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## Analysing the Effects of Assessment and Evaluation Applications and Exam Formats in Distance Education

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### ABSTRACT

This study examines the online assessment-evaluation activities in distance education processes. The effects of different online exam application styles considering the online assessment-evaluation in distance education processes, including all programs of a higher education institution, were documented. The population for online assessment-evaluation activities, exam types, and student achievement scores comprised 3830 courses by 805 academics over the Uşak University learning management system and 29511 students. The data were analysed with descriptive statistics and t-tests for comparisons. It was found that academics preferred multiple-choice exam formats more than online assignments or classical (written) ones. Moreover, students' success scores in multiple-choice exams were significantly higher than exams including open-ended questions. It was also found that average exam success was higher when the questions were presented as separate but as a group. The findings were discussed and reported with a literature review.

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Keywords:

Online exam, exam formats, e-assessment, e-exam, online assessment.

### 1. Introduction

It can be argued that distance education applications, starting from the 1800s, reached the most widespread implementation with the pandemic in the 2020s. Institutions from pre-school to higher education have switched from formal to distance education, and distance alternatives have replaced classroom learning activities. In March 2020, a decision was taken to transition to distance education in all higher education institutions in Turkey as teaching activities were conducted through communication and educational technologies. Distance education in higher education institutions resorted to both online and offline assessment-evaluation applications in this process.

Assessment is a process of observation and examination through which quality is intended to be tested and marked with numbers or symbols (Turgut, 1987). Assessment quantifies the attributes of an event or objects to be compared with others (Pedhazur & Schmelkin, 1991). It is also the process of assigning a value to an observed event and quantifying that by specific rules (Büyüköztürk, 2018). Besides, it is also tried to be determined how much/how efficient one has a particular trait. Therefore, assessment can also be defined as a descriptive process (Kargın, 1989; Linn & Gronlund, 1995).

It can be conducted in three ways as direct, indirect, or constructs, depending on the application method and the nature of the characteristic aimed to be assessed. In a direct measurement, the feature to be assessed is examined through other instruments of the same type. For example, measuring a stick with a meter is a direct measurement. However, indirect assessment examines an aspect of measure by observing another

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feature. For example, IQ Test is an indirect measurement to assess the level of intelligence. A construct assessment is a derived examination if the aspect to be measured is obtained by blending the results of two or more measurements. For instance, the speed of an object is obtained by dividing the distance travelled per unit time (Karagöz & Bardakçı, 2020).

On the other hand, evaluation is a process that makes inferences by interpreting the assessments' data (Tekin, 1996). A decision is made by comparing the assessment results by a criterion in the evaluation. (Turgut, 1987). Evaluation is a broader concept that includes the assessment. This concept comprises assessment results, criteria, and decision components (Bahar, Nartgün, Durmuş, & Bıçak, 2012). Although there are different assessment type classifications within the education system (Baran, 2020), there are three commonly approved approaches (Eviren, 2017). These are the diagnostic assessment, formative assessment, and summative assessment (Torrance & Pryor, 1998). A diagnostic assessment aims to examine an individual's profile of their strengths and weaknesses (Delandshere, 1990), and defines an individual's current situation before starting a program. Moreover, formative assessment is made during the learning process and aims to improve learning by focusing on details (Huhta, 2008), and it determines the learning difficulties and deficiencies of individuals in the learning process. Summative assessment, on the other hand, is conducted at the end of the learning process, including both previous and post-process learning (Yaşar, 1998).

Assessment and evaluation reveal whether the learning objectives set out earlier have been achieved as it is essentially a data collection process (Turgut & Baykul, 2015). The entire process of data collection on whether student learning was achieved, and the transition of this data to the student as feedback, realising the necessary cognitive, affective, and psychomotor behaviour changes in the student are addressed by the measurement and evaluation discipline. With specific standards, assessment-evaluation methods determine and evaluate whether targeted skills, attitudes and behaviours are achieved during the learning process (Özalkan, 2021).

