

EFFECTS OF STUDENTS' CHARACTERISTICS ON ONLINE LEARNING READINESS: A Vocational College Example

**Harun CIGDEM, Ph.D.,
Osman Gazi YILDIRIM, Bs.D.,
First Lieutenant
at Noncommissioned Officer School,
Balikesir, TURKEY**

ABSTRACT

Educational institutions rapidly adopt concepts and practices of online learning systems for students. But many institutions' online learning programs face enormous difficulty in achieving successful strategies. It is essential to evaluate its different aspects and understand factors which influence its effectiveness. Readiness stands out among the variables that influence online learning effectiveness. Therefore, it is important to examine online learning readiness (OLR) and students' characteristics that affect OLR. This paper reports relationship between student characteristics and OLR at vocational college. Quantitative method was used to collect relevant data in this study. Hung et al.'s Online Learning Readiness Scale (OLRS) was administered to 725 vocational college students, in Balikesir. OLRS has 18 items grouped into five factors; computer/Internet self-efficacy (CIS), self-directed learning (SDL), learner control (LC), motivation for learning (ML), and online communication self-efficacy (OCS). t-test and multivariate analysis of variance (MANOVA) were used to determine if there were significant differences in online learning readiness across the students' characteristics. The study revealed that students surveyed overall ready for online learning but they need to improve themselves especially in CIS and OCS in order to be successful at online learning. Students' characteristics (PC ownership, department, type of high school graduation) significantly affect learners' in some dimensions of OLRS especially CIS dimension. The research findings were discussed in line with the literature and some suggestions were presented for further research and researchers.

Keywords: Online learning readiness, vocational college, readiness factors

INTRODUCTION

Rapid development of the Internet technologies, infrastructure and communication systems have enabled development of online learning as effective teaching and learning tools. Online learning can be defined as acquiring knowledge and skills through synchronous and asynchronous learning applications (Morrison, 2003). Advantages like cost reduction, time and space freedom, assistance to traditional instruction (Chao & Chen, 2009), providing more flexible and interactive learning environments than traditional distance learning applications (Kaymak & Horzum, 2013; Tang & Lim, 2013) make it significant and popular.

Since education paradigm shifts from teacher centered to learner-centered (Lee, Yoon, & Lee, 2009), education institutions have dedicated great efforts to design and implement online learning systems (Hogo, 2010; Hung, Chou, Chen & Own, 2010; Lee, 2010). Number of online courses and programs has increased drastically in the recent years, but many universities face enormous difficulty in achieving successful strategies, including delivery, effectiveness, and acceptance of the courses (Park, 2009). According to Wang and Wang (2009) number of online learners is not increasing as fast as expected and universities fail to take benefit of their great effort. Determination of factors influencing effectiveness online learning is a key factor in order to get benefit of it (Schreurs, Sammour, & Ehlers, 2008). According to Wang, Zhu, Chen, & Yan, (2009), one of the most important variables of successful online learning is readiness factor (İlhan & Çetin, 2013). Student readiness is the most important factor (Aydin and Tasci, 2005) considering OLR of learners, trainers and the organizations as key elements for better online learning practices (Bowles, 2004).

Warner, Christie and Choy (1998) describe OLR of students in three major aspects: preferences for online learning as opposed to face-to-face learning instructions, capability and confidence in using the technological tools and ability to learn independently (Tang & Lim, 2013). McVay (2001) concretize readiness concepts focusing on student behavior and attitudes. According to Guglielmino and Guglielmino (2003), online learning readiness can be assessed by evaluating an individual's technical experience and competency in using computers (Schreurs et al., 2008). Hung et al. (2010) took readiness concepts of McVay (2001) one step forward and involved new concepts as computer/Internet self-efficacy (CIS), learner control (LC), motivation for learning (ML), and online communication self-efficacy (OCS) self-directed learning (SDL).

