-357.

Yuan, J., Liberman, M., Cieri, C. (2006). Towards an Integrated Understanding of Speaking Rate in Conversation. INTERSPEECH 2006 - ICSLP, Ninth International Conference on Spoken Language Processing, Pittsburgh, PA, USA, September 17-21. https://www.researchgate.net/publication/221478381.

	International Conference on	
IICRES	**Research in Education and Science**	**istes** Organization
www.icres.net	April 1-4, 2021 Antalya, TURKEY	www.istes.org

Multimodal Analysis of Online Webinars Conducted in Zoom

Pasala Krishna Chaitanya

ITMO University, Russia, https://orcid.org/0000-0002-1982-8858

Sofia Sorokina

ITMO University, Russia, https://orcid.org/0000-0001-9159-5203

Oleg Basov

ITMO University, Russia, https://orcid.org/0000-0001-5788-4845

Abstract: Student satisfaction is one of the important factors to be considered in the education system. Due to the COVID19 pandemic and to make quality education available for a wide range of people, the current higher education system has undergone several changes. The classes and webinars being conducted through video conferencing systems such as zoom have gained unprecedented popularity. So, according to statistics, more than 97% of students switched to online education in the United States as it is a safe and feasible option to continue their education during the pandemic situation. At the same time, only 31% of students consider this format to be of the same quality as full-time, and only 5% of students find online learning to be of higher quality than offline. That is, 63% of students receiving online education are not satisfied with its current quality. According to the many types of research on student-teacher communication, non-verbal communication plays a crucial role in student satisfaction. Therefore, the study is conducted to find the direct correlation between time characteristics such as loudness, silence duration, change in intonations, tempo, and hand gestures of instructors during online classes and student satisfaction levels. As part of the study, recent online classes and webinars from MIT, Harvard, Stanford, IIT's, ITMO, and few prestigious universities are analyzed. The quality of the classes is rated by the students as high or low based on their satisfaction level. Based on the analysis, successful and unsuccessful models are compiled. Based on the obtained models and the time parameters illustrated, assessment and recommendation systems are offered to improve the quality of both individual characteristics and the general concept of classes

Keywords: Non-verbal communication, Zoom, Online classes, Webinars, Correlations

Introduction

The COVID-19 pandemic forced most of the universities and schools worldwide to remain closed for students

---

162

and working staff safety. So, to continue with the curriculum and to provide uninterrupted education, most of the universities have switched to synchronous E-learning mode. Development of the technology has provided different options for distance education are quickly adopted to promote additional values in the educational area (Malinovski T., 2018). Synchronous E-learning is a method of education where teacher and students are separated in space by utilizing software-based services to bridge the gap between them (Singh S., 2020). It is the all-inclusive blending of ICT gadgets and modern telecommunication equipment into the education system (Eze S., 2018). The E-learning platform is a softwarebased module that integrates diverse management devices, communication, evaluation, checking, etc. with an objective that could provide technological help to teachers as well as the targeted students to improve the variety of phases of the teaching-learning process, also the educational procedure in its nature being distant, classroom-based or having a combined nature where they merge the two modes in various extents (Malinovski T., 2018).

Synchronous E-learning can happen with the help of video conferencing platforms. Videoconferencing-based educational systems can enable students in one or many locations, to watch and listen to an instructor in real-time, and maintain interactivity with those remote locations. It is a mature technology that can be used in the distance learning process to provide instructor-student or student-student interaction (D. Clawson, 2016). For most of the educational systems during the pandemic, It is the best way to deliver a better experience to the students. Most of the video conferencing applications are user-friendly and easy to operate while establishing the connection between users. Virtual classrooms can be created using video conferencing systems.

The advancement of digital technology and Internet services made people connect through video conferencing in the modern world. It has increased the flexibility of geographical locations and also increased cost and time efficiency. But still, users face few constraints due to the bandwidth limitations, high development, and maintenance costs, and lack of skills to use (H. Kimiloglu, 2017). Among the popular video conferencing applications Zoom video communications is considered to be more helpful in the teaching-learning process. It solves most of the connectivity and user issues by its unique architecture and userfriendly interface. Even in the low bandwidth, zoom provides hassles communication to its users (Z. V. C. Inc, 2020).

In the education industry, the way instructors communicate with the students plays a crucial role in student satisfaction and academic performance. According to the research conducted it is assumed that 65% of the meaning of conversational messages comes from non-verbal communication and only 35% through verbal communication (Ahmad, 2009). Therefore, verbal and nonverbal communication is an aspect that needs to be emphasized for every teacher. The teacher's ability in applying both can help improve the quality of learning in the class. It has an impact on the academic and non-academic performance of students. Instead, if the teachers are not able to communicate effectively in transferring knowledge, skills, and attitudes, it will be hard to achieve the expected objectives. This shows that students who understand and can do the tasks very well also depend on how the teachers' style of verbal and nonverbal communication. Verbal communication includes a short talk, discussion, ideas, and so forth (Wahyuni, 2018). Nonverbal communication skills include body language, the use of eye contact, hand gestures, tone, change in intonations, and speed of speech which cues for creating

emotional connections and understanding the meaning of the words (Fan, 2021), (Scott-Parker, 2017). Then the two communication skills must always be honed by teachers, to create quality learning.

Non-Verbal Communication

Nonverbal communication is the process of sharing meaning interpretive and multi-media communication type. It is natural, reliable, and spontaneous (Wahyuni, 2018). In simple it is a process of conveying messages without using written or spoken words. Nonverbal communications help to maintain learner's focus throughout the class via a continuum of instruction to achieve an equilibrium between communication and rapport (Scott-Parker, 2017). Using nonverbal signals, the following information can be encoded such as physical attributes of the speaker, nonarbitrary referential meaning to objects and environmental states (S. Fruhholz, 2020). The sender of non-verbal communication may be unaware that he or she is sending a non-verbal message. Consequently, he or she may not be aware of the impact that the non-verbal message may have. Since the non-verbal message may be transmitted unconsciously, the sender will not have planned it. Therefore, a non-verbal message can be more reliable than an oral or written message. The types of nonverbal communication associated with student satisfaction are eye contact, paralinguistics, gestures, physical appearance, and proxemics (Fan, 2021).

According to (Fan, 2021), the instructor physical appearances are not associated with student satisfaction levels. As the study deals with digital education eye contact and proxemics are not considered. So, the relation between gestures and paralinguistics is considered in the study to find their association with student satisfaction during online webinars and classes.

Gestures

Gestures are movements and signals using body parts used to communicate messages with or without the conjunction of words. Gestures include movements of hands, face, head nods, and other body parts. Gestures refer to the interlocutor rather than to the topic of conversation, and they help maintain the conversation as a social system (J. Bavelas, 1992). Gestures are made predominantly when the person is talking, and they are temporally synchronized with the speaker's verbal syntax occurring at precisely the same moment as the relevant part of speech (S. Kita, 2017). Gestures are not treated as physical movements but rather as referential acts; they convey meaning, depict events, and represent ideas. They specify and often clarify verbal references, and they can denote meanings that may not be in the accompanying words. Gestures work together to convey semantic information in a highly integrated manner. Gestures are particularly suited for solving the speaker's problem of involving the listener without disrupting the topical verbal narrative. Sometimes, interactive gestures are specialized to serve their function efficiently without requiring words (J. Bavelas, 1992).

Interactive gestures would be particularly affected by the loss of visual availability (i.e., fewer in the partition than in the face-to-face condition) because unwitnessed gestures could not serve the function of including and involving the other person in the conversational system. Individuals talk and gesture to convey information to

others, so the absence of another person physically would be expected to decrease the overall rate of gesturing. The rate of interactive gestures was higher for partners interacting face-to-face than for those who could not see each other (J. Bavelas, 1992).

Paralinguistics

Paralinguistics is part of vocal communication that refers to every element and nuance of the speech that does not involve the verbal message of the speech. Paralinguistics is defined as the discipline dealing with those phenomena that are modulated onto or embedded into the verbal message, be this in acoustics (vocal, non-verbal phenomena) or linguistics (connotations of single units or bunches of units) (B. Schuller, 2013). Besides the linguistic (verbal) information conveyed by speech, the paralinguistic (non-verbal) information, such as intentions, attitudes, and emotions expressed by the speaker, also convey important meanings in communication. Therefore, to realize smooth communication between humans and spoken dialogue systems (such as robots), it becomes important to consider both linguistic and para-linguistic information. Para-linguistic communication can be much more subtle than other forms of nonverbal communication.

Para-language, sometimes called vocalic refers to any cues created in the process of verbalizing other than the words themselves. This includes sniff and sneezes, pitch, rate of speech, nasality, pauses, and even silence. With spoken language, loudness, rate of speaking, tone, pitch variation, and uses of pauses can have a major influence on whether and how one can react to the words (Ruben, 2020).

Research reveals that when a listener or receiver attempts to judge where the speaker or source is on a contempt-affection continuum, they rely more on the tone of the voice than on the content of the message. Paralinguistic features of the human voice are used to identify a person's age, gender, emotions, and health condition (H. Perez-Espinosa, 2017).

Change in intonations: The term intonation refers to a means for conveying information in a speech that is independent of the words. Central to intonation is variation in speaking pitch, and intonation is often thought of as the use of pitch over the domain of the utterance (B. Aarts, 2016). Variation of pitch within speakers, whether within or across utterances, is known as intonation, and largely reflects the syntactic and semantic structure of the utterance. Intonational contours are more abstract than absolute pitches and are usually described as sequences of relative units of highs, and Lows. Languages vary in the intonational contours they use for particular types of utterances. Intonation can also, for instance, help to regulate turntaking in conversation, since there are intonational mechanisms speakers can use to indicate that they have had their say, or, conversely, that they are in full flow and do not want to be interrupted.

Tempo: The tempo is defined as the speed of speaking, that is speaking rate, which is best measured by the rate of syllable succession (Wood, 1973). The speech tempo of a person may vary based on contextual and emotional factors, and the tempo is also dependent on the language is spoken and the dialects of the language.

People may interpret speech tempo as an indicator of the importance of what is being said (Quene, 2007).

Loudness: Loudness is a psychological term used to describe the magnitude of an auditory sensation (Munson, 1933). It is evident that loudness is dependent not alone upon the intensity of the sound but also upon their physical composition. Loudness is the perceptual attribute of sound intensity and is that attribute of auditory sensation in terms of which sounds can be ordered on a scale from quiet to loud. The perception of loudness is a psychological attribute that depends on intensity, but also on several other parameters, like frequency selectivity, bandwidth, and duration of the sound (Gidla, 2020).

Experiment and Results

The experiment is conducted to find the direct correlation between time characteristics such as gestures, and paralinguistic features of the instructors during online classes and student satisfaction levels. Based on the obtained results, assessment and recommendation systems are offered to improve the quality of both individual characteristics and the general concept of classes.

Sample Data

As part of the experiment, recent online classes and webinars from MIT, Harvard, Stanford, Oxford, IIT's, ITMO, and few prestigious universities during the period 2019-2020 are collected. The study included 215 webinars. Out of the sample, 192 units are of English medium and 23 units are in Russian medium. The data is extracted from free sources such as YouTube and university websites available on the internet. From the obtained data, characteristics such as loudness, tempo, change in intonations, instructor visual presence, and duration of hand gestures performed are extracted and analyzed.

Data Extraction

From the collected video sample data, selected non-verbal features are extracted using modules build in python language. All the paralingustic features are extracted using librosa and pyloudnorm libraries in python. All the frames from the video are gathered and Pre-trained modules are used to identify and extract information about gestures and host visual presence using opencv-python.

Student Satisfaction Level

The quality of the classes/ webinars is rated by the viewers as positive or negative. Final rating to the webinar is represented on the scale of 1 to 5. Based on the rating system, '1' implies all the participants are dissatisfied, whereas '5' implies all the participants are satisfied with the class or webinar. As the data is collected from the public domain, most of the students, who rated the video may be interested in the topic or subject. From Fig. 1,

the frequency of the rating is aligned right toward '5'. Therefore the distribution of rating is leftskewed. According to the collected sample data, the median is considered a central tendency due to its skewness. The median satisfaction level is 4.82.
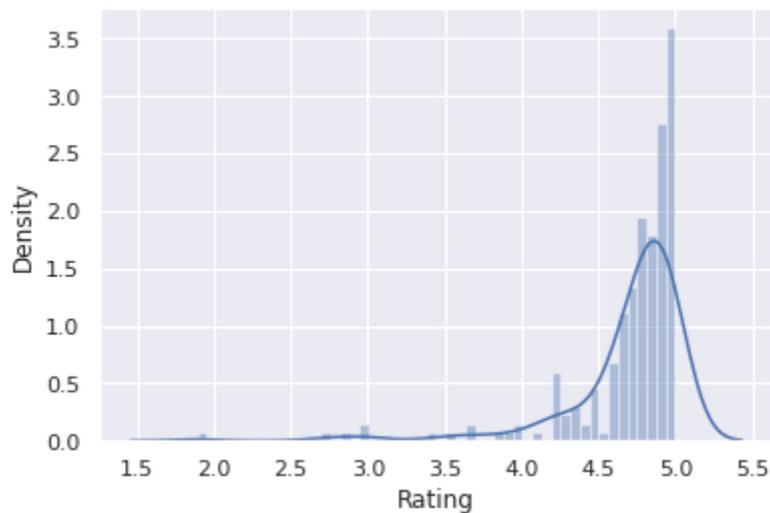

Figure 1. Frequency Distribution of Students Rating

Correlation and Dependence

Correlation is used to find the association between two variables and estimate the strength of their relationship. Correlation provides information about not only the strength but also the direction of a relationship. The most important fact is that correlation does not imply causation. The correlation between two variable is quantified with a number which varies between -1 to 1, negative values mean that variables are inversely related. The study is conducted to find the association between individual nonverbal characteristics and student satisfaction levels, using the collected sample data.

In the experiment, the Pearson correlation coefficient is used to determine the strength of association between the time characters tics and the student's satisfaction level. Pearson correlation coefficient just efficiently characterizes the linear correlation between the attributes of the normal distribution. A Pearson coefficient also ranges from -1 to $+1$. It can be interpreted as describing anything between no association ($\rho = 0$) to a perfect monotonic relationship ($\rho = \pm1$). Any relationship or association between two variables should be assessed not just for the strength and direction, but also by whether the relationship is "significant", based on the p-value. The significance level of $\alpha = 0.05$ is chosen for the experiment to check the reliability of correlation analysis.

Gestures: According to the sample data collected, the correlation between gestures performed during online lectures and student satisfaction level is 0.036, which is weak. And the corresponding p-value for the sample is 0.6, which is greater than the significance level 0.05. Therefore the relation is not significant enough. So, it is assumed that there is no significant relation between gestures performed during online classes and student

satisfaction

Table 1. Pearson Correlation Matrix between Variables

Index	Gestures	Change in intonations	Silence	Tempo	Loudness	Visual presence	Rating
Gestures	1	-0.156	-0.148	-0.01	-0.083	0.75	0.04
Change in intonations	-0.156	1	0.75	0.186	-0.112	-0.02	0.15
Silence	-0.148	0.75	1	-0.08	-0.07	-0.03	0.1
Tempo	-0.01	0.186	-0.08	1	-0.09	0	-0.02
Loudness	-0.083	-0.112	-0.07	-0.09	1	-0.06	0
Visual presence	0.75	-0.02	-0.03	0	-0.06	1	0.05
Rating	0.04	0.15	0.1	-0.02	0	0.05	1
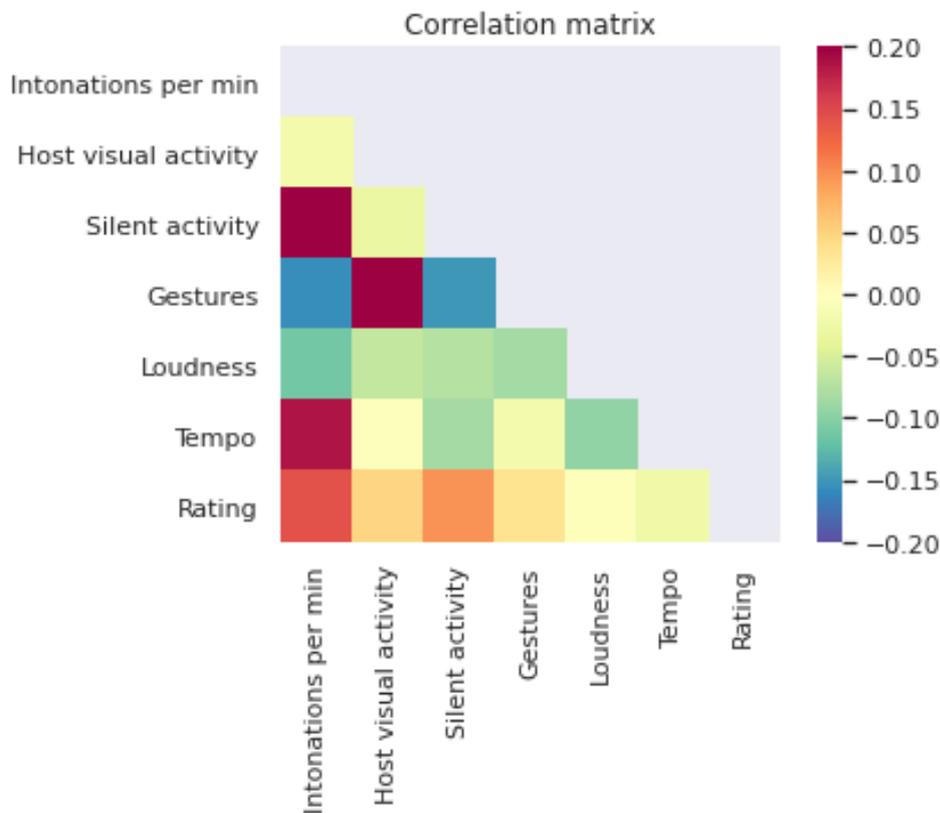
Figure 2. Heatmap of Correlations between the Variables

From the sample data it can be observed that the host is visually present in the online class or webinars about 30

	International Conference on		
ICRES	**Research in Education and Science**		**istes** Organization
www.icres.net	April 1-4, 2021	Antalya, TURKEY	www.istes.org

percent of the duration only, as, during most of the lecture, the instructor used digital presentation in form of slides to interact with the audience. From the table I, the correlation between host visual presence and gestures performed is 0.75, which is strong. So, due to the loss of visual availability of the host, gestures are not showing much effect on students' satisfaction level.

Paralinguistics: Among the paralinguistic features, From the table II, it is clear that silence, tempo, and loudness are not significantly related to satisfaction level during online classes. But there is a significant relationship between change in intonations and students' satisfaction. As the Pearson coefficient between the variables is 0.14, and the p-value is 0.036, which is less than the significance level 0.05. So, it is assumed that there is a significant positive relationship between change in intonations and satisfaction.

Table 2. Reliability and Pearson Correlation of Paralinguistic Features

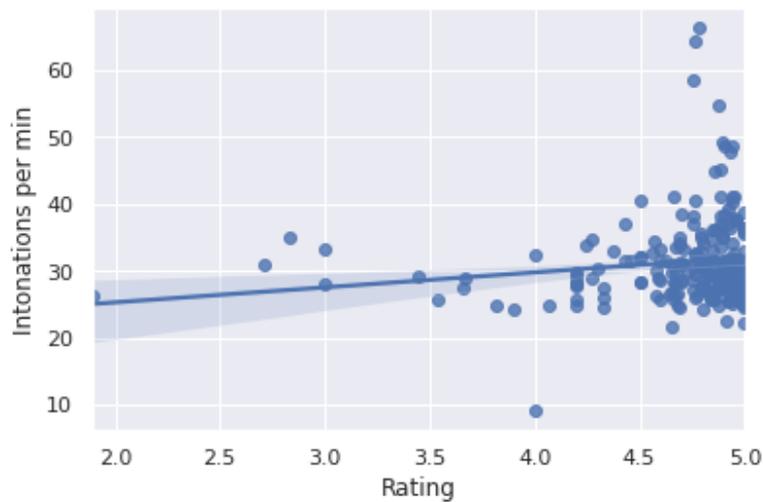| Paralinguistic feature	Correlation	p-value	Significance
Change in intonations	0.15	0.036	Significant
Silence	0.1	0.15	Not significant
Tempo	-0.02	0.75	Not significant
Loudness	0	0.94	Not significant

Figure 3. Regression between Change in Intonations and Students Rating

Limitations

One of the major limitations of the study conducted is that the majority of the data collected is from free sources like YouTube. So, the data may differ from the real-time online lectures conducted by the universities. And most of the people who participated in the lecture or webinar are interested in the topic or course. So, the ratings given by the participants may be biased. Due to the small sample size of 215 units, the results may not reflect

the whole population. There are few other factors such as internet connectivity, geographical locations, students' mood, instructors' behavior towards students which also affect the student's satisfaction level. But these all factors are neglected in this study case. In further research, these limitations will be avoided by collecting proper data from universities and by continuous student's feedback.

Conclusion

Based on the experiment conducted, it is assumed that there is a significant positive association between instructors' change in intonations in speech and students' satisfaction during online classes. This implies that any effort to enhance students' satisfaction should be preceded by improvement in paralinguistic features. This result is also supported by previous researches conducted based on nonverbal communications.

The study offers sufficient depth of insights into the specific areas that require attention and improvements during online classes. Despite many limitations and disadvantages, online education is growing every day. So, to provide proper education and satisfy students, educational departments should try to overcome these kinds of situations, the instructor should try to show more variations in pitch based on the emotion carried by the sentence and its meaning. Mostly, due to the unavailability of visual presence of the instructor during online classes or webinars, para-linguistic features should be prioritized.

References

Ahmad, S. S. (2009). The relationship of non-verbal communication cues and student satisfaction.

B. Aarts, A. M. (2016). *The handbook of English linguistics.*

B. Schuller, S. S. (2013). Paralinguistics in speech and language—state-of-theart and the challenge. *Computer Speech & Language*, 4-39.

D. Clawson, M. K. (2016). Society for Information Technology & Teacher Education International Conference. *Cloud-based videoconferencing learning environments in higher education: The growing pains of synchronous learning in an asynchronous world*, (pp. 178-184).

Eze S., C.-E. V. (2018). The utilisation of e-learning facilities in the educational delivery system of Nigeria: a study of M-University. *International Journal of Educational Technology in Higher Education*, 1-20.

Fan, L. Q. (n.d.). Learning Triadic Belief Dynamics in Nonverbal Communication from Videos. 2021.

Gidla, B. N. (2020). "Detection, thresholds of human echolocation in static situations for distance, pitch, loudness and sharpness. *Applied Acoustics*, 107214.

H. Kimiloglu, M. O. (2017). Perceptions about and attitude toward the usage of e-learning in corporate training. *Computers in Human Behavior*.

H. Perez-Espinosa, J. M.-M.-C.-J.-G. (2017). Using acoustic paralinguistic information to assess the interaction quality in speech-based systems for elderly users. *International Journal of Human-Computer Studies*, 1-13.

	International Conference on	
	Research in Education and Science	
www.icres.net	April 1-4, 2021 Antalya, TURKEY	www.istes.org

Inc, Z. V. (2020). Zoom connection process.

J. Bavelas, N. C. (1992). Interactive gestures. *Discourse Processes*, 469-489.

Malinovski T., T. V.-S. (2018). Impact of Different Quality of Service Mechanisms on Students' Quality of Experience in Videoconferencing Learning Environment. *Turkish Online Journal of Distance Education* (19(3)), 24-37.

Munson, H. F. (1933). "Loudness, its definition, measurement and calculation. *Bell System Technical Journal*, 377-430.

Quene, H. (2007). On the just noticeable difference for tempo in speech. *Journal of Phonetics*, 353–362.

Ruben, L. S. (2020). Communication human behavior — higher education. *Kendall Hunt*.

S. Fruhholz, S. R. (2020). Nonverbal auditory communication–evidence for integrated neural systems for voice signal. *Progress in Neurobiology*, 101948.

S. Kita, M. W. (2017). How do gestures influence thinking and speaking? the gesture-for-conceptualization hypothesis. *Psychological review*, 245.

Scott-Parker, B. (2017). Nonverbal communication during the learner lesson with a professional driving instructor: a novel investigation. *Transportation research part F: traffic psychology and behaviour*, 1-12.

Singh S., H. S. (2020). Mechanising e-learning for equiping startup entrepreneurs. *Materials Today: Proceedings.*

Wahyuni, A. (2018). 1st International Conference on Intellectuals' Global Responsibility (ICIGR 2017). *The power of verbal and nonverbal communication in learning.* Atlantis Press.

Wood, S. (1973). Speech tempo (introduction). *Dept. of Linguistics, Lund University*.

Chemistry in the Preservation of Written Heritage

Iskra Tsvetanska

University of Library Studies and Information Technologies, Bulgaria

Ivanka Yankova

University of Library Studies and Information Technologies, Bulgaria

Veska Lasheva

University of Chemical Technology and Metallurgy, Bulgaria

Abstract: Chemistry plays an important role in the preservation of written cultural heritage. Through it we understand the processes of degradation as well as the development and evaluation of new materials and methods for interventions. In recent decades, the rapid development of chemical science and environmental chemistry has brought us new tools and methods with great excellence, which represent new horizons in the analysis, diagnosis and conservation of written cultural heritage. Chemistry is the basis for choosing the most appropriate method of restoration of written collections, i.e. chemistry helps to understand why a book or a document is destroyed, how exactly this happens and how it can be prevented. In this regard, the article describes the main tasks of the chemist-restorer. The mechanisms of aging are monitored, the essential processes of natural aging of paper, adhesives, leather, parchment, inks and inks. Methods are proposed for studying the causes that occur as a result of regular processes. The changes under the influence of the environment are traced - the physicochemical destructive processes under the influence of temperature, humidity, light, atmospheric gases and the mechanical load. The article acquaints with the preliminary examination of the documents for restoration - the visual inspection, conducting physical and chemical examinations, determining the acidity of the paper, fiber and composition, the type of inks, based on which the methods of restoration are determined

Keywords: chemistry, preservation, analysis, written heritage, restoration, conservation

Introduction

Our mission to preserve and pass on the written cultural heritage to generations is unique. The most important reason for the preservation of written texts is to ensure that future generations can read them and absorb the knowledge on the basis of which they can create new knowledge that will enrich the cultural heritage of mankind. Restoration and conservation are the part of the activities applied to the preservation of the written heritage, which aims to "stop the kiss of time and postpone the inevitable", and this is impossible without the

application of chemical expertise, analysis and treatment with appropriate chemical reagents. For us chemist-restorers, chemistry is the area of miracles in which the secrets of preserving the written monuments of culture are hidden.