Result-oriented assessment and evaluation mechanisms are not used to improve students' learning but rather to determine what level of learning is achieved. Midterm, finals and make-up exams in higher education institutions are parts of this evaluation process. Formative (process-oriented) assessment and evaluation assume a more diagnostic role than the result-oriented approach. It is essential to monitor student learning and provide continuous feedback, especially in lectures where the information is cumulative, and previous learning is fundamental to the subsequent. The feedback will be beneficial for the teaching and learning process, and thus, the mastery learning model requirements will be met at the end of a term. The quizzes, forum discussions, and activities implemented with Web 2.0-based tools in the process can be counted among these types of assessment activities.

### **1.1. Assessment and Evaluation in Distance Education**

Objective and/or subjective evaluation methods can be utilised in distance education. The achievement and multiple-choice tests can be used in objective evaluation, while tools such as projects, online discussions, and portfolios can be used in distance education for subjective evaluation (Simonson, Smaldino, Albright, & Zvacek, 2012). The distance education field also improves with technological advances, especially in assessment and evaluation approaches (Baran, 2020). The assessment-evaluation in distance education has become even more vital with the urgent transition to distance education. This evaluation process also plays a vital role in revealing the functionality of the distance education system and shaping the future of individuals (Özalkan, 2021; Sari, 2020).

A sustainable assessment and evaluation approach should be adopted in distance education (Ann & Christie, 2002). Turkey's most commonly used measurement tools are multiple-choice tests, true-false tests, matching tests, short and long-answer open-ended written exams, oral examinations and homework (Çakan, 2011). Moreover, several different question types are multi multiple-choice (with multiple correct answers), matching, selecting missing words, filling in the blanks, random short-answer matching, dragging and dropping on the picture, cloze test, and the calculated multiple choice. In addition, online puzzles can be used as an alternative assessment tool (Genç & Aydemir, 2015).

A multiple-choice question is defined as a question type in which the student is asked to select the correct answer from the choices listed (Güler, 2017). Tests with multiple-choice questions have advantageous features such as covering a wide cognitive area with the number of questions, responding to cases with a high number of students, objectivity in the evaluation process, and high reliability (Martiarini, 2017). The multiple-choice tests can be applied synchronously or asynchronously through online technologies in distance education. However, the true-false questions are similar to the multiple-choice, but in which the number of options, there are only two options such as true/yes or false/no (Parker et al., 2012). This type of question, also known as a closed-ended question type, has the advantage that the evaluation process can be performed in shorter times (Dossetto, 2021).

On the other hand, open-ended questions are subjective questions in which students can express their views on a broader perspective and generate original answers (Ar, 2019). It can be a one-word short answer or a long answer. It also has some disadvantages compared to closed-ended questions with specific options are presented to students. Collection and analysis of responses take time, may require extensive coding for in-depth analysis, and data may be incomplete (Reja, Manfreda, Hlebec, & Vehovar, 2003; Neuert, Meitinger, Behr, & Schonlau, 2021). Exams with open-ended questions are called classical exams.

Assessment applications with different question types can be performed through the assessment-evaluation modules within the learning management systems. These exams can include only one type of question, or different questions can be combined (e.g., multiple-choice + open-ended). Exams that contain such different types of questions are named mixed exams. Besides the multiple-choice exam applications, assessment-evaluation activities can be conducted in classical, mixed, and assignment formats.