Computer/Internet self-efficacy is related to technical skills involving computers and the Internet (Keramati, Afshari-Mofrad, Kamrani, 2011; Peng, Tsai, & Wu, 2006). Learner control is related to flexibility and freedom in web based study materials. Learner control is the degree to which a learner can direct his or her own learning experience and process (Shyu & Brown, 1992) and in online learning, learners are allowed to choose the amount of content and the pace of learning with maximum freedom (Hannafin, 1984; Reeves, 1993) thus the dimension of learner control also becomes an important part of students' readiness (Hsu & Shiue, 2005; Stansfield, McLellan, & Connolly, 2004). Considering perspectives of students, motivation for learning can be regarded as getting a higher grade on exams, getting awards, and getting prizes (Baeten, Kyndt, Struyven, & Dochy, 2010; Hung et al. 2010; Saadé, He, & Kira 2007). Online communication self-efficacy is related to computer-mediated communication. Self-directed learning is related to direct his or her own training through the appropriate knowledge, skills, attitudes and habits. Motivation to learning (Moolman & Blignaut, 2008), self-directed learning and learner control dimensions are related to students habits and these are the abilities that are not related to any technological device. Students' ability to make use of e-learning resources and multimedia technologies to improve the quality of learning so online learners should therefore be ready to adopt the responsibility of a self-driven mode of training (Powell, 2000). Considering online learning, the characteristics of students and online content must be reviewed carefully in order to improve quality of learning. According to Borgman, Galagher, Hirsch and Walter (1995) investigating individual differences will allow educators make transition to new innovative interfaces. Therefore, designing online learning environments requires an understanding of the learners.

The diverse characteristics of vocational college students challenge instructors in online learning. Therefore, a target-group analysis should focus on characteristics such as age, educational level, prior knowledge related to web based education, computer experience, preferences, motivation, reading and writing skills, computer skills, familiarity with differing instructional methods and previous experience with online learning (Khan, 2005). Different aspects such as gender, age, education level, and learning style have been investigated in the literature (Yukselturk & Bulut 2007) and before implementing online learning environments students' characteristics should be carefully investigated during a needs-analysis to avoid a pedagogic mismatch (Moolman & Blignaut, 2008). Once a learner's profile is determined, online learning can be easily adapted in a way that best suits that learner. Therefore, it is important to examine student characteristics to see their effects on readiness for online learning. This study seeks to examine the vocational students' readiness for online learning. In addition effects of five important students' characteristics on OLR have been examined including: age, PC ownership, department, house income level, type of high school graduation. This study will explore the following research questions:

- Are vocational college students ready for online learning?
- Do demographic characteristics (age, PC ownership, WBE, department, house income level, type of high school graduation) of students affect their OLR?

METHOD

Participants, research instruments, data collection and method of analysis are described in this section. The research was performed according to quantitative survey model.

Participants

A sample of 725 students at vocational college voluntarily participated in this study in 2013/2014 academic year. All participants were male and ages of participants ranged from 17 to 21. Students guaranteed confidentially that data would only be used for academic purposes.

Research Instruments

An online questionnaire was used as data collection tool. The questionnaire was divided into two sections.

Table: 1
Reliabilities of online learning readiness dimensions

Scale	Items	Hung et al. (2010)	Yurgudül and Alsancak Sarıkaya (2013)	Study
CIS	3	0.736	0.92	0.719
SDL	5	0.871	0.84	0.855
LC	3	0.727	0.85	0.624
ML	4	0.843	0.80	0.843
OCS	3	0.847	0.91	0.793

The first section was related to demographical characteristics (i.e., age, type of high school graduated) and computer experiences (i.e., PC ownership, computer usage level, computer usage frequency).

The second section of the questionnaire was the Online Learning Readiness Scale (OLRS), validated by Hung et al.'s (2010) and translated into Turkish by Yurdugül and Alsancak Sarıkaya (2013). OLRS contains 18 items that measure online learning readiness on a five-point Likert type scale (1= Strongly disagree, 2= Disagree, 3= Undecided, 4= Agree, 5= Strongly agree). OLRS has a five-factor structure; CIS, SDL, LC, ML, and OCS. To determine internal consistency of the scale, reliability analyses were conducted. The comparative values of reliability analysis for the five dimensions are given in Table 1and they were acceptable. Kehoe (1995) recommends that reliability values as low as .50 would be satisfactory for short tests.