The focus of the article is on the applications of chemistry related to the materials used to compile a document, such as writing inks, paper and parchment. Chemical methods are used for document analysis, as well as conservation and restoration procedures based on chemical preparations. Two different approaches are applied - static and dynamic for the use of analytical methods, which include the study of elements in or on documents such as inks, papers and their components.

Conservation and restoration developed academically in the 20th century to include not only the humanities and natural sciences, but also applied chemistry. Restoration is a partnership between art and chemistry. It involves intervention with the use of chemical and organic compounds. Chemicals have been used since ancient times, and today as solvents, resins, fungicides play an extremely important role in preserving the world's artistic and cultural heritage.

Today, chemistry plays a crucial role in characterizing the nature of written materials, in studying ancient production techniques, and in supporting archaeometric research (origin, dating, attribution), by determining the qualitative and quantitative identity of an element, finding causes and degradation mechanisms and evaluation of the effectiveness of restoration materials and methods.

Chemistry is the basis for selecting the most appropriate conservation procedures for the preservation and long-term preservation of the written heritage. It is chemistry that helps us understand why a book or a valuable document is destroyed, how exactly this happens, and how it can be prevented.

In this aspect, the main tasks of the chemist-restorer include:

- In close collaboration with the historian, determines the context and period in which the work was created by studying the techniques and materials available at the time, as well as the mechanisms of aging, through appropriate chemical methods.
- Finds the essential processes of natural aging of parchment, paper, adhesives, leather and inks. Applies chemical methods to study the causes of natural processes.
- The chemist is obliged to monitor the changes under the influence of the environment - the physic-chemical destructive processes under the influence of the environment - temperature, humidity, light, atmospheric gases and mechanical load.
- Deals with the preliminary examination of the sites for restoration - the visual inspection, the conduct of chemical examinations, determines the acidity of the paper, the fiber and the composition, the type of inks, determines the algorithm of the conservation treatment with the most suitable chemicals and the methods of restoration that will be applied, through the appropriate solutions of adhesives, etc.

Method

The applications of chemistry in the preservation of written heritage emphasize the following key points:

- Application of non-invasive and safe chemical methods for analysis and conservation treatment of written collections
- Nanotechnologies and nanomaterials for diagnostics, conservation and restoration
- Sustainable chemical materials and methods for conservation and restoration
  - The chemical interaction of the environment and the written collections
- Chemical aspects of the phenomena related to biological change
- Ecological aspects of chemistry in the preservation of the written heritage

The criteria for protection of written heritage require, before the restoration activities start, strict control - identification of the physical characteristics of the document - opening of a dossier and protocol, showing the given chemical treatment, the methods that will be applied, etc. The individual characteristics of each document and the diagnosis of the causes and consequences of deterioration, as well as the severity of the damage, are determined by a series of physical, chemical and biological analyzes. The most common chemical analyzes of written documents are: determination of the fibrous composition of paper by the Herzberg method, analysis of the content of wood pulp in the paper document, determination of the type of sizing of the paper document, acidity as the biggest enemy of written collections, application of appropriate neutralizing chemical agents, chemical analysis of the inks with which the documents are written, etc.

Dust particles contribute to the chemical degradation of written heritage, which is important when considering appropriate measures to preserve documents in libraries, archives and museums. Different types of dirt / stains / are removed with appropriate chemicals. Dry cleaning in the conservation with selection of the appropriate organic solvent is a key point prior to the restoration intervention. Aqueous and non-aqueous treatments in the preservation processes with detergents and colloidal agents, bleaching of pigment spots in some cases with oxidants, etc. One of the most important processes in conservation practice - deacidification is performed with appropriate neutralizing and buffer solutions.

Results

Environmental problems are becoming more serious. The trend of sustainable development requires chemistry to be "clean" or "green". Chemicals that are toxic have not been used in recent years. As a result of the assessment of their negative consequences for human health and the environment, the notion of applying non-toxic methods is becoming more and more widespread. Therefore, the institutions are starting to change their attitude towards the use of these products. In an effort to cure biological agent collections, conservation experts are trying to develop effective treatments to kill the pests. Chemical treatments have long been widely used in the preservation of cultural collections. After research and scientific evidence from various international

organizations, that some chemical methods are highly toxic and harmful to humans, the environment and collections, experts are beginning to apply alternative methods of treatment without toxic chemicals. In this regard, the most well-known non-toxic methods that treat collections are freezing and oxygen-poor modified atmospheres by argon and oxygen absorbers. There is an increasing attention to green chemistry to serve the sustainable development of modern society.

Discussion

From the very beginning of research, preservation and conservation-restoration of our written heritage, chemistry has played an important role in documentation, studying the ancient production of materials and technologies, understanding the processes of degradation and the current state of written collections, and developing and evaluating new materials and methods for conservation interventions. In recent decades, the rapid development of chemical science, especially in analytical, organic and environmental chemistry, has brought us new tools and methods with great excellence, which present new horizons in the analysis, diagnosis and protection of written cultural heritage.

The study of the information stored in manuscripts and books offered some authors the opportunity of interrogating these objects in novel ways. Fiddyment et al. [2] set up a triboelectric technique for non-invasive sampling of biomolecules on the parchment surface enabling the exploration of biological data associated to parchment documents, whereas Bicchieri et al. [1] studied the micro-objects, both inorganic and organic, associated to either parchment or cellulose fibres, or inks and dirt. Both approaches have the ability to reveal information about manufacture, ageing, livestock economies, handling, conservation and the historic use of the object.

Conclusion

Green chemistry is part of the concept of sustainable development of modern society. The miniaturization of analytical devices and the reduction of the time required between performing an analysis and obtaining reliable analytical results are important aspects of green chemistry. The application of alternative solvents and assisted extractions are considered to be the main approaches in line with the principles of green analytical chemistry.
It is necessary to look for opportunities to use the techniques and principles of green chemistry in the field of protection of written heritage, based on the principles that overlap with the goals of sustainable development. The proposals are for a more environmentally friendly preliminary analysis of the documents and a more environmentally friendly chromatographic method of analysis. The main goal is to achieve more environmentally friendly analysis in conservation and restoration laboratories through various strategies and techniques, to replace toxic reagents and to modify or replace analytical methods and / or techniques with safer ones, which makes it possible to drastically reduce the quantities of reagents consumed and waste generated.

Recommendations

To apply eco-chemical methods in preservation of the cultural heritage.

Acknowledgements

References

[1]. Bicchieri M, Biocca P, Colaizzi P, et al. Microscopic observations of paper and parchment: the archaeology of small objects. Herit Sci. 2019;7:47. https://doi.org/10.1186/s40494-019-0291-9.

[2]. Fiddyment S, Teasdale MD, Vnouček J, et al. So you want to do biocodicology? A field guide to the biological analysis of parchment. Herit Sci. 2019;7:35. https://doi.org/10.1186/s40494-019-0278-6.

[3]. Lasheva V., Todorova D., Yavorov N., Biocidal properties of paper - modern challenges, Journal of Food and Packaging Science, Technique and Technologies, 15, 2020. – C. 24-26.

[4]. 4.Tzvetanska, Iskra. V.Lasheva. *New Methods Protection during the Conservation of Books*. // *Chemistry* Science and Technology for Better Life, 9-th National Conf., 29.09 - 01.10.2016 "Bulgarian Chemical Communications" special bro, volume 49, 2017.

Analysis of the Use of Web 2.0 Tools in Educational Environments in Turkey

Muharrem Altunisik

Necmettin Erbakan University, Turkey, ![ORCID icon] https://orcid.org/0000-0002-8458-6672

Ahmet Oguz Akturk

Necmettin Erbakan University, Turkey, ![ORCID icon] https://orcid.org/0000-0003-0061-4865

Abstract: Rapid technological advances affected the field of education, as well as other fields. This fact creates the need of utilizing technology in education effectively. Another fact that emerges when the subject of education in technology is considered is Web 2.0 tools. Along with Web 2.0 technology, students get more active in education instead of remaining passive, and become more productive and more willing to share. In this study, MA and PhD theses focusing on Web 2.0 technology which are published on Council of Higher Education National Thesis Center database between the years 2010 and 2020 were investigated according to content analysis method. In this sense, 44 of the theses which were reached as a result of the review of the related database were analyzed under the categories of thesis type, thesis year, the university it was carried out, its language and the subject it reviewed. It was revealed as a result of the investigation of the theses that Turkish language is the most used language in the theses, that the subject drew more attention especially in 2019 as the number of the studies on the subject of Web 2.0 tools increased in the recent years, and that the number of the studies carried out in the state universities is more than the number of the studies carried out in private universities.

Keywords: Web 2.0 tools, Education technology, Content analysis

Introduction

With the increasing use of online communication tools today, the amount of freely accessible online information created by web users is also increasing. The increase in these tools and, accordingly, in the information produced with the help of these tools also affects the way teachers and students interact (Aktürk, Çelik, Şahin, & Deniz, 2014; Aktürk, Emlek, & Çelik, 2017). Today's web environment has become more than just an information repository or a platform to look for resources. With the advent of Web 2.0, we can say that the internet has now turned into a global network of interconnected learning communities. With this transformation, the web environment has become a platform where content is created, shared, remixed, rearranged, and

exchanged rather than an environment where information is just transmitted and consumed (Ajjan & Hartshorne, 2008; Altun, 2008; Yuen, Yaoyuneyong, & Yuen, 2011).

The ability to benefit from the collective intelligence and knowledge of its users is the first of the main features that make Web 2.0 applications unique. Using Web 2.0 applications, every user has the right to create content, and thus, with the participation of other users from all over the world, they become part of a global network of people where they can use their collective knowledge, intelligence, and skills in a way never before possible. Through Web 2.0 applications, students can interact with other students, benefit from shared experiences, and continually build their own knowledge. In this way, students will not be passive recipients of information and can become equal partners in the learning process as they create their own knowledge by collaborating in a social way (Heafner & Friedman, 2008). This situation provides quite new opportunities for teachers to be able to teach more effectively (Yuen, Yaoyuneyong, & Yuen, 2011). Simply put, when Web 2.0 tools are effectively integrated into the classroom, student-centered pedagogy becomes the norm. In this way, while increasing their high-level thinking skills, students can improve their cooperation with other students and at the same time, they can build their own knowledge (Adcock & Bolick, 2011). In addition, the collaborative nature of Web 2.0 forces students to take multiple perspectives into account (Bull, Hammond, & Ferster, 2008). Considering all these, Web 2.0 technology should be seen as a technological move that supports changes and developments in education and should be included more in educational environments (Elmas & Geban, 2012).

With the development of Internet technologies, Web 2.0 applications stand out with their innovations that will completely change the use of the Internet. Web 2.0 allows a person to create content on the Internet comfortably and easily and enables cooperation and social interaction to emerge automatically thanks to its ease of use (Atıcı & Yıldırım, 2010). In this context, Web 2.0 can be defined as a user-centered new generation internet platform that offers its users freedom of action and allows them to contribute to the content (Genç, 2010). However, as a result of the literature review, it is noteworthy that there is a limited number of literature review studies conducted within the scope of educational use of Web 2.0 tools. In the research conducted by Korucu and Gündoğdu (2014), 38 studies were examined. In the related research, the subjects such as the journals in which the studies are published widely, the preferred topics and the distribution of the topics according to the years, the methods used, and the distribution of the methods according to the topics, and the sample characteristics were focused on. As a result of the research, it was stated that most of the studies were published in 'Akademik Bilişim' conferences, and it was stated that the studies mainly focused on the use of Web 2.0 and opinions about it and educational practices related to social networks. In addition, it was stated in the research that most of the studies on the use of Web 2.0 applications were carried out with undergraduate students, and surveys and documents were mainly used as data collection tools in the studies.

It has been seen that examining and interpreting different studies conducted on the use of Web 2.0 tools for educational purposes has made a great contribution to the literature. The research examining the studies on Web 2.0 tools (Korucu & Gündoğdu, 2014); while presenting a summary of the studies conducted so far, it is thought that similar research will shed light on related future studies from different perspectives. For this purpose, in this

study, master's and doctoral theses in the database of YÖK (Turkish Republic's Council of Higher Education) National Thesis Center between 2010-2020 regarding the use of Web 2.0 tools for educational purposes were examined with the content analysis method to reveal the descriptive features and general tendencies of these theses. In line with this general purpose of the research, answers to the following questions were sought.

1. What is the distribution of theses by their types?
2. What is the distribution of theses by their years?
3. What is the distribution of the theses by the universities where they were prepared?
4. What is the distribution of theses by their languages?
5. What is the distribution of the topics covered in the theses?

Method

In this study, the use of Web 2.0 tools for educational purposes was investigated with the document analysis method, one of the qualitative research designs. Regarding the use of Web 2.0 tools for educational purposes, master's and doctoral theses in the database of YÖK National Thesis Center between 2010-2020 were handled by content analysis method. Content analysis is to bring together similar data using certain themes and concepts, and to organize and interpret them in a way that readers can understand (Yıldırım & Şimşek, 2006).

Scope of the Research

The scope of this research consists of master's and doctoral theses about Web 2.0 Technology in the database of YÖK National Thesis Center. In order to determine the theses to be included in the research, the filtering process was carried out in the YÖK National Thesis Center using the keyword "Web 2.0", which is frequently used in the literature. After the filtering process, the master's and doctoral theses studied between the years 2010-2020, selected by purposive sampling technique, were collected in a single folder, and duplicate studies were deleted and a total of 44 studies were included in the research.

Data Collection Tools

After a process of reconstitution, the "Thesis Classification Form (TCF)" developed by Hebebci, Çelik, and Şahin (2016) was used for Web 2.0 technologies research.

Analysis of Data

The data obtained from the studies examined by the content analysis were analyzed using percentage and frequency values. Regarding the obtained data, the frequencies and percentages were calculated to correspond to the answer to each research question. The resulting data has been tabulated.

Results

The collected data were analyzed considering the research questions.

Distribution of the Theses by Their Types

By examining the theses prepared between 2010 and 2020, the distribution of 44 studies on the use of Web 2.0 technology in educational environments according to their types is shown in Table 1.

Table 1. Distribution of the Theses by Their Types

Thesis Types	N	%
Master's Thesis	41	93
Ph.D. Thesis	3	7
Total	44	100

When Table 1 is examined, it is seen that a significant number of theses consist of master's theses (n=41; 93%). Contrarily, it is revealed that Ph. D. theses (n=3; 7%) are very few numbers.

Distribution of Theses by Their Publication Years

When Figure 1 is examined, 1 study in 2010, 5 in 2011, 2 in 2012, 3 in 2013, 3 in 2014, 3 in 2015, 1 in 2016, 6 in 2017, 1 in 2018, 12 in 2019, and 7 of the studies were carried out in 2020. 44 theses in total; 41 of them are master's and 3 of them are doctoral dissertations. It is seen in the figure that Ph. D. The theses were published in 2011, 2015, and 2017. It has been observed that studies on this subject have been carried out regularly since 2010. The fact that the interest in Web 2.0 technology is increasing day by day with the opportunities brought by today's technology is also supported by this result.
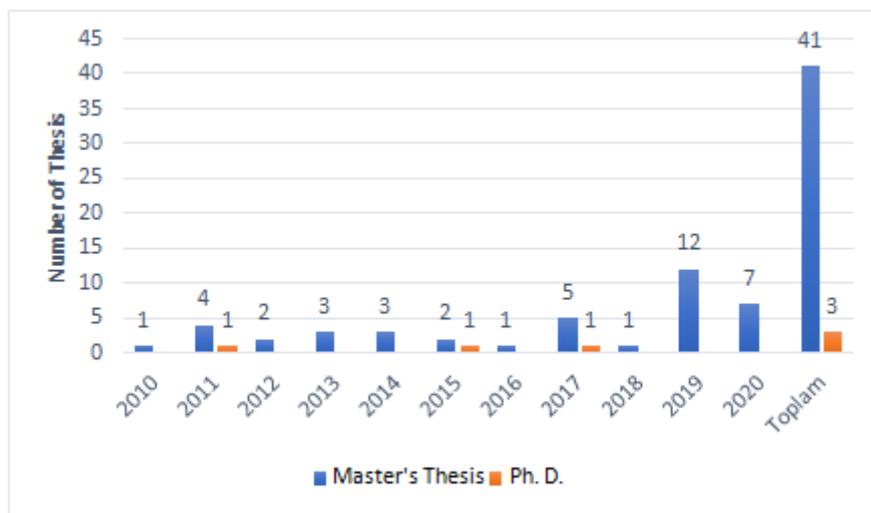

Figure 1. Distribution of Theses by Years

Distribution of Theses by Universities

When Table 2 is examined, it is observed that universities are close to each other in terms of the number of theses produced on this subject. In this context, the theses related to the use of Web 2.0 tools in educational environments were conducted in Middle East Technical University (n=4), Hacettepe University (n=3), Akdeniz University (n=3), Dokuz Eylül University (n=2), Gazi University (n=3). =2), Bahçeşehir University (n=2), Aksaray University (n=2), Çağ University (n=2), Anadolu University (n=2), Çanakkale Onsekiz Mart University (n=2), Balıkesir University (n=2), Marmara University (n=2), Çukurova University (n=2), Bilkent University (n=2) and 12 other universities.

Table 2. Distribution of Theses by Universities

Universities	N
Middle East Technical University	4
Akdeniz University	3
Hacettepe University	3
Aksaray University	2
Anadolu University	2
Bahçeşehir University	2
Balıkesir University	2
Bilkent University	2
Çanakkale On Sekiz Mart University	2
Çağ University	2
Çukurova University	2
Dokuz Eylül University	2
Gazi University	2
Marmara University	2
Cumhuriyet University	1
Dicle University	1
Dumlupınar University	1
Düzce University	1
Ege University	1
İnönü University	1
Mevlâna University	1
Necmettin Erbakan University	1
Sakarya University	1
Trabzon University	1
Yıldız Teknik University	1
Zonguldak Karaelmas University	1
Total	44

Distribution of Theses by Their Languages

The theses examined were written in two different languages, Turkish and English. But when Table 3 is examined, it is noteworthy that most of the theses were written in Turkish (n=30; 68%). The low number of theses in English (n=14; 32%) can be explained by the insufficiency of language education in our country and the fact that most of the universities where theses are prepared to have Turkish as their language of instruction. Another prominent finding is that almost all of the universities where these were written in English provide education in English and some of them have the status of foundation universities.

Table 3. Distribution of Theses by Their Languages

Language		N	%
Turkish		30	68
English		14	32
	Total	44	100

Distribution of Topics Covered in Theses

When Table 4 is examined, it is noteworthy that the thesis topics are mainly focused on the effects of Web 2.0 tools on attitudes and academic achievement (n=17; 38%) and the use of Web 2.0 and opinions about it (n=13; 30%). These topics are followed by educational practices related to the semantic web (n=8; 18%), educational practices with social networks (n=4; 9%), and other topics (n=2; 5%).

Table 4. Distribution of Topics Covered in Theses

Topic		N	%
The Effect of Web 2.0 Tools on Attitudes and Academic Achievement		17	38
Web 2.0 Usage and Opinions About It		13	30
Educational Applications Related to Semantic Web		8	18
Educational Applications Related to Social Networks		4	9
Other		2	5
	Total	44	100

Discussion, Conclusion and Recommendations

In this study, the theses published in the YÖK National Thesis Center on the use of Web 2.0 in educational environments were examined. The analyses were made in a way to deal with the type, year, university, language, and topics covered by the theses. Each research question within the scope of the research was handled one by one and examined in detail.

As a result of the research, it is observed that Web 2.0 technology in education is a subject that has attracted the attention of researchers in recent years and is being studied more and more each year. According to the research findings, it is seen that the studies have increased significantly especially in 2019. It can be thought that this situation is due to the widespread use of the internet and technology in recent years. However, in the light of the theses examined, it is noteworthy that the subject is handled much more in master's theses (n=41) than in Ph. D. theses (n=3). This situation can be explained by the fact that the time required to produce doctoral theses, which should be more qualified and equipped compared to master's theses, is not sufficient, considering that technology has become widespread in education in recent years.

When the theses are considered by the universities they are conducted, it has been found that they have mostly been studied in state universities and that foundation universities haven't hosted much research on the use of Web 2.0 tools in education. At the same time, when the university repertoire is examined, it has been revealed that the universities working on this subject are not very diverse. Considering these situations, it is thought that it will be beneficial if other universities also conduct studies on this subject in the coming years.

When the languages of the theses are examined in the research, it is observed that 30 studies are in Turkish and 14 studies are in English. The fact that the majority of theses prepared in English were prepared in foundation universities or universities where the language of instruction is English shows that the language of instruction is a factor that can also affect the preferred language in theses. In parallel with the study of Korucu and Gündoğdu (2014), it is determined that the majority of the publication languages in this study were Turkish. It is thought that it will be beneficial to the literature to carry out studies by paying attention to this situation in future studies.

According to the results of the research, the effects of Web 2.0 tools on attitudes and academic achievement and the use of Web 2.0 and opinions about it were chosen as the subject in the theses prepared on the use of Web 2.0 tools in education. It is observed that this situation produced a result contrary to that obtained from the study of Topuz, Yıldırım, Topu and Göktaş (2015). In parallel with the study of Korucu and Gündoğdu (2014), this study it is determined that there have not been many studies on blogs and wikis, which are Web 2.0 technologies. It is thought that considering this situation in future research will be beneficial in terms of enriching the studies in the field.

References

Adcock, L., & Bolick, C. (2011). Web 2.0 tools and the evolving pedagogy of teacher education. *Contemporary Issues in Technology and Teacher Education*, *11*(2), 223-236.

Ajjan, H., & Hartshorne, R. (2008). Investigating faculty decisions to adopt Web 2.0 technologies: Theory and empirical tests. *The Internet and Higher Education*, *11*(2), 71-80.

Aktürk, A. O., Çelik, İ., Şahin, İ., & Deniz, M. E. (2014). Facebook Bağlanma Stratejileri Ölçeğinin Türkçe uyarlama çalışması. *Ilköğretim Online*, *13*(1), 319-333.

Aktürk, A. O., Emlek, B., & Çelik, İ. (2017). Üniversite öğrencilerinin facebook bağlanma stratejilerinin ve yaşam doyumlarının incelenmesi. *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, *13*(2), 512-530.

Altun, M. (2008). *İlköğretim İkinci Kademe (6, 7 ve 8. Sınıflarda) Matematik Öğretimi* (6. Baskı). Bursa: Aktüel Yayınları.

Atıcı, B., & Yıldırım, S. (2010). Web 2.0 uygulamalarının e-öğrenmeye etkisi. *Akademik Bilişim'10-XII. Akademik Bilişim Konferansı Bildirileri, 10-12 Şubat 2010*. Muğla Üniversitesi, Muğla.

Bull, G., Hammond, T., & Ferster, B. (2008). Developing Web 2.0 tools for support of historical inquiry in social studies. *Computers in the Schools*, *25*(3/4), 275-287.

Elmas, R., & Geban, Ö. (2012). Web 2.0 tools for 21st century teachers. *International Online Journal of Educational Sciences*, *4*(1), 243-254.

Genç, Z. (2010). Web 2.0 yeniliklerinin eğitimde kullanımı: Bir Facebook eğitim uygulama örneği. *Akademik Bilişim'10-XII. Akademik Bilişim Konferansı Bildirileri, 10-12 Şubat 2010*. Muğla Üniversitesi, Muğla.

Heafner, T., & Friedman, A. (2008). Wikis and constructivism in secondary social studies: Fostering a deeper understanding. *Computers in the Schools*, *25*(3/4), 288-302.

Hebebci, M. T., Çelik, İ., & Şahin, İ. (2016). Eğitim ortamlarında etkileşimli tahta kullanımı: Araştırmalar ve eğilimler. *Eğitim, Bilim ve Teknoloji Araştırmaları Dergisi*, *1*(1), 55-76.

Korucu, A. T., & Gündoğdu, M. M. (2014). Eğitim teknolojilerinde Web 2.0 kullanımı 2007–2015 Dönemi makalelerin içerik analizi. *Journal of Turkish Science Education*, *11*(1), 3-23.

Topuz, A. C., Yıldırım, Ö., Topu, F. B.,, & Göktaş, Y. (2015). Öğrenme teorileri üzerine inşa edilen Web 2.0 uygulamaları: Science Direct veri tabanı incelenmesi. *Bilişim Teknolojileri Dergisi*, *8*(2), 59-69.

Yıldırım, A., & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri* (14. baskı). Ankara: Seçkin Yayıncılık.

Yuen, S. C. Y., Yaoyuneyong, G., & Yuen, P. K. (2011). Perceptions, interest, and use: Teachers and web 2.0 tools in education. *International Journal of Technology in Teaching & Learning*, *7*(2), 109-123.