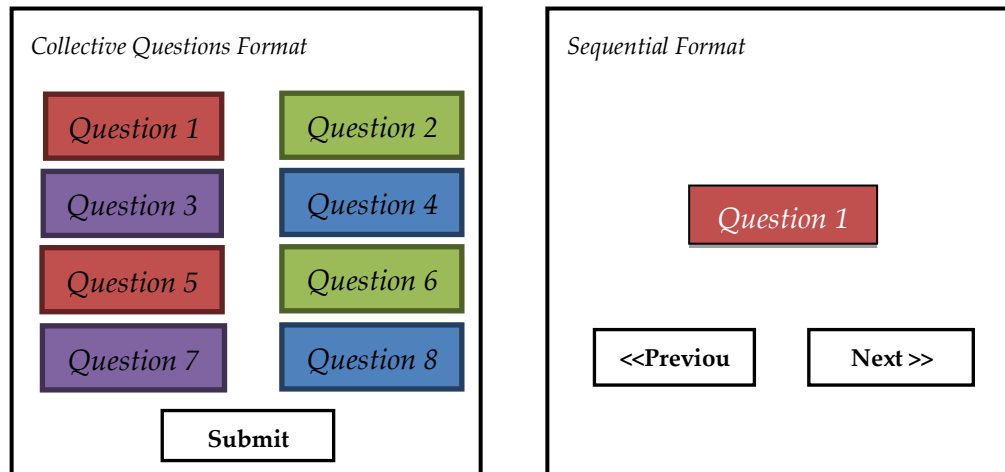
Homework is written, or oral schoolwork usually carried out in a non-classroom environment. Various homework sub-types can be applied in or outside the classroom, such as complementary, preparatory, constructive, and creative (Güneş, 2014). Homework can be helpful in student evaluation activities in distance education. Students can be given homework through web-based modules in learning management systems with a set deadline. When the deadline comes, the assignments are collected as different types of tasks or file(s). According to the homework content, these file types can be text files such as pdf, word (.doc) documents, and an image, picture, design, or program files. Students can upload files up to the file limit (or size) defined by the instructor for the homework.

Baran (2020) examined higher education institutions' assessment and evaluation activities for open or distance education. It was found that the majority of universities prefer objective evaluation methods. Kuikkaa, Kitola, & Laakso (2014) and Shraim (2019) revealed that multiple-choice questions were preferred more in online exams, followed by fill-in-the-blank and matching type questions, respectively, in their study with teachers in Finland. Students' perceptions about online assessment-evaluation activities applied in higher education were analysed in this study. Online exam applications were examined in pedagogical, validity, reliability, efficiency, practicality, and safety dimensions. It was concluded that online exams are more efficient in time and effort than classroom exams, but there are problems with exam security, validity, and proper application. Karadağ (2014) examined the assessment and evaluation activities applied in open and distance education institutions and argued that almost all universities used open-ended questions and multiple-choice tests intensively in distance education assessment and evaluation activities. However, it was also argued that the most preferred assessment tools were multiple-choice tests, exams with open-ended questions, and assignments, respectively.

## **1.2. Online Exam Application Styles**

There are security problems compared to classroom exams due to the nature of online assessment-evaluation applications (Al-Hakeem & Abdulrahman, 2017; Can, 2020; Gunawardena & LaPointe, 2003). Although research or project-based and process-oriented evaluation approaches are more reliable than web-based instant assessment-evaluation applications (Semerci & Bektaş, 2005), online tests with multiple-choice and/or open-ended exams are more common, thanks to their practicality and application friendliness (Karadağ, 2014). Recently, physical security measures such as checking student ID, camera and ambient sound recordings, etc., are applicable in online exams. Online exams also offer a variety of settings such as time limits, session passwords, penalising for wrong answers, randomising pool questions, question orders in consecutive or mixed form, individual or collective tests formats.

The students can be impeded from returning to the previous questions in online exam applications, where questions are directed to the students sequentially. The student has the right to see a question only once in such cases. However, the exam applications where the questions are addressed to the student collectively allow the students to start the online exam and access all the questions simultaneously from a single screen. Only one question is displayed on the student's screen at a time in the exams with the sequential formats, and the student can navigate between the questions through back and forth (previous/next) buttons. The <</previous button might be removed to set only forward (sequentially) and conduct the exam irreversibly. The online exam application screens with collective and sequential questions are shown symbolically in Figure 1.



**Figure 1.** Symbolic Representation of Student Screens with Collective and Sequential Questions in Online Exams

These settings may differ by the web-based learning management system and assessment-evaluation modules used. There are also additional security mechanisms such as preventing several tabs on the web browser, reporting the applications running in the background of the student devices, camera checks at certain intervals, recording the student's image and ambient sound, reporting the student's network traffic (thus viewing the operations on different devices) in the current online examination tools.