Data Collection and Data Analysis Procedures

The online questionnaire was utilized at the beginning of 2013/2014 academic year for two weeks. In order to provide objectivity in choices the participants were requested not to write their identification information (e.g., name, last name, school number, etc.) on the questionnaire. The SPSS statistical package program was used to analyze the data using descriptive statistics, independent samples t-test and One-way Multivariate Analysis of Variance (MANOVA). All statistical analyses were tested at .05 significance level.

FINDINGS

Descriptive statistics

Table: 2
Demographics of the students

Question	Choice	n	f (%)
Gender	Male	725	100.0
	17	83	11.4
	18	122	16.8
Age	19	182	25.1
	20	221	30.5
	21	117	16.1
The Type of High School Student Graduated	Vocational High School	538	74.2
	High School (nonvocational)	187	25.8
Department	Computer	46	6.3
	Civil Construction	76	10.5
	Electronic	263	36.3
	Mechatronic	202	27.9
	Business Administration	138	19.0
Have Computer	Yes	502	69.2
	No	223	30.2
Web Based Education Experience	Yes	491	67.7
	No	234	32.3
Level of House Income	<500 TL	35	4.8
	500 – 1000 TL	313	43.2
	1000 – 2000 TL	281	38.8
	2000 – 3000 TL	76	10.5
	3000 – 4000 TL	13	1.8
	4000 – 5000 TL	4	.6
	>5000 TL	3	.3

The ages of the participants ($n=725$) in this study ranged from 17 to 21 ($M=19.23$, $SD=1.23$). The participants were vocational college students in Balıkesir, Turkey. Therefore, the study is limited to the college students at this vocational college.

Demographics data were shown in Table: 2. Considering the characteristics of the college where the study was conducted, all of the students in the study group were male.

Vocational Students' Readiness for Online Learning

The first research question was related to readiness level of vocational college students for online learning. In order to determine whether or not vocational college students are ready for online learning, descriptive data were used.

Mean scores, standard deviations, minimum and maximum scores of the participants are reported in the Table 3.

Table: 3
Descriptive statistics of online learning readiness dimensions

Scale	N	Minimum	Maximum	Mean	SD
CIS	725	1	5	3.564	.850
SDL	725	1	5	4.143	.677
LC	725	1	5	3.862	.785
ML	725	1	5	4.455	.655
OCS	725	1	5	3.790	.878

To calculate each student's mean score for every dimension, we identified the sum of the answers to each item in that dimension, and then divided the sum by the number of that dimension's items.

The higher mean score indicates the higher level of readiness.

As it is shown in Table: 3, within the limits of the students surveyed, all students' average scores relative to the different dimensions range from 3.564 to 4.455 on a 5-point Likert-type rating scale, indicating that students exhibited above-medium levels of readiness for online learning.

Relationship between Students' Characteristics and Their Readiness for Online Learning

The second question of the study examines the differences that occur in dimensional scores of OLRS due to students' demographic characteristics such as age, computer ownership, department, type of high school graduation and house income level.

Age

In order to test age differences in OLRS dimensions, MANOVA were conducted which revealed no significant difference between ages as shown in Table: 4.