Proof of Concept: Effectiveness of Photography Training Simulator during COVID-19

M. Izani Zainal Abidin

Higher Colleges of Technology, UAE, https://orcid.org/0000-0002-8254-1219

E. Alkaabi

Higher Colleges of Technology, UAE

A. Razak

Multimedia University, Malaysia, https://orcid.org/0000-0002-3359-2140

Abstract: With an urgent change of the learning approach from face-to-face to online learning in academic institutions due to the COVID 19, this medium's effectiveness is arguable, particularly in the case of practical-based courses. This paper discusses our experience in handling photography course during this pandemic time using an online simulator and proposes an interactive VR-based camera simulator to learn photography course using online platform. Photography has been selected as the main course based on the actual learning experience at the Applied Media Department, Higher Colleges of Technology (HCT), Men's Campus Abu Dhabi, UAE. We explore 10 online digital camera simulators and present an analysis of these applications' features, usability, and interactivity. Then, one chosen simulator is implemented to teach a 15 weeks photography course through a digital platform, and the feedbacks from students were collected and discussed. It is found that using a DSLR simulator allows students to explore and understand the concept of using a camera and photography. This paper presents the proof of concept for a DSLR simulator based on immersive environment and virtual reality, which is enhanced with interactive features that mimic the actual DSLR camera. Our proposal includes suggestions of missing features for the current simulators to overcome the course's physical and practical issues.

Keywords: DSLR, Photography, Online learning, Simulation, Interactive application

Introduction

The current online learning phenomenon which become mainstream in 2020 was a result of an emergency decision making due to the COVID 19 pandemic (Aguilera-Hermida, 2020; Hussein et al., 2020). Without adequate preparation and guidelines, the academic institutions have no choice but to adopt to fully digital and online learning approach. Photography is one of the main courses taught at the Applied Media Department,

	International Conference on		
IICRES	**Research in Education and Science**		**istes** Organization
www.icres.net	April 1-4, 2021	Antalya, TURKEY	www.istes.org

Higher Colleges of Technology, UAE. This course develops conceptual and technical skills needed to function as a professional photographer in a variety of media and platforms. It also explores both analog and digital technology as students work in an experimental and critical environment to appreciate both historical developments and contemporary practice in commercial photography. At the end of the course, students will create a mini digital portfolio by implementing all the knowledge and skills gained throughout the course. Previously, the course was handled using face to face approach through physical classes at the university with the course materials accessible through Blackboard. However, due to the COVID 19 pandemic and the declaration of the state of emergency (Allam, 2020) and lockdown in the UAE beginning March 16, 2020, face to face approach is no longer allowed. Having to handle a practical based course in full digital mode is very challenging and sometimes frustrating (Abou-Khalil et al., 2021; Owusu-Fordjour et al., 2020). However, it is acknowledged that the advancement of technology in digital applications and devices development has helped us in handling online courses (Koi-Akrofi et al., 2020; Niemi & Kousa, (2020; Onat Kocabiyik, 2021). Hence the objective of this paper is summarized as the followings:

- To compare 10 online camera simulators and study their features including weaknesses and advantages.
- To select one online simulator to be implemented in a 15 weeks photography course and get feedbacks from the student.
- To present the proof of concept for the proposed VR based camera simulator for learning photography on online platform.

Methodology

Research Question: What are the factors that make effective online camera simulator?

To answer this question, we have chosen to analyse ten online simulators and explore the application's features and usability from 8 categories: choices, shooting features, type, interactivity, feedback, exposure meter, learning lesson, and shooting mode. The advantages and disadvantages of each category's features are discussed and analysed to identify the main features that will be added to the proposed VR-based camera simulator application.

Then we chose to experiment with one online simulator called Canon PLAY developed by Canon to teach our photography course in fully digital mode. This application aims to assist the beginner in photography to get some idea and concept using the virtual camera. The simulation allows students to understand and practice handling DLSR camera with similar features that mimic the actual DSLR. A survey will be conducted at the end of the course to get feedback from the students on the effectiveness of this approach in general and the usability of the Canon PLAY application. Finally, based on all the collected information, we present the proof of concept for a VR-based camera simulator to help teach photography courses, especially during this pandemic, where face-to-face approach is not available.

Analysis

Ten interactive online camera simulators have been identified for this analysis namely Canon PLAY, Exposure Simulator, Photography Mapped CameraSim Dofsimulator Be the camera Nikkor Lens Simulator Camera Simulator by Canon Labs Samyang Lens Simulator Magic Hour.

Table 1. Summary of the analysis of 10 online camera simulators

| Simulator name | Choice | | Shooting Features | Type | Interactivity | Feedback | Exposure meter | Learning lesson | Shooting mode |
	Lens	Scene							
PLAY Canon	No	1	ISO, Aperture & Speed	Web based	Shutter release	Yes	Yes	Yes	Manual, Aperture Priority & Speed Priority
Exposure Simulator	No	1	ISO, Aperture & Speed	Web based	Image slider	No	No	No	Manual, Aperture Priority & Speed Priority
Photography Mapped	No	1	ISO, Aperture & Speed	Web based	Shutter release	Yes	Yes	No	Manual & Auto
CameraSim	No	1	ISO, Aperture & Speed	Web based	Shutter release	Yes	Yes	No	Manual, Program, Aperture Priority & Speed Priority
Dofsimulator	Yes	8	ISO, Aperture & Speed	Web based	Image slider	No	No	No	Manual
Be the camera	Yes	6	ISO, Aperture & Speed	Web based	Image slider	No	No	No	Manual, Auto, Aperture Priority & Speed Priority
Nikkor Lens Simulator	Yes	1	No	Web based	Image slider	No	No	No	No
Camera Simulator by Canon Labs	Yes	Multi	ISO, Aperture & Speed	VR	Shutter release	No	Yes	No	Manual, Auto, Aperture Priority & Speed Priority
Samyang Lens Simulator	Yes	3	Aperture	Web based	Image slider	No	No	No	Aperture
Magic Hour	No	Multi	ISO, Aperture & Speed	VR	Shutter release	No	No	No	Auto, Aperture Priority & Speed Priority

The categories included in the analysis are choices for lens and scene, shooting features, platform type, interactivity, feedback, exposure meter, learning lesson and shooting mode. Table 1 below summarizes the output of each category for each simulator.

From the table, it shows that five of the applications do not have choices for choosing lens. This gives a very limited features for users to explore with various lens. Others have more choices of lens which give more options to choose and explore various features like zoom and wide angle. Out of ten applications, it is found that five of them only have one scene for shooting, three applications have more than one scene and two has multi scene choices because it is based on virtual environment which allows users to change the unlimited angle. For the shooting features, eight out of ten applications have complete features like ISO, speed and aperture, one has no features at all and another one has only aperture feature. Eight applications are web-based application and two are VR based applications. For the interactivity, five applications use shutter release option and another five uses image slider option.

Only three applications provide feedback after the users use the application and seven have no feedback features which gives no comments or suggestion to the users. For exposure meter, four applications provide that features and six has no exposure meter features. Exposure meter is very important for the users to choose the right combination of the photography elements like speed and aperture. Only one application provides learning lesson features which allows users to learn basic knowledge about photography while exploring the applications. One application has no shooting mode feature, one has manual mode, one has aperture mode and seven has all the basic shooting modes like manual, aperture priority, speed priority, automatic and program.

From this analysis, we prioritize five important aspects to improve and to apply in our proof of concept application. This application is based on VR features and technology. These are outlined as below:

Lens options: To add more interactive features and more options for the users to choose various lens, we plan to provide three lenses for our application like wide angle, standard and telephoto lens.

Scene: Our first development of the scene will be only one scene in immersive environment with realistic lighting and environment. Our scene has some movement like flying birds and running horses. This allow users to shoot using various modes and explore more possibilities.

Shooting features: It will show three options like aperture, ISO and shutter speed. It will utilize shutter release for taking photos. In addition, exposure meter will provide assistance to the users like the actual digital camera for measuring correct exposure.

Feedback: The proposed application has feedback features which will appear after shooting each photo and has option to turn off if necessary. Additionally, learning lessons also will be provided for new learners to understand the concept of photography.

Shooting mode: The application will have five modes like automatic, manual, shutter priority, aperture priority and program. This will mimic the actual digital camera features.

Photography Course Experiment using Canon PLAY

The course structure

This course timeline is 15 weeks and divided into two sections; theoretical and practical sections with 3 credit hours. The first four weeks activities covered the theoretical background, lectures and conceptual explanation about photography. The course is continued with the practical implementation using Canon's DSLR camera simulator online from the fifth week onwards. At this stage, the students will explore and experiment with the theory and concept learnt in the previous classes.

The Canon PLAY application

The Canon PLAY application imitates all the standard DSLR camera core features, including aperture, shutter speed, and ISO. It also consists of standard three shooting modes like manual, shutter priority (Tv) and Aperture priority (Av). However, there are some missing features for future improvement, which we will discuss in the next section. These are basic features for beginners who need to understand the whole concept of taking photos. This application offers three main categories of features which are:

Learn

This section covers four basic photography topics like aperture control, shutter speed, ISO and exposure meter. These four features are basic elements that students need to understand and know how to control. Besides, this section also provides tips and notes for further understanding.

Play

The play section consists of the main interactive features of this application. It comes with an interface (Figure 1) and simulator that controls the whole concept of taking a photo that replicates DSLR camera. Once the photo is taken, it will immediately appear at the bottom of the screen and feedback will automatically generated based on the quality of the photo taken.

There are three elements of the play interface as below:
- *Main interface acts as a viewfinder*
- *Result interface to show the output and feedback based on the photo taken*
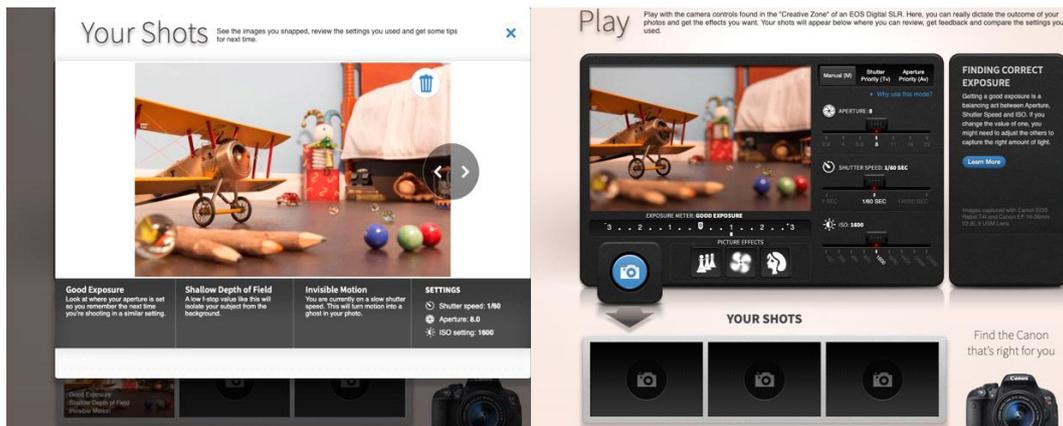- *Examples and guidelines based* on good photos attached to the correct setting

	International Conference on		
ICRES	Research in Education and Science		**istes** Organization
www.icres.net	April 1-4, 2021	Antalya, TURKEY	www.istes.org

Figure 1. The main interface for the PLAY application

Challenge

Challenge section allows user to explore more interactive features like challenging themselves by trying to take photo based on the given example. The instruction will be generated together with the sample picture.

The survey

A total of 46 students have participated in a survey consisting of 29 female and 17 male students. The research asked students some questions such as their learning experience using online platforms in general and questions specific to using the Canon PLAY simulator. They were asked to give a rating of 1 to 5 with (1) Strongly disagree; (2) Disagree; (3) Neither agree nor disagree; (4) Agree; (5) Strongly agree on each of the survey questions and an open-ended question regarding their overall comment on the experience.

Overall, 81.2% of the respondents either agree or strongly agree that they are comfortable learning this course through an online platform without face to face interaction. However, if given a choice, 72.3 % of the respondent would prefer face to face learning for this course. Among the reasons given for this are they like to have direct communication with the instructor because it is easy to ask questions directly. They found it challenging to learn practical course through an online platform. Figure 2 shows the response to the question of whether the respondents believe that the online learning approach that we used for this course is effective for them. With 72.3% either agree or strongly agree on this point, it might suggest that the online simulator Canon PLAY have contributed to this response.
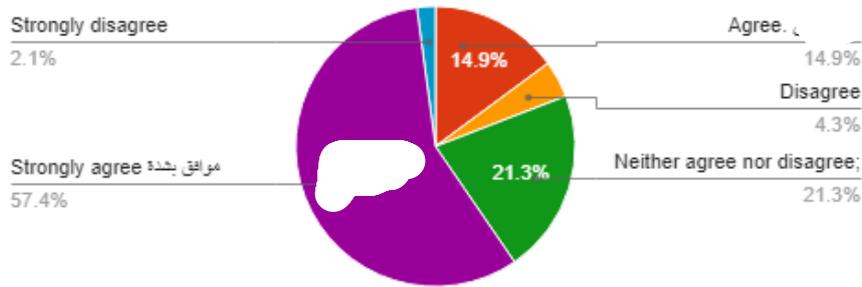
Figure 2. Response on Online learning is very effective for me

Moreover, regarding the questions specific to Canon PLAY features and experience, overall responses show that the respondents were satisfied with the simulator (80.8%). Around 87% agree that it is easy to use, 91.5% agree that it has a friendly interface and 93.6% agree that it has demonstrated a clear photography concept. Figure 3 shows the students' confidence to explore DSLR cameras after using the simulator, where 91.2% either agree or strongly agree and only less than 10% disagree or indifferent.
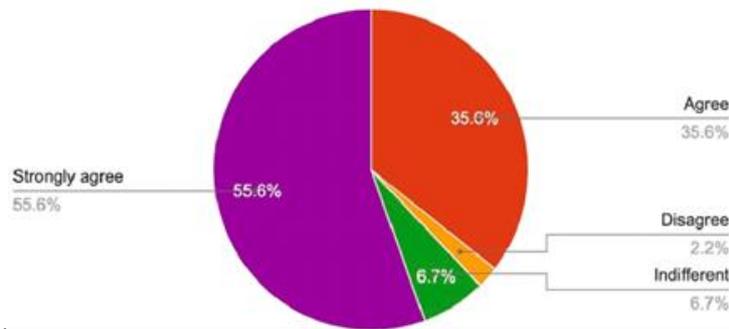
Figure 3. Response on I can explore DSLR camera by myself after using this app

Proposal for VR based Photography Training Simulator

From the analysis, we found that only two simulators utilize VR as their medium. Motivated by this, we propose the interface for our proof of concept as below (Figure 4):
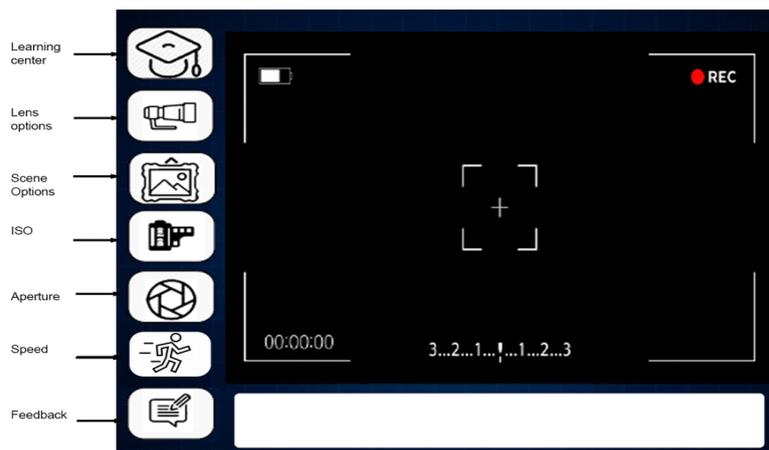
Figure 4. Interface for our proposed VR based Photography Training Simulator

Figure 4 shows our proposed simulator interface that the user will view from the VR headset and interact with the application. The main interface consists of the learning centre, lens options, scene options, ISO, aperture, speed and feedback. Assisted by three senses: audio, visual, and motion, users can experience the immersive environment and realistic scene. Figure 5 gives an illustration of a user who is using the application. The lifelike virtual environment is designed using Unity3D editor, which consists of realistic scenes, animated subject matters, and optional time, whether day or night.
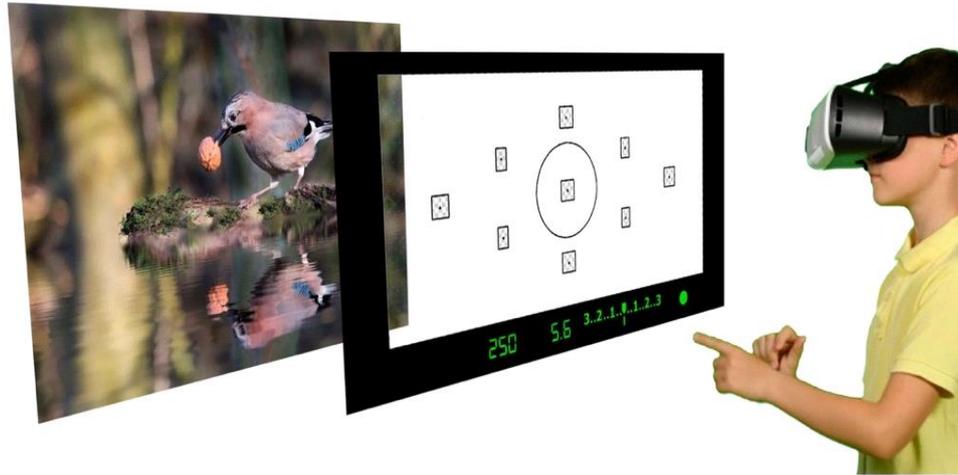
Figure 5. Illustration of a user who is using the application

This application uses a standard VR headset that supports Unity3D like Oculus Quest 2. Oculus Quest 2 is a wireless VR headset that supports up-to-date VR games and applications (Wills, 2020).

Conclusion and Future Work

This paper proposes an online interactive simulator that implements virtual reality technology to learn photography course, enabling students to learn photography at their own time without attending a physical class. The proof of concept is presented based on the analyses of 10 existing online simulators. This is stage one of the developments where the elements, interface and functionality are discussed. In this research, our survey results show that immersive simulator can propagate a high level of engagement, like learning practical courses online and virtually. Currently, most digital camera simulators are web-based, and minimal numbers are virtual and immersive.

Furthermore, with support from the main IT player like Facebook CEO's statement that mentions VR/AR could eventually replace all screens (Greengard, 2019), from smartphones to TVs, we believe this device will emerge as a promising, affordable consumer technology (Anderson, 2019; Waycott et al., 2018) and accessible to everyone one day. Finally, we hope the next stage of development is successful, where we can develop a working prototype of our VR camera simulator and test its implementation in the actual scenario.

Acknowledgements

References

Abou-Khalil, V., Helou, S., Khalifé, E., Chen, M. A., Majumdar, R., & Ogata, H. (2021). Emergency Online Learning in Low-Resource Settings: Effective Student Engagement Strategies. *Education Sciences, 11*(1), 24. https://www.mdpi.com/2227-7102/11/1/24

Aguilera-Hermida, A. P. (2020). College students' use and acceptance of emergency online learning due to Covid-19. *International Journal of Educational Research Open, 1*, 100011.

Allam, Z. (2020). *Surveying the Covid-19 Pandemic and Its Implications: Urban Health, Data Technology and Political Economy*. Elsevier Science. https://books.google.ae/books?id=DGruDwAAQBAJ

Anderson, A. (2019). *Virtual Reality, Augmented Reality and Artificial Intelligence in Special Education: A Practical Guide to Supporting Students with Learning Differences*. Taylor & Francis. https://books.google.ae/books?id=pvWODwAAQBAJ

Greengard, S. (2019). *Virtual Reality*. MIT Press. https://books.google.ae/books?id=a06qDwAAQBAJ

Hussein, E., Daoud, S., Alrabaiah, H., & Badawi, R. (2020). Exploring undergraduate students' attitudes towards emergency online learning during COVID-19: A case from the UAE. *Children and Youth Services Review, 119*, 105699.

Koi-Akrofi, G. Y., Owusu-Oware, E., & Tanye, H. (2020) Challenges of distance, blended, and online learning: a literature-based approach.

Niemi, H. M., & Kousa, P. (2020). A Case Study of Students' and Teachers' Perceptions in a Finnish High School during the COVID Pandemic. *International Journal of Technology in Education and Science (IJTES), 4*(4), 352-369.

Onat Kocabiyik, O. (2021). Social media usage experiences of young adults during the COVID-19 pandemic. *International Journal of Technology in Education and Science (IJTES), 5*(3), 447-462.

Owusu-Fordjour, C., Koomson, C. K., & Hanson, D. (2020, 2020-04-16). The impact of covid-19 on learning - the perspective of the Ghanaian student [emotions, highlife music, lyrics, popular music, structure]. *2020*. https://doi.org/10.46827/ejes.v0i0.3000

Waycott, J., Wadley, G., Baker, S., Ferdous, H. S., Hoang, T., Gerling, K., Headleand, C. J., & Simeone, A. L. (2018). *Manipulating Reality? Designing and Deploying Virtual Reality in Sensitive Settings* Proceedings of the 2018 ACM Conference Companion Publication on Designing Interactive Systems, Hong Kong, China. https://doi.org/10.1145/3197391.3197401

Wills, A. (2020). *The Oculus Quest 2 Guide: The Beginner To Expert Manual On How To Use The Advanced All-in-One VR Headset With Common Trouble Shooting Problems*. Independently Published. https://books.google.ae/books?id=QWgJzgEACAAJ

Impact of Big Data Technologies in Education Management

Shamik Palit

Manipal Academy of Higher Education Dubai, United Arab Emirates

Chandrima Sinha Roy

Eminent College of Management and Technology Kolkata, India

Abstract: Big Data Technology (BDT) and Analytics have gained immense recognition in recent years. BDT plays an essential role in various sectors. This study intends to provide a review of BDT in the education sector which includes analyzing, predicting learner's results based on behavior patterns, assessing their performance regularly. Education institutions are beginning to use analytics and techniques for improving the services they provide and to enhance learner's performance and retention. BDT in education involves Data Mining, Data Analytics. This study also aims at investigating the techniques referred to as Educational Data Mining (EDM) and Learning Analytics (LA) influencing online learning systems. Thus, this research study will examine the field of EDM and LA which give an effective understanding on student's learning methods and identify their educational outcomes.

Keywords: Education management, Big data, Higher education

Introduction

Big data has become a buzz word in recent years as education, entertainment, communication is occurring over the web, thus generating a humungous amount of data. Individual in different sectors contributes to generating of big data. Data can be generated from heterogeneous data sources such as social media, email, transactions, etc. in the form of text, image, audio, video or a possible combination of these forms. To handle heterogeneity aspects of big data the traditional data mining techniques need to be upgraded. Commercial entities have led the path of developing techniques to gather insights from the massive data generated to identify likely consumers of their products, in refining their products to better fit consumer needs. More recently, researchers and developers of online learning systems have begun to explore analogous techniques for gaining insights from learner's activities online. The advancement of BDT has facilitated education with various types of teaching, learning and assessment methods that can be achieved in classrooms or virtualized environments. The learners can receive instant feedback on the content they are learning based on big data analytics. BDT can analyze the overall performance of a class at a macroscopic level and can analyze each student's or learner's performance to find strengths and weaknesses. Then accordingly educators can take decisions on weak points of students to enhance

their performance.

More recently, researchers and developers of online learning systems have begun to explore analogous techniques for gaining insights from learner's activities online. The advancement of BDT has facilitated education with various types of teaching, learning and assessment methods that can be achieved in classrooms or virtualized environments. The learners can receive instant feedback on the content they are learning based on big data analytics. BDT can analyze the overall performance of a class at a macroscopic level and can analyze each student's or learner's performance to find strengths and weaknesses. Then accordingly educators can take decisions on weak points of students to enhance their performance.

Analysis of large educational datasets can be done by mainly two techniques: Educational data mining (EDM) and Learning Analytics (LA). These techniques respond to the event-based analysis related to education policies and practice. EDM is a DM technique applied on educational data sets. It aims to better understand students in terms of their learning pattern. EDM applies a combination of techniques such as machine learning, data mining to understand the research, learning issues in the educational sector (see Figure 1).

LA is the collection, analysis and reporting of data about learners. LA analyzes the large datasets and provides feedbacks that have an impact on students, instructors, and the learning process. There are quite a few differences between EDM and LA; Researchers in EDM rely more on classification and clustering, whereas in LA researchers use statistics, visualization, Social Network Analysis, sentiment analysis, influence analysis.
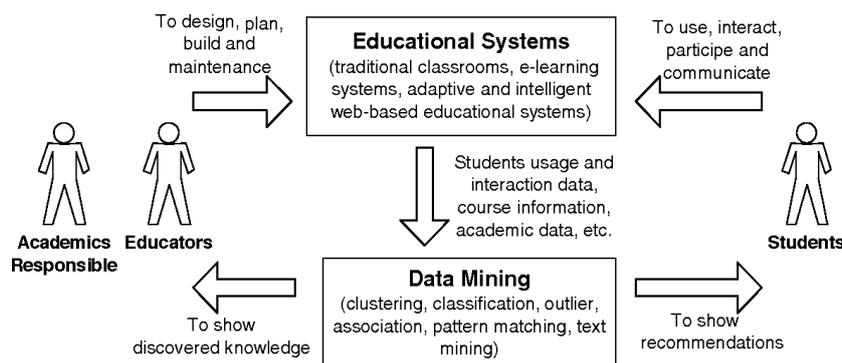

Figure 1. Application of Data Mining in Educational Systems

Literature review that has been done author used in the chapter "Introduction" to explain the difference of the manuscript with other papers, that it is innovative, it are used in the chapter "Research Method" to describe the step of research and used in the chapter "Results and Discussion" to support the analysis of the results [2]. If the manuscript was written really have high originality, which proposed a new method or algorithm, the additional chapter after the "Introduction" chapter and before the "Research Method" chapter can be added to explain briefly the theory and/or the proposed method/algorithm [4]. The use of e-learning systems has grown exponentially in the recent years, by the fact that neither the students nor the teachers are bound to any specific location and that is the form of computer-based education is virtually independent if hardware platform. LMS

are becoming much common in universities, community colleges, schools and are even used by instructors/educators to add web technology to their courses. LMS produce content material, prepare assignments and tests, engage in discussions, manage distance classes etc. LMS have a collection of vast amounts of information which is very valuable for analyzing student's behavior, very valuable source of educational data. They provide a database that stores personal information about the users, academic results of the students and their interaction data. Due to vast quantities of data generated on a daily basis, managing manually becomes difficult. These platforms do not have specific tools to allow education track and assess all student/learner's activities while they evaluate the structure and contents of the course. The use of data mining is very efficient and necessary to help educators, courseware authors to improve and enhance the educational systems through EDM &LA.