### 1.3. Purpose of the Study

It is anticipated that mechanisms boosting exam safety may have different implications for the online exam process and student performance. Therefore, the necessity of examining and reporting exam types and security measures preferred by academics in online exams has become a topic itself. Moreover, analysing the parameter impacts is essential to shape the rationale of the attempt. These parameters include the chosen question types, the number of questions, exam duration and how the questions are directed, impacting the successful scores. analys

The research questions are as follows;

1. What are the assessment-evaluation types preferred by academics?
2. What are the question types and distribution preferred by academics?
3. Is there a significant difference in student achievement averages by exam types?
4. What is the number of questions and exam durations preferred by academics?

**How much does asking questions sequentially and collectively in multiple-choice exams impact exam score averages?**

### 1.4. Importance of the Study

Baran (2020) stated that the studies on assessment and evaluation in distance education are pretty limited in higher education in terms of web-based measurement and evaluation processes. This study aims to generate data for executives and researchers who conduct assessment-evaluation activities in distance education processes and contribute to the relevant literature. YÖK (2020) reported that the rate of courses that can be enrolled and tutored via distance education in higher education raised to 40% during the pandemic, and

afterwards, it is predicted that the number of courses to be conducted through distance education will increase in the future. Therefore the number of online assessment-evaluation activities will follow this trend. Studies in this context shall generate valuable reports and recommendations based on scientific findings on the application forms of assessment-evaluation activities in distance education for decision-makers, academics, and executives.

## 2. Methodology

### 2.1. Research Model

This research was designed with the general survey model. Survey designs describe the current situation related to the subject through a snapshot (Büyüköztürk, 2018).

### 2.2. Data Collection Tools

A total of 3830 online assessment-evaluation activities and system registration data (log) were arranged by 805 academics with 29511 students studying on the Uşak University learning management system during the spring semester of 2020-2021 were used.

Learning management system (LMS) is the open-source Moodle LMS (v3.10+), a widespread tool. Moodle is a learning platform that enables educators to organise e-learning activities, create/publish online activities, content, and where students can access these materials and engage in collaborative activities (Miyazoe & Anderson, 2010). No plugins or themes (visual templates) were installed on the system, and the system was made available to students by default. The exam module is the default provided by Moodle, and the default settings for 3830 online exams were as follows;

- Each student can take the exam/assignment only once.
- The type of exam (test, classical, mixed, assignment) was determined by the academics.
- The academics determined the question types (multiple-choice, open-ended, etc.) in the exams. The academics determined the number of questions in the exams.
- The academics designated exam dates/times.
- The academics specified exam durations (time limit).
- Immediate feedback was turned off (regarding answers, test scores, etc.).
- The academics determined the collective or sequential display of questions in multiple-choice test exams.

### 2.3. Data Analysis

The descriptive data were presented as percentage and frequency tables, and parametric t-test analyses were performed for comparisons. The pilot tests were also made to determine whether the data were suitable for parametric tests. Moreover, the effect sizes have been calculated in eta square  $\eta^2$ . SPSS v19 program was used for statistical analysis.

### 2.4. Ethical

In this study, all rules stated to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed.

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Date of Ethics Evaluation Decision: 10.06.2021 Ethics Assessment Document Issue Number: 06

## 3. Findings

The descriptive statistics about the analysed academic units were presented.

### 3.1. Findings Regarding the Assessment-Evaluation Types Preferred by Academics

There are four types of exam applications varying by units: multiple choice (test), mixed (open-ended + multiple-choice), written (open-ended), and assignment. The distribution of the academic units and the exam types are detailed in Table-1.

**Table 1.** *Distribution of Academic Units and Preferred Online Exam Types*

Academic Units	N	Multiple Choice		Mixed		Written		Assignment		Total
		f	%	f	%	f	%	f	%	
Faculty	11	740	51.67	481	71.79	344	72.57	1001	79.82	2566
High School	3	204	14.24	31	4.62	5	1.05	71	5.66	311
Vocational School	11	295	20.61	158	23.59	125	26.38	182	14.52	760
Common Courses Unit	2	193	13.48	0	0	0	0	0	0	193
Total	25	1432	100	670	100	474	100	1254	100	3830

Uşak University has 25 academic units, including 11 faculties, 11 vocational schools, and 3 high schools, including standard compulsory and elective courses taught in all academic units.

