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During and After the Pandemic: Online Learning Readiness in Flipped Classroom Approaches*

Ters-yüz Sınıf Yaklaşımda Çevrimiçi Öğrenme Hazır Bulunuşluğu: Pandemi Dönemi ve Sonrası*

Ulaş İLİC

ABSTRACT

The manifestation of the alterations witnessed across various domains consequent to the pandemic took shape as remote instruction within the realm of education. In this process, mostly the flipped learning model was adopted. This approach was implemented during the pandemic, when education was purely online, and after face to face education was reinitiated. However, learners' readiness in learning environments has not been adequately researched. Hence, it was aimed to scrutinize the learner readiness in the flipped learning model in both online and blended instruction systems. The time-series method was utilized in the research. The study sample was assigned with the criterion sampling method. The study group included 51 pre-service teachers. The data were gathered at the start and end of the 2020 fall term and the end of the 2021 fall semester. Findings demonstrated that readiness, learner-control, internet self-efficacy and online communication self-efficacy levels of the students were similar. Notably, computer self-efficacy and motivation scores exhibited increments. On the other hand, it was found that the self-directed learning and ease of use parameters exhibited decreases. It was revealed that the ease of use decreased over time. The study findings would raise the understanding the learner readiness within the framework of flipped learning, both in fully online and blended formats, thereby enriching the educational discourse.

Keywords: Flipped classroom, Online learning readiness, Pandemic, Blended instruction

ÖZ

Pandemi nedeniyle her alanda gözlenen değişimin eğitime yansıması uzaktan eğitim şeklinde olmuştur. Bu süreçte çoğunlukla ters yüz edilmiş öğrenme modeli benimsenmiştir. Söz konusu yaklaşım, eğitimin tamamen çevrimiçi olduğu pandemi döneminde ve yüz yüze eğitimin yeniden başlamasından sonra uygulanmıştır. Ancak öğrenenlerin ilgili öğrenme ortamlarında hazır bulunuşlukları yeterince araştırılmamıştır. Bu nedenle çalışmada hem çevrimiçi hem de harmanlanmış öğretim sistemlerinde ters-yüz öğrenme modelinde öğrenen hazır bulunuşluğunun irdelenmesi amaçlanmıştır. Araştırmada zaman serisi yöntemi kullanılmıştır. Araştırmanın örneklemi, ölçüt örnekleme yöntemi ile belirlenmiştir. Çalışma grubunu 51 öğretmen adayı oluşturmuştur. Veriler 2020 güz dönemi başı ve sonu ile 2021 güz dönemi sonunda toplanmıştır. Bulgular, öğrencilerin hazır bulunuşluk, öğrenen kontrolü, internet öz yeterliği ve çevrimiçi iletişim öz yeterlik düzeylerinin benzer olduğunu göstermiştir. Bilgisayar öz yeterliliği ve motivasyon puanları ise artış göstermiştir. Öte yandan, özyönetimli öğrenme ve kullanım kolaylığı parametrelerinin azaldığı belirlenmiştir. Bunun yanı sıra, kullanım kolaylığının zamanla azalım gösterdiği bulunmuştur. Çalışma bulgularının, tamamen çevrimiçi ve daha sonra harmanlanmış bir yaklaşımla yürütülen ters-yüz öğrenmede öğrenen hazır bulunuşluğunun anlaşılmasına katkı sunacağı düşünülmektedir.

Anahtar Sözcükler: Ters-yüz sınıf, Çevrimiçi öğrenme hazır bulunuşluğu, Pandemi, Harmanlanmış öğretim

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INTRODUCTION

The COVID-19 Pandemic is the most up-to-date factor in transforming education. Due to the restrictions adopted to prevent infections, distance education was adopted at several educational levels globally independent of the availability of an infrastructure. Higher education institutions used the approach almost exclusively. Turkey also accepted this global crisis with the announcement on 26.03.2020 that the 2020 spring semester would be conducted entirely online except for applied sciences (YÖK, 2020). Pamukkale University approved the same approach as well (Pamukkale University, 2020a). About a month after the declaration, the University announced that the interactive online education model would be used (Pamukkale University, 2020b). It was also emphasized that students could review the materials before live classes and interpretation and evaluation phases would be conducted in the synchronous classes. Concurrently, it was announced that the flipped classroom model would be used in distance learning (Uzaktan Eğitim Uygulama ve Araştırma Merkezi, 2020). Even though it was mentioned only by name in the final announcement, it was later determined that the learner-centered flipped classroom model, where the learners study the content before the live classes and the content would be discussed and reinforced during and after the class, would be implemented. The application was initiated during the pandemic and 2020 spring semester but altered after the 2021 spring semester due to the changes in pandemic restrictions, and the blended learning model was adopted globally. The Turkish Council of Higher Education stated that distance education was successful, and next, face-to-face should be adopted increasingly (YÖK, 2021). It was declared that a maximum of forty percent of all courses or a single course could be instructed online. It was suggested that the face-to-face instruction should not be carried out as a block, but based on class hours and the current pandemic regulations. It was also stated that it would be beneficial to upload course material to the online system in advance and to include activities in limited class hours. Pamukkale University announced that the next semester would be conducted based on the above-mentioned conditions. Thus, the flipped classroom model was adopted in the final pandemic period. It was curious that the model, which was obligatory in the previous period, was preferred in this process. Furthermore, the readiness level of learners for online learning, which holds paramount importance for the success, design, and implementation of online learning (Al-Emran, Mezhuye, Kamaludin, 2018; Lin, Lin, Yeh, 2016; Rafiee & Abbasian-Naghneh, 2019), became a significant research problem as well. Thus, the upcoming sections will cover flipped classroom, online learning readiness, and the concept of ease of use, which is stated to have an impact during this process.