Problem Definition and Objective

The aim of student in an educational institute is to focus on academics. Some students might be good academics while some may perform poor. There can be several reasons on poor performance of the student such as difficulty in understanding the course, neglecting the course, their friend circle or may be some other several reasons. To understand this issue and track the students on regular basis can help in resolving issue up to certain extent, which can be done through EDM and LA. To resolve the issue of students performing poor, we intend to study the field of EDM &LA:

- An understanding of Educational Data Mining (EDM) applied to large data sets of students generated in the educational sector.
- An understanding of Learning analytics (LA) and how it is applied in the education sector.
- The benefits of LA and EDM and what factors have enabled these approaches to be adopted.

Background

Students from various locations using online platforms for learning purposes, generate vast quantities of data on a daily basis, it is difficult to manage manually or with traditional techniques. Therefore, it gets harder for an instructor to extract useful information as there are large number of students each generating large amounts of on a regular basis. The data mining techniques have been applying on large volumes of educational data sets to extract useful information required by the instructors which accordingly instructors can monitor the student performance, these data mining techniques applying on educational data sets are known as EDM. "EDM is an emerging interdisciplinary research area that deals with application of DM techniques on educational data.

Classification is most frequently studied by DM and ML researchers. It consists of predicting the value of a categorical attribute based on the values of other attributes that is the predicting   attributes. In classification, it is an approach of supervised learning. Classifier from set of correctly classified instances known as the training set. This classifier is used in algorithms directly. The other set known as testing set is used to measure the quality of the obtained classifier after the learning process. Different types of models can be used to represent

classifiers obtained from the training set. One of the algorithm types which can be used is decision trees:

Decision trees: It's a hierarchical structure where set of conditions are organized that contains zero or more internal nodes and one or more leaf nodes. Arcs with labeled node to its children are labeled with different outcomes of the test at the internal node. The decision tree is a predictive model in which an instance is classified by following a path of conditions which satisfy from the root node of the tree reaching the leaf node, which corresponds to the class label. Different and well-known classification algorithms are ID3, C4.5, CART etc (see Figure 2).
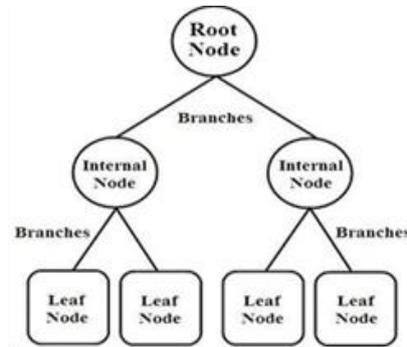
Figure 2. Decision Tree

Clustering is a DM technique which identifies data points that are similar in some respect so that a full dataset can be split into various categories of small datasets. Unlike classification here the training data set is not provided, hence it is an unsupervised learning. Some of the well-known clustering algorithms are K-Means, hierarchical clustering etc (see Figure 3).
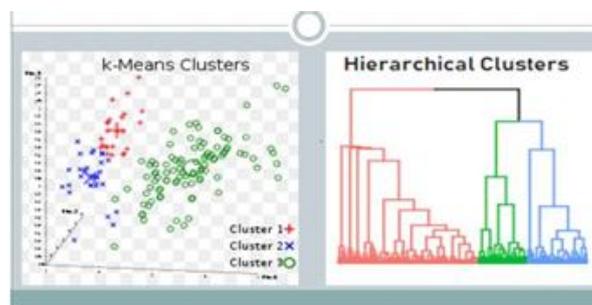

Figure 3. Clusters

Literature Review

The Knowledge gathered from research papers were on various data mining algorithms used on educational data sets and how they process educational data sets. The following are summary of citations of the algorithms that would detail in the further chapters of the report.

ID3: In,[6], Kalpesh Adhatrao &Aditya Gaykar define the process ID3 Algorithm and how it is applied on educational data sets. It describes the parameters which decide the root nodes, internal nodes and leaf nodes of

the decision tree.

C 4.5: In [7], T.Miranda Lakshmi, A.Martin define the process of C4.5 Algorithm and how it applies on educational data sets. In the algorithm it specifies the parameters that choose the nodes of the decision tree.

K-Means: In [8], Velmurugan T, C Anuradha define the process of K-means Clustering Algorithm and how it impacts in the educational sector, how clusters are formed and grouping based on the clusters is done.

Hierarchical Clustering: In [8], Velmurugan T, C Anuradha define the process of Hierarchical algorithm can process the data sets in the education sector, the steps and formation of cluster is being described by them.

Methodologies

In this study, methods used to carry out the reseach study are classification and clustering algorithms and one comparative analysis between the classification algorithms and other between clustering algorithms. The comparative analysis will be done based on: The classification technique involves learning and classification if data. Most of the frequently used DM method, which develops the cases and assign data set to the classes. The target data is evaluated by classification algorithm. In classification method, the test data are utilized to evaluate the efficiency of the classification rules. If the rules are acceptable, it can be utilized to new data sets.

Decision Tree is used to predicting the student's academic performance. Example: Classifying learners according to their interactions with course content (video lectures and assessment) in learning activities and forecast student performance based on their interacting behavior.
The two algorithms of classification to be discussed are:

- ID3-This is a decision tree algorithm introduced in 1986 by Quinlan Ross. It is based on Hunts algorithm
- C4.5-This decision tree algorithm is a successor of ID3 and based on Hunts algorithm.

The Clustering is an iterative process of discovering knowledge. The techniques find classes an assign the object to a desire class. Example: In terms of educational sector grouping students based on their learning and interaction patterns and grouping users for purposes of recommending actions and resources to similar users
The two algorithms of clustering technique to be discussed are:

- K-Means
- Hierarchal Clustering

DM Algorithms

- ID3 uses information gain measure to choose splitting attribute.

- It accepts categorical values in building a tree model and doesn't give accurate result when there is noise, hence to remove the noise preprocessing technique is required.
- To build the decision tree, information gain is calculated for each and every attribute and the attribute with the highest information gain is selected to designate as the root node.
- The attribute is labelled as a root node and the possible values of the attribute are represented as arcs.
- All the possible outcome instances are tested to check whether they are falling under the dame class or not.
- If all the instances are falling under the same class, the node is represented with single class name otherwise choose the splitting attribute to classify the instances.

1. ID3
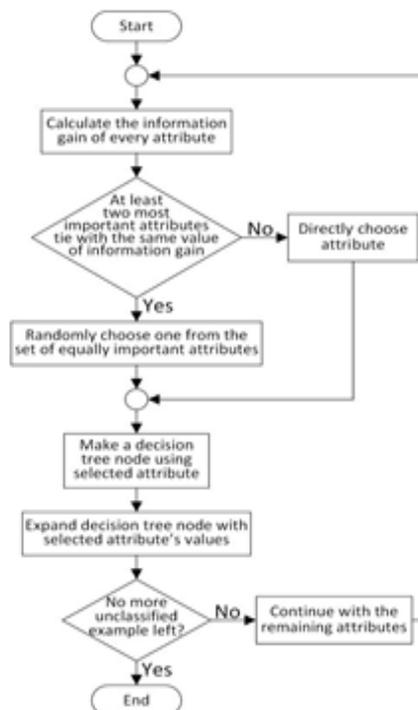
Flowchart of the traditional ID3 algorithm

Formula of Entropy

Given probabilities $p_1, p_2, \ldots, p_s$, where $\sum p_i = 1$, Entropy is defined as

$$H(p_1, p_2, \ldots, p_s) = \sum - (p_i \log p_i)$$

Entropy finds the amount of order in a given database state. A value of $H = 0$ identifies a perfectly classified set. In other words, the higher the entropy, the higher the potential to improve the classification process.

Formula of Information Gain:

ID3 chooses the splitting attribute with the highest gain in information, where gain is defined as difference between how much information is needed after the split. This is calculated by determining the differences between the entropies of the original dataset and the weighted sum of the entropies from each of the subdivided datasets. The formula used for this purpose is:

$$G(D, S) = H(D) - \sum P(D_i)H(D_i)$$

2. C 4.5
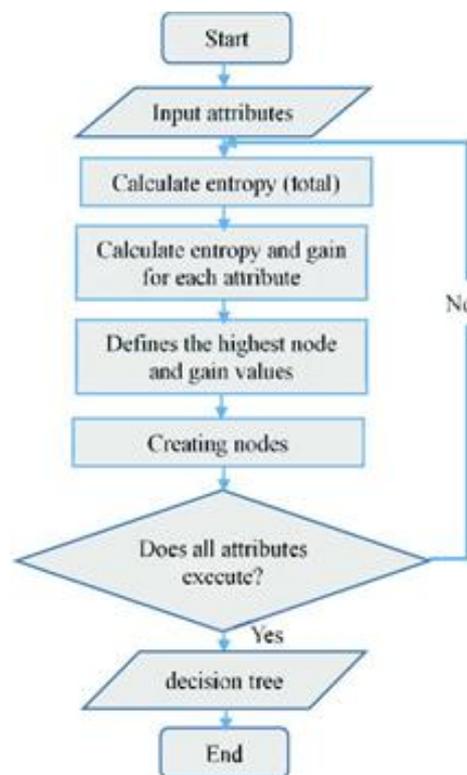
C4.5 handles both categorical and continuous values

To handle the continuous attributes, C4.5 splits the attribute value into two partitions based on the selected threshold such that all the values above the threshold as one child and the remaining as another child.
Handles missing attribute values.

It uses gain ratio as an attribute selection to measure to build a decision tree. Firstly, calculate the gain ratio of each attribute The root node will be the one whose gain ratio is maximum.

This algorithm uses pessimistic pruning to remove unnecessary branches in decision tree to improve the accuracy of classification.

3. K-Means Clustering
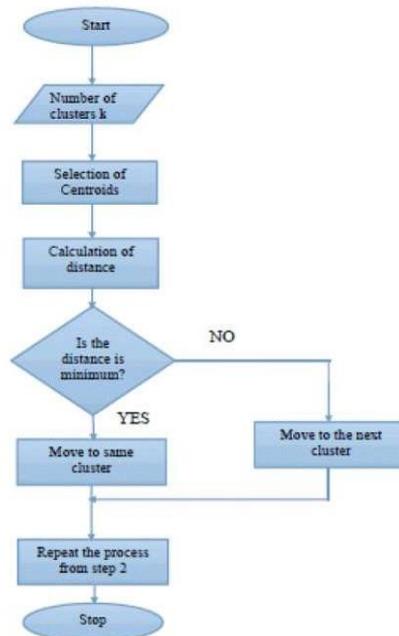
In this algorithm K data elements are selected as initial centers and Euclidean distance formula is used to calculate the distance between the selected centroid and other data elements and then same procedure is followed iteratively.

Firstly, select the no of 'c' cluster centers. (Here fixed no of clusters is used).

Initial cluster center is determined for each of the c clusters either by software or the researcher.

Then distance between each data point and cluster center is calculated using Euclidean distance formula.

Assign the data point to that cluster center whose distance from the cluster center is minimum as compared to all cluster centers

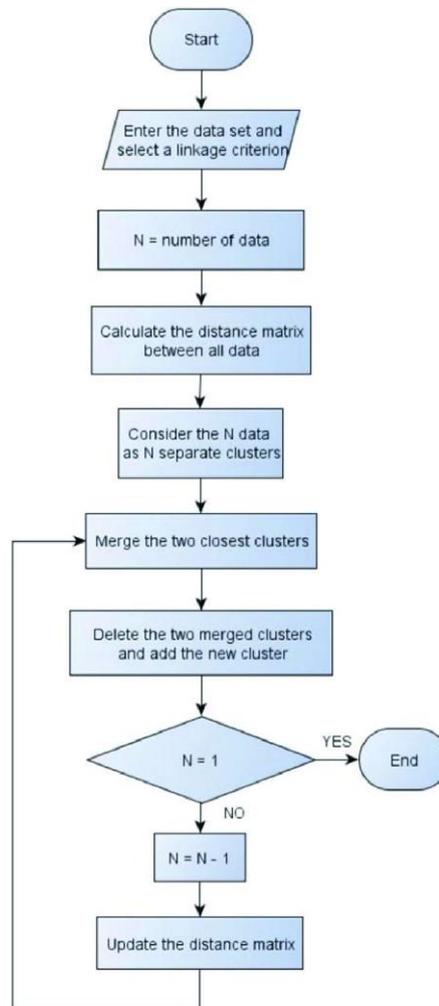Recalculate the new cluster center using the formula:

$$v_i - (1/c_i)\sum_{j=1}^{c_i} x_i$$

Where 'c_i' represents the number of data points in
ith cluster.

Recalculate the distances of each data point with new cluster centers.

If there is no reassigning of the data points then stop, otherwise repeat the calculate the Euclidean distance step.

4. Hierachchial clustering

Hierarchical Clustering is basically set of nested clusters organized in a hierarchical tree.

Assign a cluster to each item, such that N clusters for N items.

Find and merge the pair of clusters which are closet to each other.

Calculate the distances between new and each of old clusters.

A) Start with the disjoint clustering 1(0) =0 and sequence number n=0.

B) In the current clustering, now find the least dissimilar pair of clusters say pair (A), (B), according to d[(A),

Increment the sequence by n=n+1 and merge clusters A sand B into single cluster to form the next clustering n.

Set the level of this clustering 1(n)=d[(a), (b)]

The next step is to update the proximity matrix, M, by deleting rows and columns corresponding to clusters A and B and adding a new row and columm corresponding to the newly formed cluster. The proximity between the new cluster, denoted by (A, B) and old cluster k is defined in this way[(k), (a, b)] =min d[(k), (a)], d[(k), (b)].

If all the objects are in one cluster then stop the process, else go to step to find and merge the pair closer to each other.

Implementation Details

Moodle is one of the most widely used online learning environments by educational institutions. Educators inexperienced in DM can carry out basic Dm analyses on log records they obtained via Moodle LMS. This way educators will be able to obtain data—driven information on the status of the learning environment and students, while researchers will be able to seek answers for research questions regarding online learning. According to available data, it is used by over 138 million registered users in 230 countries. Furthermore, it is distributed for free with an open source code. It offers educators effective tools for providing course materials to students and organizing online learning activities. Moodle does not store simple text files. It registers the logs, and all information in a relational database.   It allows to get full reports on the activities of a unique student or of all students for a specific activity or course. However, all this data is usually raw, without any form of intelligent processing, is uses have sued different told for Moodle data analysis.

The EDM in Virtual Learning environment follows mainly four steps:

- Data collection: while the students use the system, information is collected and stored in the database. In Moodle, the data is collected in system logs.
- Preprocessing: after data collection, the data is transformed into suitable formats for analysis. Usually software is used for data preprocessing.
- Data mining: with the aim of developing a model and discovering useful patterns, the appropriate data mining algorithms are applied at this stage.
- Results evaluation: in this last step, educators interpret the obtained results and use discovered knowledge to improve the learning and decision-making process.

Moodle Predicta is a tool developed in Java that allows users to connect into any version of Moodle DB as well as different management systems.

Moodle PREDICTA is divided into two parts:

1. **Visualization Module**

Allows users to have an overview of student behavior, interactions, personal data and academic performance. This module enables educators to evaluate the course structure and its effectiveness.

To bring the processed data to the user, this module is comprised of mainly four steps:

- Data Selection: Here the data (Moodle DB) is selected, according to user's requirements.
- Data Transformation: After selection, the data is gathered and transformed/discretized.
- Reports execution: In this stage, the reports are generated.
- Reports: The reports are presented to the user.
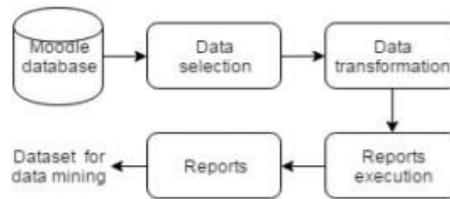
Once the user has selected the desired DB, he is asked for specific course on next screen. To make the selection Moodle Predicta creates a hierarchical structure of courses, according to categories and subcategories in selected DB, When the course is selected, a new screen is presented to the user. The selected attributes will compose of reports and quizzes, logs, assignments and grades. Once the user makes the selection, Moodle PREDICTA generates a file as the final result, which can be in mainly three formats: HTML, CSV, ARFF.

2. Prediction Module

The prediction module allows teachers and tutors to identify students not following classes, may abandon courses before the end, making it possible to take some preventive action.
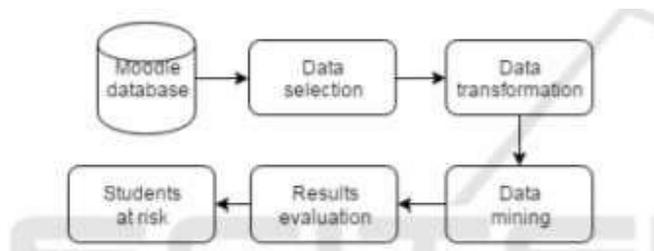
To undertake the students' prediction performance, this module is composed of mainly five steps:

- Data selection – in this step, the data is selected, from attributes data describe students' behavior, interactions
- and grades.
- Data transformation – the data is gathered and transformed/discretized for data mining.
- Data mining – in this stage, the data is used in decision tree models.
- Results evaluation – the results presented by data mining are interpreted and evaluated automatically.
- Students at risk – Students at risk are listed to user.

Once the course is selected, a, Moodle Predicta prepares the data, in a preprocessing phase (cleaning, integration, transformation and reduction), and generates an ARFF file. After connecting to the WEKA data mining API, the decision tree algorithms are executed with standard parameters for listing of students at risk of failing. Students whose behavior, interactions, and performance, is similar to those students from the training dataset that have failed will be defined as "at risk". Teachers can then follow up on these students to confirm

their situation and take some.

Comparative Study and Results Obtained

Comparative study between ID3 and c4.5 classifiers are:

	Splitting Criteria	Missing Values	Attribute type	Speed
ID3	Information gain	Doesn't handle it	Handles categorical values	Low
C4.5	Gain ratio	Can handle it	Handles both categorical and Numeric value	andFaster than ID3

Comparative study between K-means and hierarchical clustering are:

Properties	K-Means	Hierarchical Clustering
Clustering Criteria	It is well suited to generating globular cluster	Use a distance matrix as Clustering Criteria
Category Data	K-means can be used in categorical data is first converted to numeric by assigning rank.	Applies categorical data and due to its complexity, a new approach for assigning the rank value to each categorical attribute.
Sensitive to noise	K-Means is sensitive to nose in dataset.	Comparatively less sensitive to noise in the dataset.
Execution time	Increases time of execution	Better performance than K-Means
Dataset	Good for larger data sets	Relatively good for smaller data sets.

Conclusion

With the advancement of information and communication technologies, new and major challenges being created mainly because of huge volumes of data about student's activities, academic results and user's interaction being stored. However, this data can be explored and analyzed by knowing DM techniques and algorithms. These facts are the basis of the recent area of research educational data mining, that consists of DM technologies applying to data collected from educational institutions with the aim to discover patterns and useful information. The data mining processes are difficult and need previous knowledge to be applied successfully. Moreover, the data needs to be correctly selected, prepared and the result of process requires evaluation and interpretation. In this study, the DM algorithms under classification and clustering techniques are studied to understand how they can apply on EDM. Also, in this study Moodle Predicta, an easy-to-use tool was presented. This software enables students follow up, selecting and preparing the Moodle data for two modules: (i) the visualization module, that generates reports for analysis purposes; and (ii) the prediction module, that integrated to WEKA data mining software, uses decision tree models to identify and list students at risk of dropout or failure.

References

[1] The main references are international journals and proceedings. All references should be to the most pertinent and up-to- Santosh Kumar Ray and Mohammed Sayed, "Applications of Educational Data Mining and Learning Analytics Tools in Handling Big Data in Higher Education: Trends, Issues, and Challenges", Khawarizmi International College, Al Ain, UAE, July 2018.

[2] Marviah Adib Hamiah, Sarfaraz N Brohi and Babak Bashari Rad, "Big Data Technology in Education: Advantages, Implementations and Challenges", Taylor University, Lakeside Campus, Selangor, Malaysia, July2018.

[3] Jiechao Cheng, "Data Mining Research in Education", Wuhan University, Wubei, China, March 2017.

[4] Abeer Badr El Din Ahmed, Ibrahim Sayed Elaraby, "Data Mining: A prediction for Student's Performance Using Classification Method", Sadat Academy, Cairo, Egypt, 2015

[5] Velmurgun.T, "Clustering Algorithms in Educational Data Mining: A Review", D.G Vaishna College, January 2015

[6] Kalpesh Adhatrao, Aditya Gaykar," PREDICTING STUDENTS' PERFORMANCE USING ID3 AND C4.5 CLASSIFICATION ALGORITHMS" Navi Mumbai, Maharashtra, India Vol.3, No.5, September 2013

[7] T.Miranda Lakshmi, A.Martin, R.Mumtaj Begum, "An Analysis on Performance of Decision Tree Algorithms using Student Qualitative Data ",Bharathiyar University, Coimbatore, India, 201

[8] C. Anuradha, T. Velmurugan, "Clustering Algorithms in Educational Data Mining A review", Bharathiar University, Coimbatore, India, Vol 7. No.1 Pp.47-52, 2015

[9] Cristobal Romero, Pedro Espejo," Web Usage Mining for predicting final marks of student that use Moodle Courses", Cordoba University, Spain, May 2013

[10]   Igor Moriera Felix, Ana Paula," Moodle Predicta: A Data Mining Tool for Student Follow Up",
          Instituto   de Informatica, Universidad Federal de Goi ´ as, Goi ´ ania, Brazil, 2017

[11]   Manju Kaushik, Bhawana Mathur, "Comparative study of K-means and Hierachical Clustering
          Techniques", JECRC university, Jaipur, India, Vol 2 Issue 6, June 2014

Health Education for the Uplift of Health Conditions and School Performance

Alqalawi Abdullah

Bordeaux University, France

Abstract: Our topic is focused on health education within the school curriculum. It's to emphasize its importance in the short and long-course during the learning and growth process. Healthy diet presents an outstanding medium in enhancing cognitive efficiency and helps in assisting the acquisition process. Adopting a guided nutriment practice participates in empowering young individuals to better manage their consuming habits. It has been outlined in several studies across continents how food behaviorism, lifestyle factors, poor quality nutrients can compromise intellectual efficiency in the stage of knowledge acquisition alongside health issues. This has drawn serious concerns to governments and institutions (WHO, UNICEF, European Union, and states) to outpoint the impact of nutriments, notably their type and quality, on childhood health and development. Our paper is set to deliver scientific-based evidence through selected studies conducted across the globe on health and nutrition and their consequence upon pupils and school performance. The majority of the surveys centered on how good diet and appropriate food consumption habits or their absence could improve or impair the overall health conditions as well as school achievements. Health education programs throughout education curriculum can partake in drawing public awareness in regards to impoverished diets and processed fast-food. The aforementioned are often considered responsible for causing chronic diseases endowed with characterized symptoms. Integrating lifestyle principles in the education agenda would bestow worthy elements to amend physical and learning conditions.

Keywords: Food behaviorism, Quality nutrition, School performance, Heath education, Lifestyle factors

Introduction

It has been observed that national programs on Health Education participated in bringing awareness to young individuals with means and knowledge to attain improvements in health and scholar performance. This is possible through a configured curriculum implemented in schools for transmitting comprehensive knowledge on diet and selective quality nutriments. The WHO's recommendations urged states' involvement in pursuing efforts in such direction. Such health schemes are meant to empower school students in the long term and take into account lifestyle and health factors for better health conditions, and thus change patterns of behaviorism towards consuming habits. More important, health education programs on the very nature of various nutriments

and their benefit in terms of value-added vitamins and minerals can be part of the core of teaching, in relevance to dietetics as an effective tool to reach the aim sought for. WHO gave an interesting definition for schools involvements for promoting various educational actions with the following remark: "*A school that is constantly strengthening its capacity as a healthy setting for living, learning and working*" (WHO, 1998, p. 2).Whilst in this, it is positioning the school as a field where representatives and fellow members of the school community and teachers can involve locals, parents, to work collectively for promoting health issues among pupils at an early age. To reach such a goal, a stream of actions can be performed to widely spread concepts and principles for/on health promotion, hygiene measures, and environmental preservation to enhance lifestyle conditions and take adequate choices at a local and national level (Ibid.).

Recently, a worldwide promotion of health education has been carried out at an international level for its implementation in schools and local communities in several states worldwide. The growing concern of prevalent chronic diseases such as diabetes, obesity, and cardio-vascular pathologies, due to low-energy poor diet, high-fat nutriments intake at an early stage gave alarming indicators to urge authorities and governments to react consequently. Furthermore, mental health and life conditions added gravity and growing concern in relevance to early adulthood health risk contingencies. Several research studies in this context highly spotted the link between children's health with that of the social and education outcomes (Taylor, Quinn, & al. 2012, p.1-2).