The 2566 online assessment and evaluation activities performed within the faculties were dispersed as 39.03% (N:1001) assignments, 28.83% (N:740) multiple-choice exam, 18.74% (N:481) mixed questions exam, and 13.40% (N:344) written formats. Moreover, the 311 online exams held within the high schools were grouped as 65.59% (N:204) multiple-choice, 22.85% (N:71) assignment, 9.96% (N:31) mixed, and 1.60% (N:5) in written format. The total of 760 online exams held within vocational schools was divided as 38.81% (N:295) multiple-choice, 23.97% (N:182) assignment, 20.78% (N:158) mixed, and 16.44% (N:125) written format. The faculties' most preferred web-based assessment-evaluation activity was assignments, while the most preferred one in high schools was multiple-choice exams. Moreover, the vocational schools and standard course units frequently utilised multiple-choice exams.

**3.2. The Question Types and Distribution Preferred by Academics**

The number of questions in 1906 written and multiple-choice online exams conducted by academics is detailed. The descriptive findings are presented in Table-2.

**Table 2.** *The Question Types and Distribution Preferred by Academics*

Question Types	Total Number of Exams	f (Question)	%	X <sub>avg</sub>
Multiple-choice Question Faculty	1432	29464	93.35	20.57
Open-ended Question	474	2098	6.64	4.42
Total	1906	31562	100	12.49

A total of 29464 multiple-choice questions were asked in 1432 multiple-choice exams, as detailed in Table-2. The average number of multiple-choice questions per exam was 20.57. Besides, 2098 open-ended questions were asked in 474 written exams. The average number of open-ended questions per exam was 4.42. It was determined that the exam types with multiple-choice questions were more preferred rather than more preferred exams with open-ended questions.

**3.3. Comparison of Student Achievement Scores by Exam Types**

It was necessary to determine whether there was a difference in average exam scores between multiple-choice and open-ended questions. T-test was used for this purpose. In order to determine whether the data was suitable for parametric analysis, the assumptions were tested, and T-test analysis results are documented in Table-3.

**Table 3.** *T-Test Results for Student Achievement Score Comparison by Exam Types*

Exam Types	N	X <sub>avg</sub>	SS	Sd	t	p
Multiple-choice Exam	1432	71.27	15:30	1143.998	10.371	.000
Open-Ended (Written) Exam	474	63.42	10.79			

While the average student achievement score in the exams with multiple-choice questions attended by 29464 students was 71.27, the average student success score in the ones with open-ended questions attended by 2098 students is 63.42. Table-3 demonstrates a significant difference in the student achievement score averages by exam types  $t(1143.998)=10.371, p<.05$ . Moreover, the student achievement average in multiple-choice exams is significantly higher than the average of open-ended exams.

### 3.4. Findings Regarding the Number of Questions and Exam Durations Preferred by Academics

The number of questions, exam duration, and distributions preferred by academics by exam types are available in Table 4.

**Table 4.** Number of Questions, Exam Duration, and Distribution by Exam Types Preferred by Academics

Exam Types	Number of Exams	Number of Questions	Question Avg.	Total Time Avg. (min)	Time Given for each Question
Multiple-choice Exam	1432	29464	20.57	29min 29"	1min 26"
Written Exam	474	2098	4.42	47min 48"	10min 49"
Mixed Exam	670	8605	12.84	39min 13"	3min 3"
Total	2576	40167	12.61	38min 50"	5min 1"

While the average number of questions asked by academics in 1432 multiple-choice exams is 20.57, as shown in Table 4, the students were given an average time of 29 minutes 29". The average time allocated to 1 multiple-choice question was 1 minute and 26". The average number of open-ended questions in the 474 written exams was 4.42, and students were given an average 47 minutes 48". The average time allocated to 1 open-ended question was 10 minutes and 49". While the average number of open-ended + multiple-choice questions in the 670 mixed exams was 12.84, the average exam duration was 39 minutes 13". It can be argued that while the time given to the multiple-choice questions is ~1.5 minutes, the time allocated for open-ended questions is ~11 minutes.