Table: 4
MANOVA analyses of online learning readiness based on age

Source	Dependent	Ss	df	Mean Square	F	p
Age	CIS	.370	4	.092	.127	.973
	SDL	1.494	4	.374	.814	.517
	LC	1.952	4	.488	.789	.532
	ML	1.418	4	.354	.823	.511
	OCS	1.517	4	.379	.490	.743
Error	CIS	523.009	720	.726		
	SDL	330.610	720	.459		
	LC	445.124	720	.618		
	ML	310.085	720	.431		
	OCS	556.866	720	.773		
Total	CIS	9733.111	725			
	SDL	12780.680	725			
	LC	11263.444	725			
	ML	14703.938	725			
	OCS	10976.778	725			

Computer Ownership

Demographics in Table 2 show that majority of the college students (502 out of 725) have computer at home. As shown in Table 5, as a result of a series independent samples t-test performed to find out whether OLR dimensions scores differ or not in terms of computer ownership, it was observed that there was a significant difference in CIS, LC, and OCS dimensions of OLR in favor of students who have computer at home ($p < 0.05$).

Table: 5
t-test results for differences based on computer ownership

Dimension	PC Ownership	N	Mean	SD	t	df	p
CIS	Owner	502	3.700	.803	6.673	723	.000
	Non-owner	223	3.257	.873			
SDL	Owner	502	4.174	.647	1.863	723	.063
	Non-owner	223	4.073	.736			
LC	Owner	502	3.930	.753	3.554	723	.000
	Non-owner	223	3.708	.835			
ML	Owner	502	4.481	.623	1.576	723	.116
	Non-owner	223	4.398	.722			
OCS	Owner	502	3.888	.857	4.552	723	.000
	Non-owner	223	3.571	.887			

t-test results displayed in Table: 5 show those students who own computers have higher means for all sub dimensions. On the other hand, there was no significant difference in SDL and ML dimensions ($p>0.05$).

Web Based Education

According to Table: 2, majority of the college students (491 out of 725) have web based education experience. A series of independent samples t-test analysis have been conducted in order to determine WBE experience effects students' readiness for online learning. t-test results displayed in Table: 6 show that the students who experienced web based education had higher mean scores than students who didn't.

Table: 6
t-test results for differences based on web based education experience

Dimension	WBE	N	Mean	SD	t	df	p
CIS	Yes	491	3.712	.819	7.012	723	.000
	No	234	3.252	.830			
SDL	Yes	491	4.194	.679	2.954	723	.004
	No	234	4.037	.662			
LC	Yes	491	3.960	.765	4.892	723	.000
	No	234	3.656	.790			
ML	Yes	491	4.484	.653	1.706	723	.088
	No	234	4.395	.657			
OCS	Yes	491	3.882	.855	4.053	723	.000
	No	234	3.598	.895			

t-test indicated significant differences for CIS, SDL, LC and OCS. As Table 6 illustrates, WBE status did not express any significant difference regarding their readiness in ML dimension.

Department

In this study, students are divided into five group of departments: (1) Computer Technology, (2) Electronic, (3) Civil Construction, (4) Mechatronic and (5) Business Administration. Relationships between students' department and the OLRS dimensions were analyzed using MANOVA.

Table: 7
MANOVA analyses of online learning readiness based on department

Source	Dependent	Ss	df	Mean Square	F	p
Department	CIS	18.216	4	4.554	6.491	.000
	SDL	5.193	4	1.298	2.859	.023
	LC	5.625	4	1.406	2.294	.058
	ML	3.037	4	.759	1.772	.133
	OCS	15.262	4	3.815	5.058	.001
Error	CIS	505.163	720	.702		
	SDL	326.911	720	.454		
	LC	441.452	720	.613		
	ML	308.466	720	.428		
	OCS	543.121	720	.754		
Total	CIS	9733.111	725			
	SDL	12780.680	725			
	LC	11263.444	725			
	ML	14703.938	725			
	OCS	10976.778	725			

MANOVA revealed that students' department made significant differences in the OLRS dimensions. As shown in Table: 7, a follow-up analysis showed that department made significant differences in mean scores of CIS ($F=6.491$, $p<0.01$), SDL ($F=2.859$, $p <0.05$), and OCS ($F=5.058$, $p < 0.01$).