Today, the latest advancements in modern medicine do offer to certain extent medical solutions to counter widespread pathologies such as: obesity, diabetes, hypertension, and cardiovascular illnesses at the advent of their characterized symptoms. Nonetheless, the major difficulty resides in the incapacity of biomedicine to eradicate or treat harmoniously such chronic afflictions. The major sources of many illnesses are mostly linked to detrimental habits of processed food consumption and lifestyle factors. Hence, once clinical diagnoses are performed a list of medications are prescribed to treat identified symptoms of specific illnesses, but none without uncomfortable side effects in most cases. While if the processes is reversed, the ideal is to prevent causes of illnesses to appear from the first place, through a bestow awareness of nutriments quality and eating habits to start with. Nonetheless, there is a necessity to add in this stream, within the health promotion agenda, a well-grounded knowledge of our own biological functions and mechanism accessible enough to both young individuals and parents.

Nowadays, integrative medicine such as Unani-Tibb for example, fosters a holistic approach towards illness and health issues, bearing in mind the very nature of humor balances for each person's proper temperaments. Such concepts attach more importance to equilibrium of the inner biological system enable to reach a balanced state of homeostasis. Observing and learning these principles participate in drawing sight about human health mechanisms and anticipate adequate measures to sustain it. At the base, Unani-Tibb is a combined Greco-Arabic deeply rooted medicine, initiated with the advent of Hippocratic theories on medicine that was integrated later on with Avicenna's scientific medical fundamentals, *Canon of Medicine* (Ansari, Khan, 2017; Sheehan, Hussain, 2002). Today, the return of such notions with regards to health sustainment and its promotion, mainly through education and healthcare empowerment, can provide a good apprehension and control of our physical

conditions, vital needs and earnestly help manage lifestyle qualities. In addition, determining the natural temperament of an individual would not only bring insight into one's proper strength and weakness as far as healthcare, suitable diet, but will also recognize any predisposition to certain diseases, medically pertained to certain risk factors. In this, Hippocrates stated an interesting reflection: «*It is more important to know what sort of a person has a disease than what sort of disease a person has*» (Bhikha, Saville, 2014, p. 15).

The concept draws us back to the ancient Greek theory associating the human body's attributes, closely linked to Man's natural environment (i.e. earth, water, air and fire). Identifying the dominant quality of an individual at an early stage would give a good apprehension of one's proper nature and thus determine the initial humors (i.e. hot, moisture, cold and dry qualities), lifestyle factors, together with the ideal diet type in correspondence. Comprehending our temperaments early enough would better prepare an individual to sustain an adequate regime/diet, since each temperament is correlated with specific physical, mental and personality traits. Temperaments and qualities in human beings are divided into four broad categories, with a dominant and subdominant combination. The four major temperaments identified with proper traits are: the Sanguineous, reputed to be persuasive, sociable, and talkative; the Bilious can be resourceful, outspoken, dominant, leader and short tempered; while the Melancholic tends to be thoughtful, logical, analytical, and perfectionist; the Phlegmatic traits is known to be calm, accommodating, patient and a good listener (Alam, Nasir, 2020; Naz, Sherani, 2014). Temperaments influence our food preferences and ideal environment. To set an example, a sanguineous dominant and phlegmatic subdominant temperament should preferably abstain from lifestyle factors that expose one to excessive moistness in food as well to moist weather conditions. Whereas a Bilious/Sanguineous combination will have a dominant quality of heat and would better follow a lifestyle that will decrease the heat level. Taking into account these guidelines would give a personal comprehension of one's own ideal conditions and adequate diet intake (Bhikha, Saville, 2014 pp.21-22).

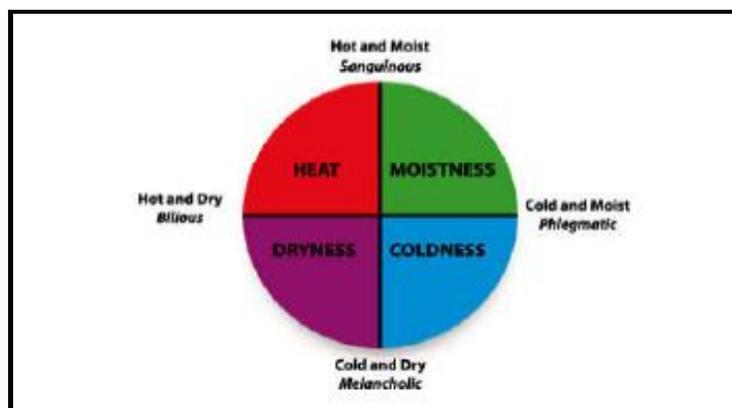The following graph represents the basic four temperaments with the corresponding qualities:

Figure 1. Temperaments associated each with humor qualities: combination dominant/subdominant (Cf. Bhikha & Dube, 2018, p.27915).

Additionally, quality nutriments, proper sleep, physical activity and appropriate eating habits would contribute to actively preserve the homeostasis balanced within the *Physis* system (e.g. *Physis* is an inner human healing mechanism, responsible for managing the three variables: proper temperament, humours, and lifestyle factors). Observing these principles would participate in striving against diseases before their occurrence, and thus stimulate the healing mechanisms from possible illnesses. This, when bearing in mind that drastic qualitative changes are often associated with pathological afflictions, presenting accordingly identifiable signs and symptoms (Boom & al., 2020; Bhikha, Dube, 2018; Bhikha, Saville, 2014).

Recently, a clinical research conducted a systematic review to inquire on patients' needs for education in health care. Analyses and evaluation were carried out to assess the appropriate advice and various tools to meet demands for information on health issues, suitable diet, and self-care management for patients under medical care. The purpose was essentially guided towards preventive measures to anticipate risks of common diseases or detect eventually their possible signs (Beydokhti, Nabavi & al., 2020). The study was implemented on adult patients through questionnaires and interviews, with a number of various patients seeking information and learning requirements. The main objective, in the light of education in healthcare, was to help attain individual empowerment on health management by observing healthy diet habits, thus in such case anticipate possible illnesses to occur later. But it's also primordial to start health management at an early stage of life, notably during school age, before recurrent diseases emerge once adult.

Objective

The present study provides various literatures conducted across the globe relevant to health and diet nature, food behaviorism and their significant impact on physical conditions and cognitive support. Additionally, an accent is expressed on how observing lifestyle factors and health management would empower young individuals to reach well-being and participate in enhancing school achievements. The emphasis on the value of health education didactic and its inclusiveness in the education curriculum can help raise awareness of health risks and promote preventive methods, thus contributing to better physical and mental conditions at an early stage. A special focus is given with respect to the role of CAM in health education, notably through the Unani-Tibb medical and health concept. The attempt is to outline the role and concept of Unani health philosophy and health care education in relation to human beings' proper mechanism and their surrounding environment.

Area of study: Health Education curriculum and its implementation for the enhancement of adolescents' health, diet quality and school performance.

Methodology: Primarily, it consists on giving analyses of various recent research studies and surveys undertaken across many countries with regards to health and nutrition quality, as well as their implementation in schools in favor of well-being and learning performance nationwide. In a second phase, present an overview of the major consumables that predispose individuals to health deterioration, exposing them to illnesses and chronic diseases. Finally, present transversal analyses and convene in respect various disciplines: health science,

education, medicine and sociology of food consumption. In addition, introduce different approaches of the selected materials and deduce elements of interest for our conclusion.

Sociological approach of the fast-food concept: the roots of a rationalized commercial model

The contemporary eating model and type of nutriments among adolescents with the advent of industrial food products had generated widespread preoccupying health concerns such as: obesity, diabetes, hypertension, high level of LDL cholesterol level (low-density lipoprotein) and cardiovascular pathologies. The principal etiological source of common chronic health disorders in today's food eating habits often regards consumption of impoverished commercial nutriments. Their impact on young individuals at an early stage would bring about a shortfall of essential vitamins during the growth process. The most known vitamins that adolescents much need enable to ensure natural development and sustain appropriate health condition are those of A, C, D, E, and K sort, adding to them a series of B vitamins: thiamin (B_1), riboflavin (B_2), niacin (B_3), pantothenic acid (B_5), pyridoxal (B_6). In addition to the precedent, vital minerals supply such as: calcium, phosphorus, potassium, sodium, magnesium, iron, and zinc are needed to reach a healthy state and upgrade physical conditions. The supply of such minerals and vitamins will also participate in encountering diseases and strengthen the human immune system (Cf. Dietary Guidelines for Americans, 2015-2020).

American food industry rapid diffusion, notably the fast-food model, has inspired largely many regions to imitate the chain manufacture process of substandard food quality, based on taste and processed nutriments that contains high levels of calories, yet deprived from essential vitamins. During the last decades, we witnessed consisting and preponderant installment of fast-food multinationals at a worldwide scale. Such a powerful expansion of food fabrics initiated a new trend of eating habits to most consumers, especially among adolescents. The pitfall engaged in such cases is to be found cultural and economic, reinforced by a powerful marketing incentive towards flourishing fast food and cost-effective business, therefore a production system capable of generating considerable profit. In consequence, it constitutes an important part of the mass economy, in the category of consuming goods (i.e. Macdonald, KFC, Burger king, extensive commercial food fabrics, ready to cook meals embedded with additives).

A model of the sort has participated in diffusing across continents, the U.S. Made food and eating habits concept and gave rise to fast-food businesses as a reference to follow; which became a worldwide spread epitome of what John Tomlinson (1999) called *glocalization*. This was so, by the introduction of popular quick meals formulas (i.e. burgers, chicken dips, fries, soft drinks, sodas, sweets, creams) compatible to their former initiators in terms of food offer and business set, that George Ritzer expressed by *The McDonaldization of Society* (Ritzer, 2011). A concept based on a rational and uniform system of production, which somewhat takes us back to the Weberian theory of rationalization (Max Weber, 1864–1920), that not only impacted the economy with its principle methods of rationalization (i.e. efficiency, calculability, predictability and control), but also the society itself (Ritzer, 1998, pp. 46-47). Such drift was responsible for introducing an inclination towards a global cultural homogenization in terms of food fabric and consumption standards. On the other hand,

it also dehumanized the catering field to a metric and robotized food manufacture; optimizing in this course services and efficiency as a principal objective. In this, it reduced the act of nourishment strictly to a commercial object ready to be consumed.

Nonetheless, consumers became acquainted in this path to a pattern of eating habits and modes of quick consumption (e.g. buy and take away or eat and turn for the next). Such a system didn't consider healthy issues, despite evident repercussions (i.e. obesity, diabetes, cardiovascular pathologies) on consumers' health from the type of fast food snacks that renowned fabrics offer. Aside from that, there can't be found a place for diversity in terms of menu choices, regarding qualitative meals proposals for such food intake. Needless to say, to which extent the impact of publicities, films and especially images in drawing consumers' attention towards fast food innovative products has created a strong trend and an irresistible stimulus to consume fast commercial meals (Powell & al., 2007)**.** The modern style of food consumption encouraged and induced young adolescents to get accustomed to such food habits, thus engendering eating behavior toward a category of catering offer. One of the keystones in this stream of poor diet is the taste potency**,** which triggered the desire to consume notorious quick food (i.e. Burgers, tacos, fried chicken dips, noodles, soft drinks, sugary sweets, etc.).

The savory effect and the synthetic taste

When coming to the subject of flavor, one of the most extensively used food-additives in commercial food that exists in the food industry is Monosodium Glutamate (MSG), equally called *savory*. It's also known in many regions by the name of "China salt" for its faculty in enhancing flavor in processed comestibles (Niaz, Zaplatic, & al, 2018). The savory substance is commonly found in ready-cooked meals and fast-food formulas. The additive is introduced as well in industrial flour, usually employed to coat chicken meat and thus embedding it with a special aroma. MSG has been practiced for many decades and until now in commercial food for flavoring purposes basically. It's copiously used for a wide range of Chinese and commercial food in general. According to our referenced scientific research, MSG extensive usage has generated multiple pathologies to consumers at an alarming rate. The most commonly known illnesses due to the overconsumption of nutriments containing MSG distinctly identified are: obesity, metabolic disorders and a potential risk of tumor formation. Moreover, the industrial component has shown threatening traces of toxicity affecting vital organs, specifically the liver for causing some hepatic damage, and in many cases gastric distension symptoms. MSG can also impact the nervous system, once the glutamate is released in the human metabolism. Current ingestion of such additives is responsible for obesity in multiple cases and can be associated with chronic inflammatory symptoms. A common pathology discovered in the past years is the *Chinese restaurant syndrome* (CRS) that was induced through the extensive use of MSG. Patients consuming commercial food containing glutamate complained of a burning sensation at the neck, back, and experienced general weakness. (Ibid: 273-275). MSG toxicity and drawbacks, given the numerous pathologies caused, is to be considered as a serious public threat, specifically among young individuals. This is so, when bearing in mind their plain tendency towards attractive commercial quick meals. Inappropriate food habits could preclude school performance and intellectual efficiency, in the absence of educational means to raise awareness regarding eating behaviour, type

of diet and observation of lifestyle risk factors.

Various quantitative scientific studies: the impact of quality nutrition on school performance

A recent scientific study concentrated its research on school students living in the Viseu district in Portugal, with the support of HBSC (Health Behavior in School-Aged Children). It showed to which extent food behavior and incongruous eating habits can affect health and school performance or conversely, a good diet would favorably enhance them. The method based essentially on the diet factor type, its frequency, school performance and health condition showed interesting results. Other social determinants regarding social-demographic criteria and study environment were taken into account as relevant variables for the survey (Duarte, Pestanac & al., 2016). In this perspective, an analytical cross-sectional study was carried out on students pursuing basic full school cycles aged between 11-17 years.

Questionnaires were submitted to 380 participants of both genders to examine diet type habits and its influence on school performance (i.e. presence of qualitative breakfast or its absence, type of nutriments that include vegetables, fruit, fish, and water consumption). Other information was collected among adolescents concerning consumption of food high in fat and carbohydrates (glucides) rich in calories and drinks containing white sugar (i.e. sodas, sweets, burgers, fries, sausage, hot dogs). The table hereafter illustrates diet findings with respect to school performance.

Table 1. Diet type and school performance

Diet type	Average sorting			χ^2	P
School performance	Non healthy diet	Intermediate diet	Healthy diet		
Study environment	166.46	181.70	220.31	21.464	.000
Study planning	164.59	179.81	222.83	24.984	.000
Study method	169.54	186.94	215.81	15.659	.000
Reading Skills	166.82	179.61	220.23	21.164	.000
Motivation for study	168.05	171.30	220.17	20.807	.000
Overall school performance	163.11	177.59	224.95	28.194	.000

Source : (Duarte, Pestanac & al., 2016, p.165)

A percentage between 7% and 8% of students confirmed skipping breakfast while other students did not. Formerly, a scientific study (Cahil, 2013) proved that breakfast rich in minerals (i.e. potassium, selenium, boron, with ratios of unsaturated fat, proteins and fruits) and fresh dairies (Yoghurts and milk) would supply the brain with the necessary elements and improve concentration and memory, thus assisting the learning process. The conclusion confirmed the influence of quality nutriments on school performance, cognitive efficiency and general health condition, while poor diet did affect health and school performance among adolescents (Ibid. pp. 164-166). However, the study did not include evaluative methods on school performance correlated in adequacy with proper learning potential and students' results at an individual scale, but rather on the impact of a healthy

diet on school performance.

Nonetheless, the Portuguese General Directorate of Health has integrated a National Program for the Promotion of Healthy Eating (PNPAS) to promote healthy diet components, notably in schools, as a pedagogical action and measures to counter cardiovascular diseases, obesity and other illnesses related to fat as well as white sugar negative effects and unhealthy nutrition.

Regarding national health plans, the French nutritional policy, Programme National Nutrition Santé (PNNS), started a similar public program for promoting healthy diet since 2001, updated until 2019 with new directories. Primarily, the objectives were to promote a qualitative diet in school meals based on ratios that contain sufficient proteins, vegetables, fruits, and dairy products in each plate in school canteens, thus accustoming pupils and university students towards a healthy diet (Cf. *légifrance* link, Clause 1, PNNS, chart, 2011). Moreover, the actual plan is meant to hinder chronic diseases at an early stage, encouraging young individuals to practice physical activities, while countering equally marketing pressure on adolescents towards commercial fast-food consumption (Etilé, F., Hercberg, S., & al., 2017, pp.13-35).

Finally, such preventive measures can be conceived as a public leverage policy to redress eating habits and counter fast-food trends among adolescents. Equally, health campaigns of the sort aim at raising awareness on the value of qualitative diet and incite for health sustainment, oriented towards the young generation.

A medical observational study conducted by the Korea Youth Risk Behaviour Web-based Survey (KYRBWS), accumulated within five years (2009-2013) resources from the Education Ministry. The data concerned the school population in Korea. It gave evidence on how dietary habits are associated with school performance. Unlike the latter study, it was carried out nationwide throughout 43 regions in Korea. The survey included volunteer students at an anonymous base. Yet, teachers were actively involved in selecting classes and submitting online questionnaires to their students. A total of 359,264 participants took part in this census (184,801 males and 174,463 females aged from 12 to 18).

The questions were meant to collect information on the frequency of local fast-food consumption (i.e. processed food and ready to cook noodles), but also the regularity of breakfast taking or their absence and the proportion of micronutrients absorption amongst school students. Several demographic and socioeconomic factors, as well as dietary habits and stress level self-assessments, were taken into account for the study (Kim, & al., 2016). These complementary variables, often useful indicators in health and social determinants surveys, were considered enable to provide more refined details on eating habits in correlation with academic performance among the school population. The following table illustrates the outcome of the survey based on collected data in regards to nutrition factors and their impact on school performance.

Table 2. Illustration of nutrimental factors and their % in relation with school performance

Factors	A	B	C	D	E	P-Value
Breakfast, %						<0.001*
6–7 times a week	2.34 (2.20–2.48)	1.99 (1.90–2.10)	1.67 (1.60–1.75)	1.29 (1.23–1.35)	1	
3–5 times a week	1.36 (1.29–1.45)	1.37 (1.30–1.44)	1.35 (1.29–1.41)	1.20 (1.14–1.25)	1	
1–2 times a week	1.12 (1.05–1.19)	1.14 (1.08–1.20)	1.19 (1.14–1.25)	1.12 (1.07–1.17)	1	
0 time a week	1	1	1	1	1	
Lunch, %						<0.001*
6–7 times a week	1.12 (1.00–1.26)	1.17 (1.07–1.28)	1.16 (1.07–1.26)	1.13 (1.04–1.22)	1	
3–5 times a week	0.72 (0.64–0.81)	0.81 (0.74–0.88)	0.95 (0.87–1.03)	1.02 (0.94–1.11)	1	
1–2 times a week	0.74 (0.65–0.84)	0.72 (0.65–0.79)	0.85 (0.78–0.93)	0.89 (0.82–0.97)	1	
0 time a week	1	1	1	1	1	
Dinner, %						<0.001*
6–7 times a week	1.38 (1.22–1.55)	1.22 (1.11–1.33)	1.08 (0.99–1.17)	1.07 (0.84–1.16)	1	
3–5 times a week	0.86 (0.76–0.97)	0.86 (0.79–0.94)	0.84 (0.77–0.92)	0.98 (0.91–1.07)	1	
1–2 times a week	0.84 (0.74–0.95)	0.83 (0.76–0.91)	0.87 (0.80–0.95)	1.00 (0.92–1.08)	1	
0 time a week	1	1	1	1	1	
Fruit, %						<0.001*
≥7 times a week	1.73 (1.62–1.86)	1.49 (1.41–1.57)	1.43 (1.36–1.50)	1.18 (1.12–1.24)	1	
3–6 times a week	1.58 (1.48–1.68)	1.54 (1.47–1.62)	1.47 (1.40–1.53)	1.26 (1.21–1.31)	1	
1–2 times a week	1.16 (1.09–1.24)	1.20 (1.14–1.26)	1.20 (1.15–1.26)	1.14 (1.09–1.18)	1	
0 time a week	1	1	1	1	1	
Soft drink, %						<0.001*
≥7 times a week	0.42 (0.38–0.46)	0.44 (0.41–0.47)	0.55 (0.52–0.59)	0.72 (0.68–0.76)	1	
3–6 times a week	0.59 (0.56–0.62)	0.62 (0.59–0.64)	0.70 (0.67–0.73)	0.84 (0.80–0.87)	1	
1–2 times a week	0.79 (0.76–0.82)	0.80 (0.77–0.82)	0.85 (0.82–0.88)	0.93 (0.90–0.96)	1	
0 time a week	1	1	1	1	1	
Fast food, %						<0.001*
≥7 times a week	0.83 (0.72–0.96)	0.63 (0.55–0.72)	0.79 (0.70–0.89)	0.81 (0.73–0.80)	1	
3–6 times a week	0.75 (0.70–0.79)	0.73 (0.69–0.76)	0.79 (0.75–0.83)	0.82 (0.78–0.86)	1	
1–2 times a week	0.97 (0.94–1.01)	0.94 (0.91–0.97)	0.95 (0.92–0.98)	0.95 (0.92–0.98)	1	
0 time a week	1	1	1	1	1	
Instant noodle, %						<0.001*
≥7 times a week	0.62 (0.55–0.70)	0.62 (0.56–0.68)	0.78 (0.71–0.85)	0.86 (0.80–0.94)	1	
3–6 times a week	0.67 (0.64–0.71)	0.77 (0.74–0.80)	0.83 (0.80–0.86)	0.89 (0.86–0.92)	1	
1–2 times a week	0.94 (0.90–0.98)	0.98 (0.94–1.01)	0.99 (0.95–1.02)	0.98 (0.95–1.02)	1	
0 time a week	1	1	1	1	1	
Confectionary, %						<0.001*
≥7 times a week	0.86 (0.80–0.93)	0.86 (0.81–0.91)	0.88 (0.83–0.94)	0.95 (0.90–1.01)	1	
3–6 times a week	1.09 (1.03–1.14)	1.07 (1.02–1.11)	1.05 (1.01–1.09)	1.06 (1.02–1.11)	1	
1–2 times a week	1.04 (0.99–1.09)	1.05 (1.01–1.09)	1.05 (1.01–1.09)	1.04 (1.00–1.08)	1	
0 time a week	1	1	1	1	1	
Vegetable, %						<0.001*
≥7 times a week	1.48 (1.37–1.61)	1.72 (1.61–1.85)	1.69 (1.59–1.81)	1.47 (1.38–1.56)	1	
3–6 times a week	1.24 (1.14–1.34)	1.50 (1.40–1.60)	1.61 (1.50–1.72)	1.42 (1.33–1.51)	1	
1–2 times a week	1.01 (0.93–1.11)	1.18 (1.10–1.27)	1.25 (1.16–1.34)	1.21 (1.14–1.29)	1	
0 time a week	1	1	1	1	1	
Milk, %						<0.001*
≥7 times a week	1.35 (1.28–1.43)	1.28 (1.22–1.34)	1.23 (1.17–1.28)	1.16 (1.11–1.21)	1	
3–6 times a week	1.35 (1.28–1.42)	1.32 (1.26–1.37)	1.26 (1.21–1.31)	1.17 (1.13–1.22)	1	
1–2 times a week	1.06 (1.00–1.12)	1.06 (1.02–1.11)	1.07 (1.03–1.12)	1.06 (1.02–1.10)	1	
0 time a week	1	1	1	1	1	

* Significance at $P < 0.05$.

Ratios: Adjusted odd ratios of dietary habits for school performance using multinomial logistic regression analysis with complex sampling. (Cf. Kim, Sim, 2016, p.5).

The medical study delivered approximate values about dietary habits and their influence on school performance using structural equation models and various analytic tools, such as multinomial regression analysis with complex sampling. While another analytical test (ANOVA) was used to measure variables of age and physical activity, besides the Chi-square test for analysis criteria based on: gender, obesity presence, region of residence, subjective health and stress level, with $P < 0.05$ significance (Ibid., p. 3). The observational scientific study did an extensive survey throughout an exhaustive examination, which enabled in giving scientific evidence over a large school population in several regions in South Korea. The conclusion confirmed the presupposition that nutriments quality does influence school performance. It unveiled the fact of having regular meals without skipping breakfast, while observing good eating habits (i.e. consumption of fresh fruits, vegetables, and essential proteins) acted favorably towards school performance.

Nevertheless, poor diet with consumption of processed food, high sugar level drinks, and irregular frequencies of meals impacted unfavorably school performance. This extensive scientific study demonstrates diligently through several specialized settings, the impact of diet on school performance and physical conditions, concerning school students inside Korea. It also offers a technical medical perspective on health issues regarding nutriments, while averting in this course chronic known diseases at an early phase.

However, a summarized description of various pathologies linked to impoverished diet can join the rest of the findings, notably that of the KCDC (Centers for Disease Control and Prevention of Korea). What's more, providing worthy education to individuals, through vulgarized medical information on eating habits and type of nutriments can be advocated likewise. This implementation could present an overview about the value of a suitable diet, while raising awareness to adolescents and parents as well about efforts to invest on countering fast-food trends. Whereas, a significant strategy by insisting on the importance of lifestyle factors could put emphasis on healthy diet consumption, hence assist in altering eating patterns when necessary.

Morality and ethical controversy on food behaviorism and beliefs

Ethical questions can be raised in regards to dietary habits and healthy food consumption amidst adolescents, in relevance to morality towards food consumption, considered here as an integrative approach of our study and analyses. This is so, in regards to eating behavior, nature of food consumption, along with cultural and socioeconomic factors (Janssen and al., 2018; Aounallah-Skhiri and al., 2008, Hargreaves and Schlundt, 2002; Eertmans and Baeyens, 2001). The main foundation about morality in healthy eating or its antonym is to release the grounded significances and meanings that frame young consumers in their food choices and behavior. Nonetheless, it is equally considerable to examine how good or bad food is conceived amongst adolescents in terms of value and symbolic, while focusing simultaneously on the social barriers and structural changes in relevance to healthy diet concerning adolescents (Sun & al., 2019; Townsend & al., 2017, Tiedje & al., 2014; Pridgeon & al., 2013). Unhealthy eating among young individuals in the U.S., as an example to set, became a serious public concern in regards to adolescents' unhealthy diet, body weight, and eating behavior (Chin & al., 1999-2013; Lindsay, 2021; Reeves & al., 2006). Owing to such preoccupation, a conducted study in the state of California throughout 2015-2016, examined the association between socioeconomic status (SES) with healthy eating and morality amongst a sample of young population (Fielding-Singh, 2019).