### 3.5. The Effect of Question Screening Type on Student Success in Multiple Choice Exams

The questions can be asked to students in different styles (sequentially or collectively) in multiple-choice exams for web-based assessment-evaluation activities performed through distance education platforms. The effect of multiple-choice exam question styles on students' average achievement scores determined by the t-test is detailed in this section. The t-test analysis results are illustrated in Table 5.

**Table 5.** T-Test Results on the Effect of Question Screening Format in Multiple Choice Exams on Student Success

Multiple-choice Exam Formats	N	$X_{avg}$	SD	Sd	t	p
Sequential	730	69.67	16.14	1418.590	-4,080	.000
Collective	702	72.94	14.19			

It was found that the average score of the students was 69.67/100 regarding the 730 multiple-choice exams with *sequential* questions. However, the 702 multiple-choice exams with *collective* question formats revealed that the average score of the students is higher at 72.94/100.

It was determined that the student success is significantly higher in the multiple-choice exams with collective question formats through the web-based assessment-evaluation system  $t(1418.590)=-4.080$ ,  $p<.05$ . Moreover, the collective display of multiple-choice questions on a single screen *positively* impacts student achievement scores. The independent sample t-test revealed differences between the groups by the multiple-choice exam question screening style with a *trim* level of impact ( $\eta^2=0.012$ ) and significant difference.

## 4. Discussion and Conclusion

This study analysed the data generated by 3830 online assessment-evaluation activities, to which 29511 students participated and were marked by 805 academics within a higher education institution through several variables such as the measurement techniques preferred by academics, question types, the number of questions, the exam duration, the question screening format and the effects of some variables on the exam success scores.

Various web-based tools were used in assessment-evaluation activities conducted in higher education institutions' distance education processes. Certain security vulnerabilities may occur due to the remote nature of the exams. Some primitive measures depending on the course content, such as asking different types of questions, increasing the number of questions, asking random questions, setting a time limit, increasing the number of questions, or applying collective/sequential question screening formats, were

implemented to eliminate such weaknesses. Many factors affect student achievement scores, ranging from the assessment tool type, duration, and the number of questions to the application style.

The study found that the most preferred "exam types" as assessment techniques based on faculty in higher education institutions are assignments, while the multiple-choice was the most common in vocational schools and high schools. Distribution, application, and retrieval of online assignments to students can be performed more quickly than traditional assignments, and also, the marking can be done without wasting time (Ismail, Mokhtar, Nasir, Rashid, & Ariffin, 2014). Today, fully automatic assignment evaluations can be performed through assignment evaluation modules in learning management systems. It is possible to evaluate the student quickly and rapidly, which facilitates personal feedback in the same manner. It was concluded that the most preferred assessment technique was multiple-choice test exams, assignments, mixed and written exams, respectively. The analysis of 31562 questions for the preferred "question types" revealed that multiple-choice questions were preferred 14 times more than open-ended questions. It can be stated that these results are in line with similar research results in the literature, which concluded that multiple-choice question types are mostly preferred (Baran, 2020; Chaudhary & Dey, 2013; Kuikkaa, Kitola, & Laakso, 2014; Montenegro N., 2014; Reja, Manfreda, Hlebec, & Vehovar, 2003). The aspects that multiple-choice questions are easier to prepare, they can be graded quickly, the content can be kept broad, and even the high-level thinking skills of the students can be measured if they are prepared in a qualified way are some of the features that make amplify the magnitude of multiple-choice questions (Weimer, 2021). Moreover, the fact that web-based test exams with multiple-choice questions are easier to apply can have student-oriented (individualized) designs, can be graded by making an instant evaluation on the distance education system, and the availability of quick feedback makes the use of such exams widespread (Simonson, Smaldino, Albright, & Zvacek, 2012). It can be stated that multiple-choice question types are preferred more because of these advantages.