A multiple-comparisons analysis indicated that students from Computer Technologies Department rated CIS (Tukey's post hoc analysis, $p < 0.05$) significantly higher than students from Electronic Department and Mechatronic Department, and students from Civil Construction Department rated CIS (Tukey's post hoc analysis, $p <0.05$) significantly higher than students from Electronic Department, and Business Administration Department students rated CIS (Tukey's post hoc analysis, $p < 0.01$) significantly higher than students from Electronic Department. For OCS dimension, students from Civil Construction department rated OCS (Tukey's post hoc analysis, $p < 0.05$) significantly higher than students from Electronic Department and Mechatronic Department.

According to Tukey's post hoc analysis, students of different departments did not express any significant difference regarding their readiness in the SDL, LC and ML dimensions.

Type of High School Graduation

Table: 2 shows that majority of the college students (538 out of 725) have graduated from vocational high school. t-test results displayed in Table 8.

Table: 8
t-test results for differences based on type of high school graduation

Dimension	Type of High School	N	Mean	SD	t	df	p
CIS	Vocational	538	3.629	.833	3.538	723	.000
	Non-vocational	187	3.376	.872			
SDL	Vocational	538	4.126	.663	-1.169	723	.243
	Non-vocational	187	4.193	.714			
LC	Vocational	538	3.881	.761	1.076	723	.282
	Non-vocational	187	3.809	.850			
ML	Vocational	538	4.451	.631	.300	723	.764
	Non-vocational	187	4.467	.724			
OCS	Vocational	538	3.822	.836	1.634	723	.103
	Non-vocational	187	3.700	.986			

t-test between vocational graduates and non-vocational graduates indicated significant differences only in CIS dimension ($p<0.05$) in favor of vocational high school graduates.

House Income

A MANOVA on the sub dimensions was performed to assess the overall house income level difference. Students were divided into five groups with regards to house income level: (1) lower than 500 TL, (2) between 500 TL and 1000 TL, (3) between 1000 TL and 2000 TL, (4) between 2000 TL and 3000 TL and (5) higher than 3000 TL.

House income levels between 3000 TL and 4000 TL, between 4000 TL and 5000 TL and higher than 5000 TL were in the same group because there were not many students in even the combination of the three groupings (about 2.8% were higher than 3000 TL).

Table: 9
MANOVA analyses of online learning readiness based on house income level

Source	Dependent	Ss	df	Mean Square	f	p
House Income	CIS	9.292	4	2.323	3.254	.012
	SDL	1.379	4	.345	.750	.558
	LC	5.443	4	1.361	2.218	.065
	ML	1.299	4	.325	.754	.556
	OCS	5.130	4	1.282	1.669	.155
Error	CIS	514.086	720	.714		
	SDL	330.725	720	.459		
	LC	441.634	720	.613		
	ML	310.204	720	.431		
	OCS	553.254	720	.768		
Total	CIS	9733.111	725			
	SDL	12780.680	725			
	LC	11263.444	725			
	ML	14703.938	725			
	OCS	10976.778	725			

Results show that house income level made significant differences only in mean scores of CIS ($F=3.254$, $p<0.05$).

DISCUSSION

Determination of students' readiness for online learning is more critical than ever before for successful implementation of online learning systems because online learning is becoming popular in educational environments across the world. Main purpose of this study was to determine effects of vocational college students' characteristics on the online learning readiness.

According to Hung et al. (2010) student should be more active in online learning environments and should be more responsible in their learning, time-management, keeping up with the class, completing work on time and they should be active contributors to instruction. Understanding student readiness for online learning is the first step for developing and implementing an effective online learning system (Aydin and Tasci, 2005). Dimensions suggested in the OLRS (Hung et al., 2010) are used as the model of this study. Online learning readiness dimensions analyzed through the descriptive quantitative data returned mean scores (between 3.564 and 4.455) over the mid-point indicating that the participants were in generally ready for online learning.

It is detected that participants had the highest readiness in the dimension of ML, followed by SDL and LC, and the lowest readiness in the dimensions of OCS and CIS.