The study was based on semi-structured interviews completed on a number of 74 adolescents from different origins and parental descent (White, Black, Hispanic, and Asian), along with the category of their respective economic standards (low, middle, high-class social groups). It showed in one hand, the relation between the levels of affluence of those whose parents can afford substantially healthy food (fruits, vegetables, natural sustenance, organic food, and home cooked meals), and those who cannot grant to their children frequent intake of frequent healthy food (low-SES residents). On the other hand, despite socioeconomic and cultural disparities, adolescents of all categories considered healthy food as morally *good* but some expressed their incapacities to have regular access to what they believe as *healthy food*, but restrained themselves to fast-food meals due to their limited budgets. Middle and high-income social groups estimated themselves as *healthy eaters* and healthy individuals, but conceived lower income social groups more inclined to consume unhealthy food (poor diet & fast-food intake) and were also more exposed to illnesses. Beliefs were shared that eating healthy is *socially worthy* and reflects a person's moral superiority, while asserting analogically self-esteem to their own image. However, such conviction from the interviewed adolescents did not exclude morality and beliefs of their fellow low-SES schoolmates but rather gave them incentive to act in the same manner, thus enabling them to

experience equal self-esteem. In conclusion, adolescents in this study, especially with the middle- and high-income categories, affirmed their positive view on healthy eating given their beliefs and morality about nutrition. Furthermore, they were determined to independently put into practice a healthy diet in their eating habits (Ibid. pp. 41-43).

The food market social influence

Still, we find the considerable influence of industrial market offer and advertising (Thai, & al., 2017) on food choices and behaviour on a category of socio-economic populations, that often reorient eating consumption to a homogenized model of nourishments, embedded with certain market symbolism and stimuli (e.g. economically affordable quick meals, gathering in groups and eating outside style, social and economic adhesion to a uniformed menu offer: soft drink, fries, burgers, etc.). Although adolescents might have their own initial cultural food standards, which would translate their affiliated identity in regards to food according to their regional backgrounds (i.e. popular plates: Mexican plates, Spanish Paella, Asian noodles, Japanese Sushi, Italian national plates, and so forth). Nevertheless, industrial products and fast-food outlets affected to large extent habits of eating, and in consequence modified the morality attributes in terms of significance towards food intake and its meaning (e.g. taste pleasure and food trend prevails over body's need of healthy input).

The ethical dimension about organic food and the social awareness

Luckily, the counterpart of the industrial food model, there exist the organic and fair trade products of ethical origin, which is gaining strong momentum among consumers and a significant part in market share. Statistics of world organic agriculture crop showed a turnover of 97 billion dollars in 2017, and previously in 2013, a bundle of 62.8 billion dollars were registered in the US alone (Willer & Lernoud, 2013, 2019), this with a steady growth rate of organic production performed each year.
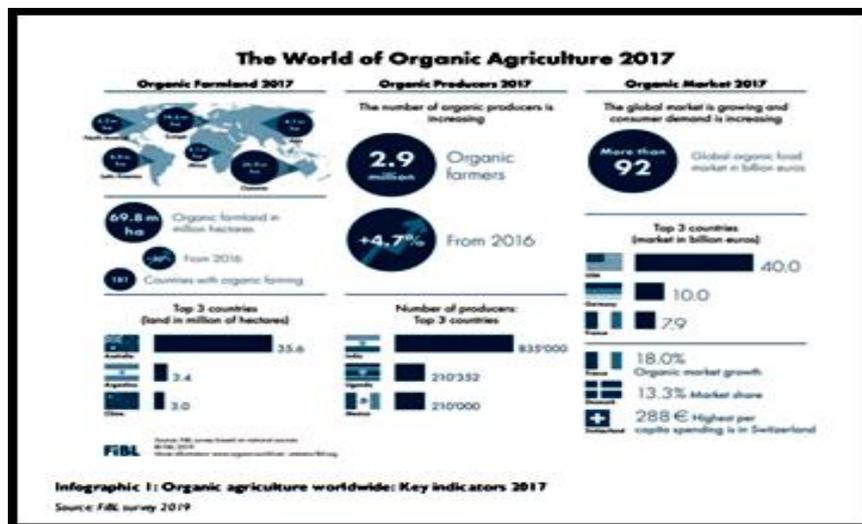

Fig. 2. World Organic Agriculture growth in different regions. Source: (Cf. The World of Organic Agriculture Statistics and Emerging Trends 2019, p.34)

	International Conference on	
ICRES	**Research in Education and Science**	**istes** Organization
www.icres.net	April 1-4, 2021 Antalya, TURKEY	www.istes.org

The emerging increase of interest in biological products harvested with less extensive and abused agriculture revealing several significances. Morality motivated drift towards pro-environmental and sustainable organic products underpins ethical and predetermined consciousness towards a selective choice on food consumption and purchasing (Bartanova & al., 2015). Nonetheless, the public came to be more aware nowadays of healthy food standards due to the diffusion of recurrent campaigns and information on quality food and its origin. Communication of the sort helped rising ethical questions on sustainable products across the Media and through non-profit world associations, this in favor of consumers' rights and sustainable agriculture on food issues. The outcome of such change and endeavors constructed a better comprehension about food origin and quality, linking all things considered, ethical beliefs and personal commitment in regards to health concerns, diet nature, ethically produced products and interest for the local crop. The other foundation in this course is the notion of moral satisfaction and human sentiments of self-credibility. It's especially the case when supporting *reasonable* produced food of ethical origin: pro-environmental and fair sustainable agriculture, as well as local organic products.

Following such perspective, an increasing number of individuals reoriented their consuming preference, seeking beside taste and worthy nutriments consumption habits, symbolic meanings by supporting a just cause in their experience through nutrition. In this, values become a core from which motivation for purchasing and consuming food of ethical origin gives a sense of reward to the moral equation. Since contributing to fair trade food for a number of consumers is perceived as a plausible value. Nonetheless, the other side of the moral satisfaction is faith in the superior quality of organic and sustainable agriculture in terms of taste and health benefit. It's so for a number of households in Europe and non-members of the EU as shown in the survey (Ibid., pp. 138-39).

Discussion

The various studies and interrelated subjects discussed beforehand attempt to give evidence on the substantive effects of diet nature on health and school performance. It also draws a critical examination on food industry fabrics in observing how and to which extent it had influenced eating habits and food behaviorisms among young individuals. The prevalence of health risks factors due to poor diet and fast-food among children and adults brought serious health and public drawbacks in producing chronic diseases such as: diabetes, obesity, cholesterol increase, inflammatory pathologies, and cardiovascular disorders. The main interest is to prevent factors of recurrent morbidities of the kind to occur among school children and students precociously. Thus, in this, participate in preserving health and upgrade school performance during the learning process.

Conclusion

Health Education can be perceived as a constructive curriculum in school education. It offers pedagogical means to *empower* pupils for better health management, while raising parents' *awareness* on eating habits inside and

outside the family composition, foreseen as preventive measures. This can be possible by introducing in the teaching scheme units grounded knowledge on nutrition and the human biological system, while insisting on lifestyle factors to achieve harmony to the global health equilibrium. Various teaching settings can be implemented in regards to vital vitamins needed to sustain health and to counter illnesses. Basic materials on micronutrients could be suggested within the syllabuses' components, thereby emphasize on their role for supporting organic functions (e.g. all the necessary vitamins and minerals found in natural food: fruits, grains, vegetables, meat). But not the least, specificities can be included in the curriculum on the necessity of adequate macronutrients requirements for their energy supply (e.g. proteins, adequate carbohydrates, lipids). Moreover, notions about temperaments and humor balances, through selected knowledge found in integrative medicine for example, can be taken into account, insisting on their importance for placing adequate knowledge for health care and suitable diet at an individual scale. Therefore, by promoting educational programs about diet and health issues will enable young individuals to reach the objective sought for in providing wellbeing and health risks prevention. Last but not the least, the notion of morality approach in food and consumption is to be considered as a complementary principle in HE, which might in consequence helps modify eating patterns and behaviour rightfully, but could also build symbolic meaning towards food.

References

Alam, M. N., & Nasir, M. (2020). Study of range of body weight in young healthy adults on mixed diet with special reference to different temperament.

Ansari, S., Khan, Q. A., Anjum, R., Siddiqui, A., & Sultana, K. (2017). Fundamentals of Unani system of medicine-a review. *European Journal of Biomedical and Pharmaceutical Science*, *4*, 219-223.

Aounallah-Skhiri, H., Romdhane, H. B., Traissac, P., Eymard-Duvernay, S., Delpeuch, F., Achour, N., & Maire, B. (2008). Nutritional status of Tunisian adolescents: associated gender, environmental and socio-economic factors. *Public health nutrition*, *11*(12), 1306-1317.

Beydokhti, T. B., Nabavi, F. H., Ilkhani, M., & Moonaghi, H. K. (2020). Information need, learning need and educational need, definitions and measurements: A systematic review. *Patient Education and Counseling*, *103*(7), 1272-1286.

Bhikha, R., & Dube, A. (2018). Impact of Tibb Lifestyle Factors in Health Promotion and Illness Management. *International Journal of Recent Scientific Research*, Vol.9, Issue C, pp. 27914-27918.

Boom, S. M., Oberink, R., van Dijk, N., & Visser, M. R. (2020). Assessment of motivational interviewing with the VASE-(Mental) Healthcare: Mixed-methods study to examine feasibility and validity in the general practice setting. *Patient education and counseling*, *103*(7), 1319-1325.

Cahill, L. E., Chiuve, S. E., Mekary, R. A., Jensen, M. K., Flint, A. J., Hu, F. B., & Rimm, E. B. (2013). Prospective study of breakfast eating and incident coronary heart disease in a cohort of male US health professionals. *Circulation*, *128*(4), 337-343.

Chin, S. N., Laverty, A. A., & Filippidis, F. T. (2018). Trends and correlates of unhealthy dieting behaviours among adolescents in the United States, 1999–2013. *BMC public health*, *18*(1), 1-8.

DeSalvo, K. B., Olson, R., & Casavale, K. O. (2016). Dietary guidelines for Americans. *Jama*, *315*(5), 457-458.

Duarte, J., Pestana, L., Coutinho, E., Amaral, O., Chaves, C., & Nelas, P. (2016). Eating behaviour effects on health and school performance in adolescents. Atención Primaria, 48 (Espec Cong 1), 163-167.

Eertmans, A., Baeyens, F., & Van Den Bergh, O. (2001). Food likes and their relative importance in human eating behavior: review and preliminary suggestions for health promotion. *Health education research*, *16*(4), 443-456.

Etilé, F., Hercberg, S., Lang, T., Julia, C., Friant-Perrot, M., Delamaire, C. & Girandola, F. (2017). Pour une politique de santé nutritionnelle en France. PNNS 2017-2021.

Hargreaves, M. K., Schlundt, D. G., & Buchowski, M. S. (2002). Contextual factors influencing the eating behaviours of African American women: a focus group investigation. *Ethnicity and Health*, *7*(3), 133-147.

Hoosen, M. (2017). Temperament an important principle for health preservation in Tibb an-Nabawi and Unani-Tibb. *Bangladesh Journal of Medical Science*, *16*(4), 487-495.

https://www.cambridge.org/core/journals/public-health-nutrition/article/concise-overview-of-national-nutrition-action-plans-in-the-european-union-member-states/0708EEED2A3B5B7C172059188F64FE3B

Jabin, F. (2011). Guiding tool in Unani Tibb for maintenance and preservation of health: a review study. *African Journal of Traditional, Complementary and Alternative Medicines*, *8*(5S).

Janssen, H. G., Davies, I. G., Richardson, L. D., & Stevenson, L. (2018). Determinants of takeaway and fast food consumption: a narrative review. *Nutrition research reviews*, *31*(1), 16-34.

Kim, S. Y., Sim, S., Park, B., Kong, I. G., Kim, J. H., & Choi, H. G. (2016). Dietary habits are associated with school performance in adolescents. Medicine, 95 (12).

Lindsay, K. G. (2021). Predicting Success in a Statistics Course Geared toward Allied Health Students. *International Journal of Research in Education and Science (IJRES), 7*(2), 339-350. https://doi.org/10.46328/ijres.1545

Miraj, S., & Kiani, S. (2016). A scientific correlation between dystemprament in Unani medicine and diseases: a systematic review. *Electronic physician*, *8*(11), 3240.

Naz, S., & Sherani, F. S. (2014). Determination of human temperament based on the literature of Unani system of medicine. *Journal of Ayurveda and Holistic Medicine (JAHM)*, *2*(5), 38-43.

Niaz, K., Zaplatic, E., & Spoor, J. (2018). Extensive use of monosodium glutamate: A threat to public health? *EXCLI journal*, *17*, 273. (Consulted: January, 25, 2021).

Powell, L. M., Szczypka, G., Chaloupka, F. J., & Braunschweig, C. L. (2007). Nutritional content of television food advertisements seen by children and adolescents in the United States. *Pediatrics*, *120*(3), 576-583.

Pridgeon, A., & Whitehead, K. (2013). A qualitative study to investigate the drivers and barriers to healthy eating in two public sector workplaces. *Journal of Human Nutrition and Dietetics*, *26*(1), 85-95.

Programme National Nutrition Santé (PNNS, 2011): https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000024614763

Reeves, A. F., Rees, J. M., Schiff, M., & Hujoel, P. (2006). Total body weight and waist circumference associated with chronic periodontitis among adolescents in the United States. *Archives of pediatrics & adolescent medicine*, *160*(9), 894-899.

Ritzer, G. (1998). The Weberian theory of rationalization and the McDonaldization of contemporary society. *Illuminating social life: Classical and contemporary theory revisited*, 37-61.

Ritzer, G. (2011). *The McDonaldization of society 6* (Vol. 6). Pine Forge Press.

Robles, B., Smith, L. V., Ponce, M., Piron, J., & Kuo, T. (2014). The influence of gender and self-efficacy on healthy eating in a low-income urban population affected by structural changes to the food environment. *Journal of obesity*, *2014*.

Sheehan, H. E., & Hussain, S. J. (2002). Unani Tibb: History, theory, and contemporary practice in South Asia. *The Annals of the American Academy of Political and Social Science*, *583*(1), 122-135.

Sun, R., Rohay, J. M., Sereika, S. M., Zheng, Y., Yu, Y., & Burke, L. E. (2019). Psychometric evaluation of the barriers to healthy eating scale: results from four independent weight loss studies. *Obesity*, *27*(5), 700-706.

Taylor, N., Quinn, F., Littledyke, M., & Coll, R. K. (Eds.). (2012). Health education in context: An international perspective on health education in schools and local communities. Springer Science & Business Media.

The World of Organic Agriculture Statistics and Emerging Trends 2019: http://www.organic-world.net/yearbook/yearbook-2019.html

Tiedje, K., Wieland, M. L., Meiers, S. J., Mohamed, A. A., Formea, C. M., Ridgeway, J. L., & Sia, I. G. (2014). A focus group study of healthy eating knowledge, practices, and barriers among adult and adolescent immigrants and refugees in the United States. *International Journal of Behavioral Nutrition and Physical Activity*, *11*(1), 1-16.

Tomlinson, J. (1999). *Globalization and culture*. University of Chicago Press.

Townsend, N., Williams, J., Wickramasinghe, K., Karunarathne, W., Olupeliyawa, A., Manoharan, S., & Friel, S. (2017). Barriers to healthy dietary choice amongst students in Sri Lanka as perceived by school principals and staff. *Health promotion international*, *32*(1), 91-101.

Wandel, M., Råberg, M., Kumar, B., & Holmboe-Ottesen, G. (2008). Changes in food habits after migration among South Asians settled in Oslo: the effect of demographic, socio-economic and integration factors. *Appetite*, *50*(2-3), 376-385.

World Health Organization. (1998). Health promotion glossary. (No. WHO/HPR/HEP/98.1). World Health Organization.

In the Context of the Relationship between Nature and Art in Postmodern Art: Alper Aydin and Elmas Deniz

Assist. Prof. Dr. Omer Tayfur Ozturk

Necmettin Erbakan University, Turkey, (iD) https://orcid.org/0000-0002-5757-1707

Sabriye Onal

Necmettin Erbakan University, Turkey

Abstract: Art has revealed new formations by being influenced by sociocultural factors affecting the society from the beginning to the present day. Since the 20th century, factors affecting society have also affected Art. Postmodern art movements first started in the USA in the 1950s and with this formation, they gave an intellectual meaning to the work of art. Nature has taken the form of an art object where contemporary art practices can be applied and has become a part of art. In this context, the reflection of the concept of nature on art as a result of sociocultural factors has been examined with its different aspects, the concept of nature and the factors that affect the formation of art objects are emphasized. For this purpose, the artworks of two Turkish artists Alper Aydın and Elmas Deniz, which were seen to reflect the art understanding of the period, were evaluated. Both artists used all the data of nature as a primary art element by fictionalizing its changing form. Alper Aydın made studies by benefiting from the history of society, people, archeology and geological structure through the relationship between the concept of body and nature. Elmas Deniz used nature as a space, reflecting the destruction of nature by capitalism and ecological concern. In the works of both artists, the factors of nature-art relationship are highly emphasized. In this research, two Turkish artists Alper Aydın and Elmas Deniz, who are seen to reflect the art understanding of the postmodern period we are in, examined the destruction of urban waste and the capitalist process affecting natural resources in terms of installation, performance and land art practices, and contemporary art works related to nature and art. . It aimed to reveal the relationship between nature and the concept of art.

Keywords: Nature-art relationship, Installation, Land Art, Performance art

Postmodern Sanatta Doğa-Sanat İlişkisi Bağlamında Alper Aydın ve Elmas Deniz

Özet: Sanat, başlangıcından günümüze kadar topluma etki eden sosyokültürel faktörlerden etkilenerek yeni

oluşumlar ortaya koymuştur. 20. Yüzyıldan itibaren topluma etki eden faktörler Sanata da etki etmiştir. Postmodern sanat hareketleri, ilk olarak 1950'lı yıllarda Amerika da başlamış ve bu oluşumla sanat eserine fikirsel bir anlam yüklemiştir. Doğa çağdaş sanat pratiklerinin uygulanabildiği bir sanat nesnesi formuna bürünmüş ve sanatın bir parçası haline dönüşmüştür. Bu bağlamda doğa kavramının sosyokültürel faktörler neticesinde sanata yansıması farklı yönleri ile irdelenmiş, doğa kavramı ve sanat nesnesi oluşumuna etki eden faktörler üzerinde durulmuştur. Bu amaçla dönemin sanat anlayışını yansıttıkları görülen iki Türk sanatçı Alper Aydın ve Elmas Deniz' in sanat yapıtları değerlendirmeye alınmıştır. Her iki sanatçı da öncelikli sanat elemanı olarak doğanın bütün verilerini değişen formunu kurgulayarak kullanmışlardır. Alper Aydın, Beden ve doğa kavramının ilişkisi üzerinden toplumun tarihinden, insanından, arkeoloji ve jeolojik yapısından faydalanarak çalışmalar yapmıştır. Elmas Deniz mekân olarak doğayı kullanmış, Doğanın kapitalizm eliyle uğradığı tahribat, ekolojik kaygıyı yansıtmıştır. Her iki sanatçının çalışmalarında doğa-sanat ilişkisi faktörlerine fazlaca değinilmiştir. Bu araştırmada, içinde bulunduğumuz postmodern dönemin sanat anlayışını yansıttıkları görülen iki Türk sanatçı Alper Aydın ve Elmas Deniz'in Kentsel atıklar ve kapitalist sürecin doğal kaynaklara etki eden tahribatının Enstalasyon, performans ve arazi sanatı uygulamaları ile doğa-sanat ilişkili çağdaş sanat eserleri, içerikleri bakımından incelenmiştir. Araştırmada, doğa ve sanat kavramları arasındaki ilişkiyi ortaya çıkarmak amaçlanmıştır.

Anahtar Kelimeler: Doğa-sanat ilişkisi, Enstalasyon, Arazi sanatı, Performans sanatı

Giriş

Sanatın başlangıcı olarak kabul ettiğimiz mağara resimlerinden günümüz sanat anlayışına kadar, Sanatın içinde bulunduğu dönemin sosyokültürel yapısından beslenerek değişim ve dönüşüme uğradığı görülmektedir. Mağara resimleri sanatın ilk örnekleri olarak değerlendirildiğinde sanat oluşumunun ilk adımlarının milattan önce 4000'li yıllarda başladığı söylenebilir. Mağara duvarındaki çizimlerde doğanın toplum üzerindeki yansımalarının çizgi ve figürlerle anlatıldığı görülmektedir. Değişen zaman içinde sanatçılar, doğayı taklit etmeye devam etmişler ve tuval vb. düz yüzeylere doğanın farklı bakış açıları ile yeniden yorumlanmasına gayret göstermişlerdir, Bir esin ve ilham kaynağı olarak doğa kavramı sanatçıların eserlerinde kullandığı yapıtların temelini oluşturmuştur. 20. Yüzyıldan itibaren Dünya savaşları, Soğuk savaşlar, Sanayi ve teknolojinin gelişmesi gibi topluma etki eden faktörlerin yaşanması toplum üzerinde olduğu kadar sanat alanında da köklü değişikliklerin yaşanmasına zemin hazırlayarak, sanatın Postmodern sanat adı altında yeni bir kimlik kazanmasına neden olmuştur. Sanatçılar, Her türlü hazır nesne ve doğa da var olan her şeye fikirsel bir anlam yüklemiş ve sanat nesnesi olarak değerlendirmiştir. Bu oluşum ekseninde doğa ve sanat kavramı da teknolojinin meydana getirdiği fotoğraf makinasının ve kameranın icadı gibi yeniliklerin sanat oluşumun da kullanılması ile sanat yeniden yorumlanma süreci içerisine girmiştir. Doğa kavramı mimesis olgusundan koparılarak değişen yeni Dünyadaki Endüstriyel ve teknolojik gelişimin doğa üzerinde bıraktığı tahribatın tehlikeli boyutları Arazi sanatı ile fikirsel anlatım yoluyla ortaya çıkmıştır. Doğal bir materyal olan doğa, bir eylem ve performans aracı olarak kavramsallaştırılarak kurgulanmıştır.

1980' lı yıllarda Türkiye'de çağdaş sanat uygulamaları başlamasına rağmen 2000' li yıllardan itibaren performans sanatının daha yaygın bir şekilde uygulanırlığı görülür. Ana malzeme olarak İnsan –doğa ilişkisi çerçevesinde çevre kirliliği, atık oluşum ve israfın temele alındığı farkındalık oluşturma amacı güdülen eserlere yoğunlaşıldığı görülmektedir. Gelişen endüstri ve teknolojinin doğal tabiat alanlarını tahrip etmesi, kapitalist yaklaşım sonucunda doğa alanlarının yok edilerek yeniden inşa edilmesi, her türlü tüketim nesnesi ile doğanın kirletilmesi sanatçıların konuları arasındadır. Çünkü doğa, sadece bizi besleyen ve nefes almamızı sağlayan bir mekân değil, aynı zamanda biyolojik bedenlerimizin hayatta kalması için gerekli olan tek imkândır. Doğa'nın tüketilemeyen bir olgu olmadığı yok olabilme ihtimalinin varlığına cevap arayabilmek adına, Sanatçılar doğayı her açıdan ele alarak farkındalık oluşturmayı hedeflemektedirler. Bu eksende çağdaş sanat pratiklerinde doğa kavramını ele alan iki Türk sanatçı Alper Aydın ve Elmas Deniz' in sanat anlayışı üzerinde durulmuştur. Alper Aydın beden ve doğa kavramı bileşkesini kullanarak toplumun tarihini, insanlarını, arkeoloji ve jeolojik yapısını irdeleyerek çağdaş sanat uygulamalarına yansıtmaktadır, Yapıtlarındaki fikirsel boyutu anlamlandırırken eleştirel bir yaklaşım içinde olduğu ve biraz ironi kattığı görülür. Eserlerinin farklı bakış açıları ekseninde algılanabilirliği üzerinde durmaktadır. Çalışmalarında araziye müdahale, fotoğraf, heykel, yerleştirme ve performans çabası içine girerek düzenlemeler gerçekleştirir, doğadan kopmuş günümüz insanının sanat pratikleri karşısında çevreye karşı yaklaşımı ve davranışlarını gözlemler.

Doğa ve sanat ilişkisini kapitalist tehdidin doğa ve her türlü canlılar üzerinde oluşturduğu tahribatı, çağdaş sanat ve uygulamaları ekseninde meydana getiren, Elmas Deniz; mekân olarak doğa ve doğal malzemelerden faydalanarak, ekolojik ve ekonomik kaygılara değinmektedir. İşlerinde insan-doğa ilişkisine ve tarih boyunca doğa fikrine odaklanıyor. Çevreye dair problemleri eleştirel ve ironik bir şekilde eserinde yorumlayarak görünür kılmayı amaçlıyor, doğa ile insan arasındaki ilişkilerin biçimlerine dikkat çekiyor ve insan eliyle doğaya verilen zararı felsefi bir şekilde araştırıyor.

Bu bağlamda günümüz sanat anlayışını yansıtan, doğa kavramını çalışmalarında performans, enstalasyon ve arazi sanatı ekseninde yorumlayan iki Türk sanatçı Alper Aydın ve Elmas Deniz' in yapıtlarında doğa-sanat bağlamının nasıl kurgulandığı ve içeriği irdelenmiştir.