The online assessment application of 1906 (only the test and written exam), 29464 students participated, was examined in this study. It was concluded that students' average scores in the exams with multiple-choice questions were significantly higher than the averages with open-ended questions (Demir, 2010). Özkan & Özaslan (2018) also analysed the questions within the PISA applications and concluded that students were more successful in multiple-choice questions. Temizkan & Sallabaş (2011) stated that the question types affect the students' success scores and emphasised that the students achieved higher success scores in the multiple-choice questions than in the open-ended ones. It can be stated that the results are similar to the previous literature. Open-ended questions are more challenging to answer for students with longer response times than multiple-choice questions, require more effort, and have difficulty expressing their own opinions with potentially very different answers (DeFranzo, 2018). Therefore, it was understood that the students' average success in the exams with open-ended questions is lower than the averages in the multiple-choice exams.

Although open-ended questions require a longer time to answer than multiple-choice questions, students are given an average of 29 minutes and 29" exam durations for an average of 20.57 questions in multiple-choice exams (1 min 26" for one question), while an average of 4.42 questions in open-ended exams with 47min 48" (10 min 49" for 1 question) allowed for the questions. Moreover, DeFranzo (2018) stated that open-ended questions require more time to solve. However, it can be stated that the academics allocated approximately ~10 times more time for open-ended questions. Reja, Manfreda, Hlebec, & Vehovar (2003) stated that answering open-ended questions online over the web and classroom written answers did not make a difference regarding student achievement scores. It was not fully grasped whether the failure of the students in open-ended questions was because of the possible loss of time they experienced while submitting their answers over the web. Although the exam duration was considered enough, the students answering the open-ended questions had lower achievement scores, confirming previous research findings (Demir, 2010; Özkan & Özaslan, 2018; Temizkan & Sallabaş, 2011). One of the research results was obtained by thoroughly examining web-based multiple-choice exams. The student achievement averages in the 1432 exams analysed showed that the scores with collective questions were significantly higher than those in the exams with sequential questions. When they can see all the questions on a single screen simultaneously, they have a higher performance than when the questions are displayed sequentially. The questions are presented to the students sequentially, and the students have to click on the back and forth buttons to see the next or



previous question. Similarly, they must navigate through the questions to instantly return to the questions for reviewing. It was concluded that this situation causes students to waste time, makes it challenging to find the question they seek and affects their success. One of the most significant weaknesses of web-based instant assessment activities in distance education is the security problem (Bilen & Matros, 2021; Dendir & Maxwell, 2020; Sarrayrih & Ilyas, 2013; Turani, Alkhateeb, & Alsewari, 2020). This problem is valid for all remote assessment applications and continues today. Regarding this situation, developers are working on various security tools and settings. The sequential and collective question display (navigation) settings offered in Moodle LMS are a precaution to increase exam security. Bilen & Matros (2021) stated that when online measurement took place in an unattended environment, students tended to cheat over the Google search engine. Similarly, Best & Shelley (2018) students stated that their tendency to cheat by copying or taking screenshots/videos to research the answers has increased in recent years. Social media applications such as Whatsapp, Facebook, and Instagram can be used for cheating purposes. If the questions are presented to the students collectively, it becomes easier for them to share all the questions with their friends by taking screenshots and sharing the answers with a group of friends. However, if the questions are given sequentially, collective copying and sharing of the answers are impeded. This situation has been interpreted as a reflection of the restriction/prevention of potential cheating attempts.

## 5. Recommendations

These research findings are limited to the sample from Uşak University. Samples from other higher education institutions' student achievement scores can be used to compare the results for assessment techniques. A limited number of studies examine the effects of asking questions sequentially or collectively in web-based online exams regarding the relevant literature. The effects of exam settings defined by academics can be examined by different variables (e.g., technology readiness) in online instant assessment applications.

Being able to carry out an effective and efficient assessment and evaluation activity in distance education processes depends on a solid system infrastructure free from problems. However, it is vital to conduct orientation studies of academics and students, the system's stakeholders, before using the system. It can be challenging to get efficient learning outcomes from a web-based measurement system that cannot be utilised efficiently. Therefore, further studies on literacy, student achievements, and academics in distance education are recommended.

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