These findings, consistent with the literature (Hung et al. 2010; Tang & Lim, 2013) suggest that students are ready for online learning however Hung et al. (2010) found highest means at CIS and OCS and lowest means at LC and SDL. In addition to this, these findings were inconsistent with Smith's (2000) study which found that students were as non-verbal and non-self-directed learners.

The second research question was related to student characteristics affecting dimensions of online learning readiness. It was found that students' characteristics except age had impact on especially computer/internet self-efficacy dimension of OLR. Similar to the results of Wattakiecharoen and Nilsook's (2013) age of students did not have any effect on OLR. It might be caused by too close age range (between 17 and 21).

In this study, computer ownership was found to be significantly related computer / internet self-efficacy, learner control and online communication self-efficacy of OLR dimensions. In terms of self-directed learning and motivation to learning, all students demonstrated an equal degree of readiness. The possible reason for this result might be self-directed learning and motivation to learning dimensions are not directly related to computer ownership. It was detected that web based education experience had effects on students' computer/internet self-efficacy, self-directed learning, learner control and online communication self-efficacy dimension of OLR. So it can be suggested that having prior experience in web based education and having a computer at home play a role in OLR.

Department seem to make differences in OLR. Students from Civil Construction Department exhibited significantly greater readiness computer/internet self-efficacy and online communication self-efficacy dimensions than Electronic and Mechatronic Departments. Computer Technologies Department exhibited significantly greater readiness in computer/internet self-efficacy dimension than Electronic and Mechatronic Departments. Business Administration Department rated dimension of computer/internet self-efficacy significantly higher than students from Electronic Department.

These findings indicate that students' department may play an important role in their computer and internet self-efficacy level. House income level and type of high school graduation show significant effect only at computer/internet self-efficacy dimension. It can be concluded from these findings that vocational college students at any house income level were ready to learn self-directed and they were motivated to learning. Students graduated from vocational high school exhibited significantly greater readiness in computer/internet self-efficacy dimension than students graduated from non-vocational high school.

CONCLUSION

Today online learning is primarily used in a blended learning environment in which the students learn through a combination of online learning system, hands-on activities and classroom teaching in the vocational college. According to results acquired from this study, vocational college students' computer/internet self-efficacy and online communication self-efficacy means were lowest scores. Because of this reason, students should be educated for computer and internet technologies in order to use online learning systems effectively (Keramati et al., 2011).

In this study, we have also some limitations. The study was completed in a male dominated vocational college and conducted within low socio economical context. Future researches can take into account the effect of gender and higher level of house income. Since participants consists mostly vocational school graduates, it might be a better idea to study with online students that compose a larger population and sample. It is recommended that this study should be replicated with students in different institutions or crucial to assess readiness of instructors in order to get a clear picture of the vocational college's readiness for online learning implementation.

BIODATA and CONTACT ADDRESSES of AUTHORS



Harun CIGDEM is currently a lecturer at Computer Technologies Department, at Noncommissioned Officer College in Balıkesir-Turkey. He got PhD degree in Computer Education and Instructional Technologies in Anadolu University-Turkey in 2012. He has played a major role in the development of Course Portal of Non-Commissioned Officer College. He teaches operating systems, computer networks, and system and network administration courses in the college. His research interests involve Web Technologies, blended learning, distance education and e-learning.

Harun CIGDEM, Ph.D.,
First Lieutenant at Noncommissioned Officer School, Balıkesir, TURKEY
Phone: +90 533 315 16 00
Email: hcigdem@gmail.com



Osman Gazi YILDIRIM is currently a lecturer at Computer Technologies Department, at Noncommissioned Officer School. He got BS degree in Computer Education and Instructional Technologies in Ege University-Turkey. He teaches visual programming, object oriented programming and web programming courses in the college. His research interests involve Web Technologies, mobile learning, distance education and e-learning.

Osman Gazi YILDIRIM, Bs.D.,
First Lieutenant at Noncommissioned Officer School, Balıkesir, TURKEY
Phone: +90 507 957 85 97
Email: ogyildirim32@gmail.com

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