Doğa-Sanat İlişkisi

Doğa İnsanlık tarihinin ilk oluşumundan itibaren insanların korktuğu, çekindiği ve bu korkularının hem inanç sistemlerine etki ettiği hem de doğanın gücüne inanan ve çoğu zaman bu güce karşı koymak isteyerek, mağara duvarlarına çizmiş oldukları resimler ile doğanın günlük hayatlarının bir parçası haline gelmiş olduğu görülmektedir, Korku ve mücadele alanı oluşturan doğa aynı zaman da sanata etki edecek kadar da güçlü bir esin kaynağı olmuştur.

Aydınlanma Çağı öncesi dönemi tanımlayan yansıtma kuramının ilk evresi, Platon'un güzeli tanımlamasıyla başlar. Platon (MÖ 5. Yüzyıl) "Sanat, fenomenler (görüngü, görünümler) dünyasını yansıtır" görüşünü

savunmuştur. Bu çerçeveden bakıldığında sanat, görünenlerin yansımasıdır ve sanatın birinci görevi görüneni olduğu gibi yansıtmaktır ki; bu da görünen gerçekliği vermektedir. Böylece sanat doğanın bir yansıması (mimesis, benzetme, taklit) olarak şekillenmiştir. Antik Yunan'da öne çıkan bu görüş ortaçağda göz ardı edilmiş ancak Rönesans'ta tekrar gündeme gelmiştir. Fransız İhtilali'ne kadar süren monarşik devlet yapılarında sanatçının görevi, görünür dünyayı ve görünümleri, var olandan hareketle ona sadık kalarak yansıtmak olmuştur. Bu anlayış temelinde sanatçının görevi ve sanat eserinin işlevi doğayı, insanı, yaşamı kısaca var olan gerçekliği doğal olanı yansıtmaktır ve bu nedenle sanat eseri, "dünyaya tutulmuş bir ayna" olarak tanımlanmıştır. Bu dönemde sanat, yaratıcılığı açığa çıkartan ve izleyicide estetik bir zevk uyandıran konumdan uzak, varoluşsal amacı daha çok görsel yolla insanlara bir takım değerleri aktarmak olan ve beceri gerektiren bir yapıya sahip olmuştur (Şentürk, 2012, s. 17).

Sanatçılar görünen doğayı güzel, doğal sahneler yakalayarak en ideal şekilde resimlerine aktarmak gibi bir çaba içerisine girerek, doğanın gerçeklerini ve kendi duygu düşünce aktarımlarını görmezden gelmişlerdir. Sanat gelişip dönüştüğü bütün zamanlarda doğadan kopmamıştır. Sanatın esin kaynağı ve temel meselelerinden biri halinde olan doğa Sanayi devrimine kadar bir problem olarak değil estetik bir materyal, bir dışa vurum olarak ele alınmıştır. Dünya savaşları, soğuk savaşlar, sanayi ve teknolojinin gelişmesi ile birlikte yeniden şekillenen dünyada sanatta yeni bir kimlik kazanarak tüm bu oluşumlar neticesinde yeniden şekillenmiştir. İlk olarak 1950' li yılında Amerika' da başlayan Postmodern sanat anlayışı ile birlikte sanat eserine fikirsel anlam yüklenmiş ve fikir planda tutulmuş, Sanatın bütün sınırlılıklarını ortadan kaldırarak kavramsallaştırılmıştır.

Tarihsel dönemler içerisinde birçok sanat akımının konusu olan doğa, 1960'larda ilk örnekleri verilmeye başlayan Doğa Sanatı' nın da adımlarını atmakta etkili olmuştur. Bu süreç içinde Yoksul Sanat, Kavramsal Sanat, Oluşumlar, Beden Sanatı, Performans ve Minimalizm' in önde gelen sanatçılarının ortaya koydukları çalışmalar yeryüzünde doğaya yönelik gerçekleştirilen çalışmaları anlamlandırmış ve onların biçimlenmesini sağlamıştır (Aydın, 2019, s. 18).

Sanayi ve teknolojinin gelişmesi ile doğa tahribatı gündeme getirilerek doğa tartışma konusu ve bir problem halini almıştır. Doğa ve ekosistemde yaşanan tahribat insanlar üzerinde olduğu kadar sanat çevresinin genelinde de endişe meydana getirmiş ve sanatsal bir eylem çabası doğmuştur. Doğa ve sanat ilişkisi birbirini var eden iki olguya dönüşerek, eleştiren, sorgulayan ve farkındalık yaratmayı amaçlayan sanatsal pratikler ortaya koymasına neden olmuştur.

1960 sonrası geçmişteki tüm sanat akımlarının/olaylarının zamanla çokça değiştiği, özellikle sanat eserinin galerilerde satışa sunulan bir meta olmasına karşı çıkan bir anlayışın doğduğu bir süreç başlamıştır. Bu süreçte sanatta, sanat yapıtlarının varlık meselesini değerlendiren, çözümleyen ve satılamaz oluşunu vurgulayan videolar, fotoğraflar, performanslar, belgelenebilir bir nitelikte gerçekleştirilirken kalıcılıktan uzaklaştırılmıştır. (Bingöl, Pazarlıoğlu Mehtap - Çevik, Naile - Şenkal, 2020, s. 158).

ICRES

**International Conference on
Research in Education and Science**

www.icres.net   April 1-4, 2021   Antalya, TURKEY   www.istes.org

istes
Organization

Özellikle 20. yüzyılın son çeyreğinde doğal dünyada ortaya çıkan doğadaki bozulmanın geri döndürülemez bir hal almasıyla birlikte sanatçılar sorunu ulusal ve uluslararası gündeme taşıyan hem eleştirel hem de çözüm üreten bir bakış sergilemeye başlamıştır (Saygı, 2016, s. 7) .

Sanatın yönü Arazi ve Enstalasyon ve Performans sanatı ekseninde doğanın yok olma olgusu üzerine dönerek toplum bilincinin oluşturulması gibi bir çaba sarf edilmiş, Çağdaş sanat uygulamaları ile Doğa ve sanat birlikteliği, düşünsel ve küresel anlamda ele alınarak yorumlanmıştır.

Land art ya da Arazi sanatçıları doğaya olan müdahalelerimizin artık tehlikeli boyutlara geldiğini vurgulamak için doğaya doğal olarak ve doğal malzemeler ile müdahale ederek, tükettiğimiz kaynaklarımızın korunması gerektiğinin altını çizmişlerdir (Genç Melda, 2013, s. 13)**.** Tüm bu sanat etkinliklerinde sanatçıların sessiz doğanın sesi olabilme gayreti içine girdikleri, görülür.

İnsan etkinliği, doğanın kendi yaşamının bir uzantısı olarak anlaşıldığında, sanatın doğanın kendisinden kaynaklanan bir şeyi ifade ettiği sonucuna varmak mantıklıdır. Diğer bir deyişle, yaratıcılar insan olsa da, sanat eserleri doğanın dışavurumları olarak görülebilir çünkü insan, nihayetinde doğadan ayırt edilemez (Schultz, 2014, s. 2).

Özellikle bu etki üzerinden giderek sanatçı, performans sanatı uygulamalarında doğa ve beden bileşeninden faydalanarak sanatsal etkinliğini gerçekleştirmiş. Doğa ve sanat iletişimi içerisinde olan insanın doğa ile ayrılmaz bir bütünlük oluşturduğuna değinmiştir.

İnsanlık, toplumsal yapıların ve ilişkilerin gereklerine uygun olarak doğayı işlemiş, kullanmış ve ulaştığı bilgi birikimi ve teknik ilerlemeye koşut olarak doğaya egemen olmaya çalışmıştır. İnsan ile insanın içinde yaşadığı çevre arasında süregiden ilişkileri çarpık biçimde kavrayarak doğada üstünlük kurmaya yönelen bir arayış yaygınlaşmıştır. Bilimin olanaklarıyla donanan insan, kendini yeterince güçlü gördüğünde doğayı sınırsızca kullanmaya ve sömürmeye başlamış ve uzun süre doğaya verdiği zararlardan habersiz yaşamıştır. 20. Yüzyıl ortalarında; toplumlar, hava, su, toprak kirlenmesiyle başlayıp bitki örtüsünün ve hayvan topluluklarının yok olmasına ve iklim üzerindeki değişikliklere kadar uzanan çevre sorunlarıyla karşılaştıklarında çevreleriyle olan ilişkilerini tekrardan sorgulamaya başlamış ve bu duruma yönelik bir gelecek kaygısı uyanmıştır (Ertuğrul Tomsuk, 2018, s. 2).

Küresel kaygı ve sorun olarak gündeme gelen doğa kavramı etkilerini, Türkiye' de 1980'li yıllardan itibaren çağdaş sanat uygulamaları başlamasına rağmen, 2000'li yıllardan itibaren doruğa ulaşmış. Daha çok toplumun doğayı görmezden gelmesi ama nihayetinde ona dönmesi çabaları Çağdaş Sanat uygulamaları ile ifade edilerek, birçok sanatçının duyarlılığı doğa konusunu işlenir hale getirmiştir.

	International Conference on			
ICRES	**Research in Education and Science**			**istes** Organization
www.icres.net	April 1-4, 2021	Antalya, TURKEY	www.istes.org	

Yeryüzü sanatıyla başlayan ve ekolojik bir bağ ile devam eden sanat çalışmaları, öncelikle doğayla uyumlu çalışmalar olmuştur. Doğada gördüklerini, hissettiklerini sanat yoluyla anlatan sanatçıların amacı, insanın doğayla, ekosistemle bütünleşmesi ve uyum içinde yaşamasıdır (Demirörs, 2019, s. 40).

Bu oluşum içinde eserlerini üreten sanatçılar, içinde bulunduğumuz süreci sanat pratiklerine yansıtırken sadece doğanın somut değerlerine değinmeyerek, düşünsel bir oluşum içine girmişler, çevresel duyarlılığı artırmaya ve farkındalık oluşturmaya yönelik eser pratiklerini sunmuşlardır.

Alper Aydın

1989, Ordu'da doğmuştur. Çağdaş sanat uygulamaları alanında yaptığı çalışmalardan birçok ödül almıştır. Alper Aydın´ın sanat pratiği; İçinde bulunduğu çevrenin fiziki koşulları ve doğanın kendine has akışını araştırarak çalışmalarını araziye müdahale, fotoğraf, heykel, yerleştirme ve doğal malzemelerle yapılmış geçici düzenlemeleri içerir. Araştırmalarında doğa bilimleri, mitoloji, sembolizm, mimari, tasarım ve sanat gibi farklı disiplinlerden yararlanır. Doğada gözlemleme, toplama veya yeni formlar ekleyerek bulunduğu yeri dönüştürme yoluyla geçici izler bırakır. Evrensel formların metaforlarından yararlanarak manzaranın içine sembolik müdahalelerde bulunur. Yeryüzüyle ilgilenmeyi kendi sanat pratiğinin belirleyici ilkesi olarak gören Aydın, yaşadığı bölgeyi merkez alarak yayıldığı araştırma alanlarında hem malzeme hem mekân olarak doğaya odaklanır. Mekâna özgü yaptığı anıtsal formlar doğaya geri donuş arzusu temsilleri olarak okunabilir ve doğaya karşı yabancılaşmış günümüz insanının çevreyi nasıl algıladığına ve deneyimlediğine dikkat çeker.

Resim 1. Alper Aydın 'D8M' Türkiye (15'inci İstanbul Bienali) 2017 (https://www.karar.com/buldozer-kepcesinde-mesaj-var-615329)

Sanatçı İnsanoğlunun var oluş sürecinden itibaren mağara duvarlarına çizilmiş olan resimlerden günümüze dek doğa ve sanat arasındaki güçlü yapıdan faydalanmış, Günümüze kadar gelişen ve dönüşen dinamik yapıya postmodern sanat anlayışı çerçevesinde yaklaşarak, Eser oluşumlarında doğa ve insan ilişkisini merkeze almış, Sanatını doğa eksenli olarak icra etmiştir. Eser üretim pratiği teknik bazlı olamamakla birlikte, Fikirsel süreç hangi tekniği kullanmayı gerektiriyorsa fikirlerini yeryüzü sanatı, Enstalasyon, heykel, fotoğraf, çizim ve performans gibi disiplinlerden yararlanarak anlatmaktadır, Doğanın tahribatı sonucunda İnsan varlığının devamına dair taşıdığı endişenin anlatıldığı yapıtlarında, Yason Burnu'nda kıyıya vuran nesneleri toplayarak,

kapitalist sürecin bir parçası olan doğanın tüketildiğini anlatan çalışmalar gerçekleştirirken kurtardığı nesneler üzerinde bir arkeolog gibi incelemelerde bulunarak doğa' nın sesini dinlemektedir. Doğa üzerine gerçekleştirdiği eser oluşumlarında materyal olarak doğanın gerçek elemanlarından faydalanmaktadır. Buradaki eser oluşumunda kullandığı ağaçları Anadolu yakasındaki dört ayrı bölgeden yakın zamanda meydana gelen doğa olayında zarar gömüş ağaçlardan temin etmiş, Kepçeyi ise bir dozer firmasından kiralayarak meydana getirmiştir. Kurgulamış olduğu eserde müzenin iç mekânı içerisinde iki duvarın kesiştiği noktada, üçgen bir kompozisyon oluşturacak şekilde sergilenmiştir. Çalışmalarında kullandığı doğal doğanın temsili elamanlarının doğa' yı temsil edebilirliğini, Doğanın kendisinden başka bir temsili olmadığını savunmaktadır. 15'inci İstanbul Bienali'ne 'D8M' adlı buldozer kepçesi çalışmasıyla katılan Alper Aydın'ın Enstalasyon Çalışmasının oluşumunda adını Caterpillar' ın Türkiye'deki model isminden alıyor. Türkiye'deki orman arazilerinin yok edilmesinde genellikle D8M modelinin kullanılmasından yola çıkan sanatçı eserine de aynı ismi vererek doğa ve tahribatını hem görsel hem de düşünsel anlamda görünür kılınmıştır. Çalışmada neredeyse her gün, aynı ya da farkı yollarla yeryüzünün birçok yerinde yaşanmakta olan bir durumun sanatsal anlatısı görülmektedir. Bu çalışma daha çok yaşamak için doğa içine inşa edilen yapılarda yaşamakta olan ve bu kapitalist menfaat doğrultusunda doğanın yok oluşuna zemin hazırlayan, doğanın bir parçası olduğunu unutan insana hatırlatma eylemi olarak ifade edilmek istenmiştir. Şehirleşme, Doğa tahribatında insanların ve kapitalist yaklaşımın etkilerine gönderme yapan sanatçı, Doğanın tahribat sürecini gerçek elemanlarını kullanarak tasarlamış, Eserinin müze içerisine taşınmasıyla eserinin fikirsel ve sanatsal oluşumunu gerçekleştirmiştir. Sanatçı bu çalışmasının aslında ironik olduğunu ve bütün sanat eserleri koleksiyonerlerin duvarlarında, galerilerde, müzelerde sonsuza dek sergilenmek üzere üretilmişken bienal bittikten sonra bu çalışmadaki ağaçların doğada çürüyüp yok olacağını, Kepçe' nin ise bir dozerin ucuna takılıp ormanları yok etmeye devam edeceğini söyleyerek aslında farkındalık oluşturmak amacı güderek kurguladığı sanat eserin de kullandığı materyalin sonrasında da doğa kıyımlarına devam etmesine karşılık olarak eleştirel bir yaklaşım sergilediği görülmektedir.

Resim 2. Alper Aydın, Corpus Membratim, Buluntu Ağaç ve Metal Konstrüksiyon (İstanbul Kültür Üniversitesi Sanat Galerisi) 2019 (https://www.unlimitedrag.com/post/yangin-alarmi)

İstanbul Kültür Üniversitesi Sanat Galerisi, *Spiral Dalgakıran* başlıklı sergi' de Ağaç ve metal konstrüksiyondan oluşan, Corpus Membratim başlıklı yerleştirmede sanatçı eser üretimlerinin bir parçasına ilham kaynağı olan Ordu ilinin doğasında barındırdığı ve 2019 yılı baharında seller neticesinde sahile vuran ağaç parçasını mezbahada etlerin asıldığı düzeneğe yerleştirerek sergilemiştir. Ağaç parçasını bir beden formu olarak tasarlayan sanatçı eserin ismini de Latince beden parçası anlamına gelen Corpus Membratim 'dan esinlenerek vermiştir. Küresel ısınmaya vurgu yapan sanatçı ona etki eden çevre politikalarına da göndermede bulunmaktadır. Doğanın ve İnsanın ayrılmaz bir bütünlük oluşturduğuna dikkat çeken sanatçı, Çalışmalarında İnsanın doğa tahribatı ve diğer türlerine uygulamış olduğu şiddeti yansıtmayı amaçlamıştır. Alınıp, satılabilen, Yakılıp yıkılabilen bu ağaç parçası içindeki doğayı çağın küresel yangın alarmına, İnsan türünün ötesine geçen genişletilmiş bir antropolojinin sağladığı evrensel bir kavrayışla tepki verdiği için önemsiyor. Tarih boyunca insan doğanın gücünün farkında olarak ve ondan korkarak doğa ile bir mücadele içinde girmiş ve doğaya hükmetme güdüsü ile doğaya ait olan her şeye meydan okumuştur. Burada asılı bir beden formunda yorumlamış olduğu çalışmada yok olanın sadece doğa değil, Doğanın bir parçası olan ve doğaya muhtaç olan insan bedeninin yok olacağına değinmiştir.

Resim 3. Alper Aydın, Barınak, 20 Mayıs'ta Keyişdere Vadisi 2017

(https://indigodergisi.com/2017/06/cappadox-cagdas-sanat-sergisi/)

Resim 4. Alper Aydın, Barınak, 20 Mayıs'ta Keyişdere Vadisi 2017

Kapadokya'nın coğrafi yapısı, geçmişten günümüze insanların bu coğrafyayı içselleştirerek yaşamaları, etkili olmuştur. Arazi formu ilk bakışta her ne kadar hem jeolojik açıdan hem de arkeolojik açıdan bir dez avantajmış

ICRES

**International Conference on
Research in Education and Science**

www.icres.net   April 1-4, 2021   Antalya, TURKEY   www.istes.org

istes
Organization

gibi algılanmış olsada daha sonra fark edilmiştirki arazi bir saklanma alanı yaratmaktadır, hem kayacın yapısı hem de formu bu anlamda çok tanrılı Roma' lılardan kaçan hıristiyanların saklanması için önemli bir yer olmuştur. Bu coğrafyada insanların 84 hem canlarını hem de mallarını korumak için gerekli olduğunda yeryüzünü terk edip kolay bir şekilde yer altına yerleştikleri arkeologlar tarafından tespit edilmiştir. Yer altında yaratılan yerleşim alanları bulunulan döneme göre hem dinsel hem işlevsel olarak Hristiyanlığın yayılıp gelişmesinde yeni dünyanın kapılarını aralayan ütopik bir merkez olmuştur. İnsanın doğa karşısında doğaya zarar vermeden, yeni bir şey inşa etmeden sadece var olanın içerisini oyarak kendine işlevsel anlamda yeni bir yaşam alanı inşa etmesi Kapadokya'da yaşayanların doğa ile olan diyaloğunun ne kadar güçlü olduğunu göstermektedir. Özellikle her şeyin sahibi olduğu yargısına varan ve doğaya hükmedeceğini düşünüp onu tahribatın zirvesine ulaştıran insanoğlunun yaşadığı zamanda, Kapadokya'daki insanların doğa ile kurmuş olduğu dengeli iletişim burada her şeyin diğer şehirlerdekinden farklı ilerlediğini göstermektedir. Öyle ki burada yaşayan arılar bile yuvalarını volkanik taşlara oymuşlardır. Kapadokya için gerçekleştirilen performans, Kapadokya'da yaşayan insanlar gibi sadece mekânın içerisinde varolan nesnelerle gerçekleştirmenin, üstelik bacaların içerisinde yaşayan insanlar gibi salt bir şekilde, bedeni çalışmanın bir parçası yapmanın doğru olacağı düşünülmüştür. Bu düşünceyi olgunlaştırırken Kapadokya'ya gidip, Kapadokya'nın tarihi, jeolojisi ve yaşamı hakkında ayrıntılı bir araştırma yapılmıştır. Yalnızca performansın yapılacağı alana dair yapılmayan araştırma aynı zamanda mimari ve bedensel mükavemet alanında da yapılmış ve performansı gerçekleştirebilmek için beş ay önceden fitness salonuna gidilmeye başlanmış ve kısa bir sürede beden gücü ile bir yapı inşa etmek için gerekli sportif eğitimler alınıp performansa göre beslenme sağlanmıştır. Bu süreç esnasında anlaşılmıştır ki insanın bedenini geliştirmesi ya da bir duruma göre bedenine form vermeye çalışması sadece bedensel bir süreç değil, ruhsal da bir süreç olmuştur. Çünkü zaman içerisinde büyük bir disiplin ile değişen beden, ruhu da değiştirmekte ve ona, uzak olduğu bedenine karşı yeni bakış açıları yaratmaktadır.

Mimari araştırma olarak ise bir malzemenin içeriden ve dışarıdan hiç bir destek almadan hangi sıklıkla ve nasıl teknik bir yol izleyerek bir kubbe formunda durabileceği araştırılmış ve araştırmalar sonucunda Roma da ikibin yıl önce inşa edilen ve hala ayakta duran Pantheon tapınağının kubbesinin mühendistik olarak nasıl yapıldığı bilgileri alınıp performansta Panthenon'un kubbe inşa formu uygulanmasına karar verilmiştir. Bilgilere göre Pantheon'un kubbesi, zemin duvarlarının üstüne ilk önce kalın ve sert kayalar kullanılarak, kubbe yükseldikçe de duvarın kalınlığı azaltılıp daha hafif kayalar tercih edilerek inşa edilmiş, en son üst noktasında ise çok ince bir duvar ve içerisi hava boşluklarından oluşan volkanik kayalar kullanılarak kubbe tamamlanmıştır. Bu teknik ile inşa edilen yapı ikibin yıldır geçirdiği onlarca doğa olayı 85 ve insani baskıya rağmen sağlam bir şekilde yıkılmadan ayakta durmaktadır. Bu bilgiler ışığında performansta mekânda olan kil ile bedenin etrafında bir yapı inşa edilmeye çalışmıştır, bunun için mekânda insan eli ile en iyi yoğurulacak ve kısa süre içerisinde mukavemeti en güçlü olabilecek toprak Kapadokya 'nın kil madenlerinden araziye getirilmiş ve performansın gerçekleştirileceği alana, dairesel bir ters kubbe formunda oyuk açılarak, bu oyuğun içerisine araziden çıkan diğer toprak ile beraber karıştırılıp, zemine yerleştirilmiştir. Performans gerçekleştirilmeden önce barınak formunun dört kez denemesi gerçekleştirilmiş, dört denemenin ilk üçünde başarısız olunmuş dördüncü denemede ise şeklin büyüklüğü ve duvarın kalınlığının ideal ölçüsü bulunmuştur. Performans esnasında tıpkı Pantheon tapınağının kubbesindeki gibi, başlangıçta zemine kalın ve çok sık bir biçimde kilden duvarlar

yalnızca bedenin kullandığı güç ile yumruklar ve kilin üzerinde zıplamalar yöntemi ile örülmüş, duvar yükseldikçe yumrukların gücü azaltılıp duvar da inceltilmeye çalışılmıştır. En son tepe noktasında ise aralarında hava boşlukları kalacak şekilde çok ince bir kil tabakasını performansı gerçekleştiren beden içeriden ufak darbelerle yerine yerleştirmiş ve bir müddet, karanlıkta, bir insanın hareket edebileceği boyuttaki mekânda kendisi ile baş başa vakit geçirmiştir. Performans gerçekleştirilirken sadece kili şekillendirmek ve sıkıştırmakta beden kullanıldığı için kilin içindeki küçük taş parti külleri, elde ve ayaklarda yaralar oluşturmuştur; yaraların verdiği sızı performans bitirildikten sonra bir acı olarak fark edilmiştir. Bu nokta da kilden barınağın içinde karanlıkta geçirilen zamanda acı ve yorgunluk duygusu büyük bir oranda bedene ağır bir duygu yaşatmış ve beden zaten üzerinde bir şey olmadığı için soğuk toprağa kendini bırakmıştır, o andan itibaren 20 dakikalık bir süreç kımıldamadan bedenin hissettiği duyguları duyumsayarak geçmiştir. Barınaktan çıkma aşamasında ise yapının bir köşesinden küçük bir delik açılmış ve oradan tekrar yeryüzüne çıkılmış ve performans sonlandırılmıştır. Çok güçlü ama kontrollü bir biçimde gerçekleşen yapı inşası sırasında hem yeryüzünün üstüne doğru yükselinirken aynı zamanda yeryüzünün altına doğru derinleşen bir yapı çıkmıştır ortaya, bu anlamda dünyadan çıkış için ayaklarımız altındaki yeryüzünün üzerine çıkmaya çalışırken ayrıca yeryüzünün katmanları altına inmek de deneyimlenmiştir. Dünyada yer açma ve inşa etme eylemine atıfta bulunan yaşamsal bir jestle, çalışmada insanın yerle/coğrafyayla olan temel ilişkisine işaret edilmektedir. Performans 3 ayrı kamera ile izleyicilerin şahitliğinde kapadokya coğrafyası fonda olacak biçimde kayıt altına alınarak hem fotoğraf hem video olarak belgelenmiştir. Performansların niyeti bedeni doğanın içerisinde yok etmek değil doğanın buna sahip olmasına izin vermektir. Performansın süreç kısmı genel olarak 86 hem sanatçıların sunumlarında hem de izleyicilerde atlanmaktadır ve sadece performansın gerçekleştirildiği zaman dilimi görülmektedir ama performansa hazırlanmak teknik ve ruhsal anlamda performansı gerçekleştirmek başlı başına büyük ve önemli bir olgudur. Çalışmalar doğal dünyaya olan etkilerimiz ve ilişkilerimiz konusundaki düşüncelerimizi genişletmeyi ve doğanın saflığına dair algılarımızı tartışmayı hedeflemektedir. Bu anlamda Barınak performansı bir performansın sunumuna dair temel koşulları göstermesi ve anlatması bakımından önemlidir (Aydın, 2019, s. 85).

Sanatçı, Kapadokya'nın jeolojik dokusunun mümkün kıldığı, kayaların oyulmasıyla ortaya çıkan mimariden ve topografyayı takip eden yerleşim formlarından esinlenerek "Barınak" başlıklı bir performans hazırladı. Bu performansta sanatçı, yaşamsal bir jestle, insanın yerle / coğrafyayla olan en temel ilişkisine işaret etti. Kapadokya'daki yaşam ve yerleşme formlarından ilham alarak üretmiş olduğu çalışma sanatçının doğa ve beden, sanat ve doğa bileşkesinden oluşmaktadır. İçinde bulunduğumuz çevrenin coğrafi koşullar sonucunda oluşan yapıların ve kültürel inşa anlayışının dışa vurumu olarak aktarılan çalışma ilksel olanı bugünün bağlamında tekrar düşünüyor, bu coğrafyadaki yerleşme biçimlerine gönderme yaparak, insanın inşa etme, yaşam kurma jestini de tekrarlar, toprakla kendi bedeni etrafına bir koza ördüğü uygulamada coğrafyaya dışarıdan bir şey getirmedi. Sadece orada var olan malzeme ve öğelerle bir mekân inşa etti ve bedenini bu mekânın bir parçası yapmayı" hedefledi. Kapadokya'nın jeolojik dokusunun mümkün kıldığı, kayaların oyulmasıyla ortaya çıkan mimariden ve topografyayı takip eden yerleşim formlarından esinlenen sanatçı, insan eli ile inşa edilen barınakların jeolojik dokunun etkisi sonucunda oyulan kayaları sanat ve beden çerçevesinde birleştirerek doğanın doğal dokularından faydalanmıştır.

Hem arazi sanatı hem de bir performans niteliği taşıyan "Barınak", 20 Mayıs'ta Keyişdere Vadisi'nde gerçekleştirilmiştir.

Resim 5. Alper Aydın Taş Kütüphanesi, 2016 İstanbul Modern Sanat Müzesi Koleksiyonu, Sanatçı bağışı

Buluntu taşlar ve ahşap, 208 x 300 x 36 cm

(https://www.istanbulmodern.org/tr/koleksiyon/koleksiyon/5?t=3&id=2481)

"Taş Kütüphanesi' nde sanatçı, yeryüzündeki doğal formların arşivini sunar. Bu toplama, biriktirme ve belgeleme eylemleri her an yok olma ihtimali olan alanları koruma altına alma güdüsünden gelir. Sanatçının, memleketi Karadeniz kıyı kenti Ordu'daki bir mağaradan, sahil şeridinden ve geçmiş dönemde Rumlara ait eski harabelerden, çalıştığı Ankara'da taşlaşmış ağaç fosillerinin olduğu bir ormandan, Konya'daki dini yapılardan ve hatta İstanbul'daki tarihi surlardan topladığı taşlar; içinde bulunduğumuz coğrafyadaki farklı toplulukların ortak belleğinin temsilleri gibidir. Çoğunluğu amorf ve bir kısmı ise kullanım müdahaleleri görmüş taşlardan oluşan kütüphanesinde Aydın, taşın kendi jeolojik belleğinden toplumsal bir bellek yaratılabilir mi sorusunun cevabını araştırır. İlkel avlanma metotlarından barınaklara, askeri, tinsel yapıların ham maddesi olan taşla, medeniyetin tarihsel belleği arasındaki ilişkiyi hatırlatır. Kütüphaneye sistematik bir biçimde istiflediği bu taşlar, sanatçıya göre salt bilginin kaynağı olan doğaya işaret ederken, kentlerin kentleşme sureci öncesindeki haline dair de canlı bir görüntü de sunar.

Aydın, taşları çalışmanın öznesi haline getirerek, doğadaki oluşum süreçlerinin biçimsel yansımalarını, taşın jeolojik bilgisini kullanarak araştırır. Taş kütüphanenin çıkış noktası olarak sosyolojik yapının etkileri görülür, Çalışmada sadece doğadaki taşların o salt jeolojik yapısıyla ele almanın dışında, Jeolojik yapının İnsan hayatına dokunan, sosyal çevreye şahitlik eden kısımları ile bütünlük kazandırılarak yansıtılmak amaçlanmıştır. Eser oluşumunda Bir zamanlar kilise olarak kullanılan ama şu anda harabe durumda olan, insanların soğuk hava deposu olarak kullandığı bir mağara, dini yapılar gibi yerlerden topladığı ve ayrıca eski zamanlarda insanların bir takım ok ve mızrak ucu yapmak amacıyla kullandıkları taşları kullanarak bir kütüphane oluşturmuştur. O nedenle sosyolojik kısmı çok daha ağır basıyor çünkü Taş Kütüphanesi'ni oluşturan ana etmen de taşların hikâyesi bir hikâye olarak tasvir edilmiş ve Kütüphane algısı oluşturularak esere yansıtılmış, İnsanların belleklerinde taşlardan oluşan bir kütüphane meydana getirmek istenmiştir.

Resim 6. Alper Aydın, Organic Faults, İntervention with Rulers to the Rocks, Yason Cape, Ordu Turkey, 2017. (Diasec Print, 80×120 & 60×180 cm) (https://www.artfulliving.com.tr/sanat/yeryuzunun-katmanlari-arasinda-yolculuk-i-11745)

Doğanın içsel düzenine ait bir tür hafızayı taşıyan volkanik taşlara, insani düzene dair bilgiyi taşıyan gönyelerle müdahalede bulunarak, doğayı gözlemleme ve yerinde (geçici) müdahaleyi fotoğraf aracılığı ile sergi mekânına taşıyan Sanatçı "Organik Hatalar", doğa algısı ve deneyimini görsel karşıtlıklar üzerinden yorumluyor. Sanatçının doğup büyüdüğü kentte, Ordu'nun Yason Burnu'nda gerçekleştirilen bu eylem, organik-inorganik, kaos - düzen, yabanıl - evcil, nesne - özne ilişkisinde gerilimli olarak görülen alanların sınırlarını araştırıyor, bir bakıma bu sınırların geçişliliğine işaret ediyor. Bu anıtsal formlar, jeolojik bilginin katmanları arasında, mimari ve tasarımın düzenleyici dili aracılığıyla insanın doğaya dönme, ona bulaşma arzusunun temsilleri olarak yükseliyor.

Resim 7. Alper Aydın, Barınak, 20 Mayıs'ta Keyişdere Vadisi 2017 (https://arzukilic.wordpress.com/2014/01/02/arazi-sanati/ resim yeni)

Sanatçı çalışmasında Ankara Nallıhan'da kan davası yüzünden terk edilmiş bir çiftlik üzerinden güncel sanat çalışmasını gerçekleştirerek Doğa ve insan kavramına değinmiştir. Durumun bir yansıtıcısı olarak çiftliğin yolunu tamamen kırmızıya boyamış ve sadece yıkanarak geçecek olan bir boyayla insanların bu kötü olaya şahit etmesini istemiş, hikâyesi olan mekâna sanatsal müdahalede bulunarak, insanların zihinlerinde hayatları boyunca unutamayacakları bir imaj yaratmayı, farkındalık oluşturmayı amaçlamıştır. Sanatçıya çalışmalarında doğa ve insan, doğa ve toplum kavramı gibi gerçekte yaşanmış ve var olan gerçekler bütünü ilham kaynağı olmuştur.

Resim 8-9. Alper Aydın "Çağdaş Sanat Açıkhavada" İstanbul 2016

(https://www.artnivo.com/cagdassanatacikhavada)

Eser Ordu'da, arazide çim üzerine branda ve halı ile müdahalesi uygulanarak üretilmiştir. Bir Türk halısı çimlerin üzerinde uzun süre bırakılarak oluşturulan bu Enstalasyonda çimler halı tarafında ışıksız bırakılmış, çimlerin rengi solmuş ve halının devamı niteliğinde basit bir hareketle algı yanılsaması yaratılarak Enstalasyon oluşturulmuştur. Burada salt bir görüntüden ziyade yıllar içerisinde değişim gösteren kültürel öğelerin, zamana ve mekâna yayılarak nasıl bir etkisinin olacağına dair referans vermektedir. Tarihi dokuların doğa ile bir bütünlük kazandığı görülür. İnsan ürünü nesnelerin doğa ile ilişkisi ve birbirlerine etkisini, kavramsal pratikler uygulanmıştır. Eserler İstanbul'da kent bilboardlarına taşınarak, yeni bir yorum daha kazanmıştır. Yeşil çim bir arazinin ortasına kare formunda bir branda bir hafta süreyle altındaki çimler güneş ışığından maruz bırakılarak yapılmış olan bu müdahalede, araziye dışarıdan hiçbir malzeme koymadan ve araziden hiç bir şey almadan bir müdahalede bulunabilir mi bu deneyimlenmeye çalışılmıştır. Ve yine buradaki amaç İnsanoğlu tarafından oluşturulan geometrik bir formla araziye dikkat çekmek olmuştur. Buradaki en güzel nokta ise branda çimlerin üzerinden kaldırıldıktan bir kaç gün sonra çimler eski haline dönerek geometrik form tamamen yok olmuştur, bu da insanın yaşamıyla do sanatı arasındaki paralelliği göstermektedir.

Doğanın içinde var olan her türlü doğal materyal ve çevre ilişkileri sanatının nesnesi halini alarak kavramsal çerçeve içinde ele alınmaktadır. Sanatçının öncelikli amacı Doğa ve İnsan bedeni arasındaki güçlü ilişkiyi yansıtmak olup doğa ve çevre faktörlerin sanata etkilerini ortaya çıkarmaktır.

Elmas Deniz

1981, İzmir' (Bergama) da doğmuştur. Kavramsal odaklı çalışan bir sanatçıdır. Çalışmaları ekonomi ve doğa arasındaki kesişimleri ve bu ikisinin iç içe geçtiği noktaları araştırır. Doğanın kapitalizm eliyle uğradığı tahribat, bunu algılayış biçimlerimiz ve bu konulardan hiç de uzak olmayan tüketim kültürü, sanatsal pratiğinde yer alan başlıca kavramlardır. Ekonomik sistemin algımızı belli belirsiz bir manipülasyon üzerinden nasıl sürekli olarak yeniden şekillendirdiğini sorgular, değerin dağılımındaki yanıltıcılığa ışık tutar. İnsan-doğa ilişkisine, tarih boyunca doğa fikrine ve Ekolojik kaygılara da odaklanır. Çalışmalarında sistemdeki hataları eleştirel bir şekilde görünür kılar ve hatta bazen olası seçenekler önerir. Form ve içerik arasındaki oyun, formu işlediği kavrama uyarlama girişimi, sanatçının seçimlerinde belirleyici olur; böylelikle sanatçı Enstalasyon, heykel, video, desen ve yazı gibi farklı mecralara başvurur. Eserlerinde tekrar eden konular doğa, küreselleşme, şehircilik ve

ekonomidir. Sanatçıya göre yeni sosyal ve doğal dünyadaki vektörler bu tarafa doğru yüzünü çevirmiştir. Malzemeleri de atıklar, çöpler, buluntu nesneler olabiliyor. Sanatçı, "Malzemenin dönüşememe ihtimali var" dese de, malzemeyi dönüştürmeyi, *Arte Povera*' dan miras aldığı simyacılık yönüyle her seferinde başarıyor. *Arte Povera* sanatçılarının eğilimleri farklılık gösterse de, buluştukları ortak nokta tuvali, yani resmi reddetmeleriydi. Resmin reddedilmesi, resim geleneğinin çok güçlü olduğu İtalya'da bu geleneğe bir tepki olarak görülebilir; resim eğitiminden gelmesine rağmen resim yapmıyor oluşunun da, aynı tepkinin nüvelerini bünyesinde barındırdığı söylenebilir.

Eserlerinde insan- doğa ilişkisine, tarih boyunca doğa fikrine ve ekolojik kaygılara odaklanır. Sistemdeki hataları ve çevreye dair problemleri eleştirel bir şekilde görünür kılmanın yanında, yeni ürettiği işlerinde doğa ile insan arasındaki ilişkilerin biçimlerine dikkat çeker. İnsanın kötülüğü, insan eliyle verilen zararları adeta felsefi bir şekilde araştırarak, aslında değerler sistemine ait farklı olasılıklara değinir. İnsanın ilgisinin dışladığı her şeye dikkatimizin geri dönmesi gerektiğini düşünerek bir çare bulma arayışına girerek eserlerini üretir.

Resim 10. Elmas Deniz Kayıp sular/ İsimsiz bir derenin tarihi 16. İstanbul Bienali 2019
(https://bantmag.com/bienal-roportajlari-elmas-deniz/ resim)

Sanatçı, Ekonomi ile doğa arasındaki kesişim alanlarını ve bağlantı noktalarını inceleyerek konseptler üzerine inşa ettiği işler üretiyor. Kapitalist sistemin ve tüketim kültürünün yol açtığı ekolojik çöküntü ve bu çürümeye yönelik algımızı odağına alarak Enstalasyondan, heykele, çizimden yazıya geniş bir yelpazeye yayılan üretim pratiklerine sahip. İstanbul'u topolojik ve coğrafi tarihî bir alan olarak ele alıyor.

Bu yapıtında da İstanbul'un eski akarsu kollarının, akış, geçim ve hareket rotalarının bir psikocoğrafyasını çıkartıyor ve doğanın belirsiz geleceğine dikkat çekiyor. Osmanlı döneminde, Taksim Meydanı'ndan civar semtlere su dağıtımı yapıldığını, Bu amaç doğrultusunda bölgeye yapılan Taksim Maksemi adlı su deposu, meydana adını veriyor. Suların taksim edilmesinden dolayı bu ismi alan maksem ve dolayısıyla meydan, dönemin İstanbullularının su sorununu zamanında büyük ölçüde çözüme kavuşturmuştur. Suyun tarihi ve geleceği üzerine yoğunlaştığı çalışmada İstanbul'un Şişli'den Taksim Meydanı'na kadar olan bölgesini kapsayan, üç boyutlu topografik bir rölyef yaratarak günümüzde kurumuş olan ve maalesef ki üzerinden yolların geçtiği nehir ve dere yataklarını işaretliyor.

ICRES

**International Conference on
Research in Education and Science**

www.icres.net　　　April 1-4, 2021　　　Antalya, TURKEY　　　www.istes.org

istes
Organization

Resim 11. Elmas Deniz, Kayıp sular/ İsimsiz bir derenin tarihi 16. İstanbul Bienali 2019

(https://bantmag.com/bienal-roportajlari-elmas-deniz/ resim)

Sanatçı, Bergama yakınlarında, Gryneion adındaki antik kentte bulunan bir derenin kurumasından yola çıkmış ve artık orada var olmayan canlı türlerini resmetmeye karar vermiştir. Çalışmasını Pinna Nobilis adlı kuş türünün kabukları ve incileri, dere civarından çıkan sikkeler ve hayvan portreleri ile tamamlayan Deniz, böylece insan eliyle değişen günümüz coğrafyasını ve doğanın uğradığı tahribatı gözler önüne sermeyi hedefleyerek, insan kaynaklı çevresel dönüşüm ve tüketnişlerin altını çiziyor. Çalışma, Pinna Nobilis kabukları ve incilerinden, hayvan portrelerinden, dere civarından çıkan sikkeler gibi arkeolojik buluntuların çizimlerinden ve bu sit alanıyla ilgili botanik desenlerinden oluşan çok parçalı bir duvar yerleştirmesinden oluşuyor.

Resim 12. Elmas Deniz, Kayıp sular *"İsimsiz Bir Derenin Tarihi"* 16. İstanbul Bienali 2019

(https://www.kolekta.com.tr/eser/isimsiz-bir-derenin-tarihi-pinna-nobilis/)

Sergide Ege Denizi'nde küresel ısınma dolayısıyla bir parazitin toplu halde yok ettiği Pina Nobilis adlı deniz kabuğunu çıkarttırarak kabukları sergileniştir. Kabuklar yüzeyinde oluşmuş desenleri, renkleri ve dokusu ile ilk bakışta seramiği andıran Kırık Pina kabuğu, doğayla sanat arasındaki bu tür görsel benzeşmelerle ve doğadaki ağaçların, bitkilerin, yani organik varlıkların kendi kendine ve zaman içinde oluşturduğu estetik sanatçının ilgi odağı olmuştur. İnsanların küçük şeyleri görmezden geldiğine ama onların doğa için büyük unsurlar teşkil ettiğine ve bu yok oluşun sadece doğa için değil, insanlar içinde kaçınılmaz bir sonu getirdiğine değiniyor. Elmas Deniz Kayıp sular/ İsimsiz bir derenin tarihi isimli eserleri 16. İstanbul Bienalinde sergilenmiştir.

Resim 13. Elmas Deniz, *"Yazsız Yıl"* İstanbul 2018 / Resim 14 *"Yazsız Yıl"* Satılmaz Eser, 2018
(https://t24.com.tr/haber/istanbul-bienali-nden-elmas-deniz-ve-kesifleri-devam-ettirmek,847192)

Sergi ismini tarihsel bir doğa olayından alıyor. 17 Nisan 1815'te Endonezya'da gerçekleşen yanardağ patlamasının etkileri dünyanın büyük kısmında hissediliyor ve mevsimleri etkileyecek bir boyuta ulaşıyor. Ekinlerin yetişmediği, yokluğun baş gösterdiği 1816, sonrasında "yazsız yıl" ismiyle anılıyor. İnsan-merkezli, doğa-merkezli veya pragmatik yaklaşımların ötesinde, sergide yer alan işlerin her biri, insanın doğa ile kurduğu ilişkiyi çeşitli düzlemlerde ele alıyor. Reklamların hayatımızdaki yerini, bitkilerin taşınma kurallarına değinmiştir. Hayvanlardan yararlanmayı, insanın olmayan yerlerde olmayan bir şeyleri var etme çabasını vurgulamak istemiş, bitkileri dünyanın her yerine taşımayı, yerli tohumları satamamayı, demirden ve camdan bir serayı, insanmış gibi düşünülmüş karga portrelerini, bilim insanlarının sözlerinden hayvanları öğrenmeyi, ekonomi odaklı düşünen insanın kendi doğasını bir türlü kavrayamayışını içeriyorlar. Haberlerde anlatılan doğa, reklamlardaki doğa, tarihsel doğa, içinde yaşadığımız doğa, kurallar koyduğumuz, sahip olmak istediğimiz veya muhtaç olduğumuz, bizim yüzümüzden bizimle birlikte mahvolan, sürekli şiddetli bir ekonomik sarmaldaki doğa serginin temel konusunu oluşturuyor.

Sergideki "Satılmaz Eser" (2018) isimli yapıtında sanatçı, yerel pazardan aldığı tohumları bir kutu içinde sergilerken, bu tohumların yerel halk tarafından satılmasının büyük şirketlerce engellenmesine eleştiri getiriyor (Pişkiner, 2019, s. 96).

Sonuç

İnsanlık tarihinin ilk oluşumundan, günümüze kadar insanların müdahalesi, ekolojik ve teknolojik faktörler neticesinde değişime uğrayan doğa kavramının, toplumun içinde bulunduğu sosyokültürel yapı ve olaylar ile etkileşim içinde olduğu, Bu etkileşimin doğa sanat ilişkisine etki ederek sanatsal pratiklere yansımaları görülmüştür. Değişen doğa, değişen sanat anlayışında beraberinde getirmiş, 1960' lardan itibaren Küresel bir problem halini alan doğa kavramı için sanatçılar, problem çözme ve çözüm üretme çabası içine girerek sanatsal pratiklerini yansıtmıştır. Sanatın galeriler dışında uygulaması mekân olarak doğaya yönelimleri tetiklemekte, duyarlı sanatçılar tarafından doğa sanat ilişkisi çağdaş sanat uygulamaları ile ele alınmaktadır. Günümüz sanat anlayışını yansıtan Alper Aydın ve Elmas Deniz' in çağdaş sanat eserlerinin doğa ve sanat ilişkisi içinde olduğu, İncelenen eserlerinin içerik bakımından doğadaki ve çevredeki faktörleri içinde barındırdığı, Doğanın sanatsal yansımalarına etki ettiği tespit edilmiştir. Sanatçılar doğa ve sanatın bileşkesinden faydalanarak oluşturdukları

eserlerini doğa üzerinde ya da sergi mekânları içinde izleyicilere sunarak doğanın gerçekleri ile yüz yüze getirmekte ve konunun ciddiyetine sanatsal bir anlatım ile dikkat çekmektir.

Günümüz sanat anlayışını yansıtan Alper Aydın ve Elmas Deniz, küresel ve yerel çevre sorunlarını doğa sanat ekseninde farklı bakış açıları ile sanatsal platforma taşıyarak toplum bilinci oluşturma ve farkındalık oluşturma gayretindedir.

Kaynakça

Aydın, A. (2019). *Performans Olarak Beden Ve Doğa Diyaloğu*. Sanatta Yeterlilik Tezi. Hacettepe Üniversitesi.

Bingöl, m. P., Çevik, N., & Şenkal, A. D. (2020). *Çağdaş Sanatta Doğanın Manipüle Edilmesi Üzerine Sanatçı Söylemleri*. *Fine Arts, 53*(9), 158.

Demirörs, A. S. (2019). Doğa Ve EkolojiK Sanatin Bütünleşik İlişkisi. *Yüksek Lisans Tezi*.

Ertuğrul Tomsuk, E. (2018). *Sanatta doğayla işbirliği eylemleri bağlamında doğa sanatı.* Sanatta Yeterlilik Tezi. Hacettepe Üniversitesi.

Genç, M. (2013). *Doğa, Sanat Ve Biyomimetik Bilim*. Sanatta Yeterlilik Tezi. Hacettepe Üniversitesi.

Pişkiner, G. (2019). 1990'lardan Günümüze Türkiye Sanatında Doğaya Yaklaşımlar. *Aγaη*, *8*(5), 55.

Saygi, S. (2016). Çağdaş Sanatta Doğa Algısı Ve Ekolojik Farkındalık. *Sanat-Tasarım Dergisi, 7,* 21–26. Https://Doi.Org/10.17490/Sanat.Xxx

Schultz, L. C. (2014). *Creative Climate: East-West Perspectives On Art, Nature, And The Expressive Body*. Dissertation. University of Oregon

Şentürk, V. L. (2012). Analitik Resim Çözümlemeleri. *Ayrıntı Yayınları*, *53*(9), 17. https://Doi.Org/10.1088/1751-8113/44/8/085201

Web Adresleri

https://www.artnivo.com/alper-aydin

https://www.artnivo.com/c/alper-aydin-ile-roportaj-3557

https://www.karar.com/buldozer-kepcesinde-mesaj-var-615329

https://www.unlimitedrag.com/post/yangin-alarmi

https://indigodergisi.com/2017/06/cappadox-cagdas-sanat-sergisi/

https://www.artfulliving.com.tr/sanat/bir-kacistan-ziyade-yeniden-kurgulama-dunyadan-cikis-yollari-i-11974

https://www.milliyet.com.tr/kultur-sanat/galeri/dunyadan-cikis-yollari-2464248/1

https://www.istanbulmodern.org/tr/koleksiyon/koleksiyon/5?t=3&id=2481 5.resim

https://www.artfulliving.com.tr/sanat/yeryuzunun-katmanlari-arasinda-yolculuk-i-11745

https://www.google.com/amp/m.gazetevatan.com/amp/banu-carmikli-909770-yazar-yazisi-dogayi-seven-iki-sanatci/

http://14b.iksv.org/works.asp?id=65

https://arzukilic.wordpress.com/2014/01/02/arazi-sanati/ resim yeni

https://www.zilbermangallery.com/elmas-deniz-a418-tr.htm

https://www.artnivo.com/cagdassanatacikhavada# resim

https://bienal.iksv.org/tr/sanatcilar/elmas-deniz

http://www.saha.org.tr/projeler/proje/elmas-deniz

https://bantmag.com/bienal-roportajlari-elmas-deniz/

http://www.pilotgaleri.com/exhibitions/detail/91

https://acikradyo.com.tr/su-hakki/para-yoksa-su-yok-tuketime-indirgenmis-insan-doga-iliskisi

https://www.bmw.com.tr/tr/topics/fascination-bmw/bmw-joy-blog/yedinci-kitaya-sanatsal-bir-bakis.html
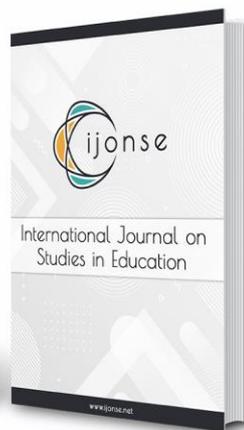
https://www.unlimitedrag.com/post/arte-povera-ruhuyla-gunceli-uretmek

https://bantmag.com/bienal-roportajlari-elmas-deniz/

https://yesilgazete.org/elmas-deniz-sanatin-da-bir-agac-gibi-korunmaya-ihtiyaci-var/

https://tiyatrolar.com.tr/sergi/suyun-uc-rengi

https://www.timeout.com/istanbul/tr/sanat/suyun-uec-rengi

https://t24.com.tr/haber/istanbul-bienali-nden-elmas-deniz-ve-kesifleri-devam-ettirmek,847192

https://www.zilbermangallery.com/elmas-deniz-a418-tr.htm

INTERNATIONAL CONFERENCE ON RESEARCH IN EDUCATION AND SCIENCE

APRIL 1-4, 2021 ANTALYA/TURKEY

istesoffice   istesoffice   istesoffice

www.icres.net