Flipped Classroom

Flipped classroom is an approach where the course content is instructed before and outside the class, while further activities and discussions are conducted in the classroom (Bishop & Verleger, 2013). Thus, the course material is provided before the class, and the students study the content at their own pace, and learning occurs during the discussions and activities conducted in class. Although it was suggested that the flipped classroom could put a burden on the student, it is also student-centered and allows active learning (Forsey, Low, & Glance, 2013). It was even argued that the approach leads to student motivation and better learning levels compared to traditional approaches (Lai & Hwang, 2016). The flipped classroom model presents flexibility as well (İlic, 2021a). Taking into consideration individuals' personal characteristics constitutes another significant advantage (Latorre-Cosculluela et al., 2021). The flipped classroom approach also has certain disadvantages. For example, due to the lack of guidance and support, learning outcomes could fall below conventional instruction (McLaughlin et al., 2014; Sun, Wu, & Lee, 2017). The existing literature suggests that, in comparison to traditional and blended education, the flipped classroom approach generally demonstrates greater effectiveness (Schmid, Borokhovski, Bernard, Pickup, & Abrami, 2023) and is more effective in terms of academic performance and student motivation (Al-Said, Krapotkina, Gazizova, & Maslennikova, 2023; Debbağ & Yıldız, 2021; Karabatak & Polat, 2022; Stöhr et al., 2020; Thai et al., 2017). However, a study conducted by Tang et al. (2023) has identified that learners, in general, were not satisfied with the flipped classroom approach and encountered issues, particularly in the context of communication. These pros and cons overlap with online learning environments as well. Thus, the variables associated with the flipped classroom, preferred both in distance education and the blended approach, such as online learning readiness should be investigated.

Online Learning Readiness (OLR)

Online learning readiness - is one of the utmost factors that is important for online settings (Hukle, 2009). OLR is defined as the awareness of the learner about personal learning style, intrinsic motivation elements, time management resources and procedural acquisition (Smith, Murphy, & Mahoney, 2003). In brief, online learning readiness denotes students' preparedness to excel in a digital learning environment (Wei & Chou, 2020). In fact, as individuals enhance their OLR levels, their academic achievements in these settings rise as well (Dai, Luan, & Lin, 2023; Wang, Xia, Guo, Xu, & Zhao, 2022). Thus, it is important for distance education (Artino, 2009, Kruger-Ross & Waters, 2013). However, OLR is a complex phenomenon. Self-directed learning, online communication self-efficacy, computer-use efficacy, learner control, and motivation towards e-learning are some of the elements in this structure (Hung, Chou, Chen, & Own, 2010). Internet & computer self-efficacy is defined as an individual's competence in utilizing technology within online learning environments (Hung et al., 2010). Given the perceived correlation between technical skills in these contexts and learner performance (Peng, Tsai, &Wu, 2006), the significance of this concept becomes evident. The concept of Online Communication Self-Efficacy pertains to an individual's ability to engage in communication within online learning environments, encompassing activities such as commenting, participating in discussions, and fostering collaboration (Ra-

fiee & Abbasian-Naghneh, 2019). It is noted that individuals who actively engage in online discussion forums, which offer significant opportunities for bringing learners and instructors together, tend to be successful students (Roper, 2007). Self-directed learning underscores the learners' proactiveness in aspects such as setting goals, making choices, and conducting online searches for information related to the course or other subjects (Geng et al., 2019). Lin and Hsieh (2001) observed that successful online learners exhibit self-directed behavior, making decisions autonomously to meet their unique needs, pacing themselves, and aligning with their existing knowledge and learning goals. Learner control, as articulated by Snow (1980), suggests that learners may experience advantages when afforded greater autonomy in determining the pace and style of their learning. The flexible nature of online learning environments necessitates individuals to make decisions in activities such as self-pacing, adjusting study schedules, and controlling the types of content accessed. Consequently, learner control assumes a significant position within the context of Online Learning and Resources (OLR). The Component Display Theory by Merrill (1983) and the Elaboration Theory proposed by Reigeluth and Stein (1983) have underscored that learner control is a crucial element for optimizing effective learning and that the degree of learner control may enhance student performance. Motivation towards E-Learning pertains to an individual's inherent desires, attitudes, and preferences concerning online learning (Hung et al., 2010). Motivation has exerted a substantial influence on learners' attitudes and learning behaviors within the realm of educational research and practice (Deci & Ryan, 1985; Fairchild, Jeanne Horst, Finney, & Barron, 2005; Ryan & Deci, 2000). Comprehending students' attitudes and preferences toward learning is imperative for enhancing the design, development, and implementation of educational resources (Federico, 2000).

It was found that the OLR of the participants increased at the end of the semester when compared to the beginning of the semester during the pandemic (İlic, 2021b). However, this impact would change after the transition to blended education. Because OLR and time spent online are correlated positively (Fırat & Bozkurt, 2020; Smith, 2005; Smith et al., 2003). In addition, individuals who spend time online better understand the elements of the process (Venkatesh & Davis, 2000). Thus, it was suggested that OLR, which is the most important dependent variable (Al-Emran, Mezhuye, Kamaludin, 2018; Lin, Lin, Yeh, 2016; Rafiee & Abbasian-Naghneh, 2019),should be investigated in the current flipped classroom approaches.

Ease of Use (EOU)

The student's belief that they can use technology to complete a task with less effort is defined as EOU (Davis, 1989). EOU is the major element in technology acceptance models (Venkatesh & Davis, 2000). Besides, resources affect this variable as well (Sánchez-Prieto, Olmos-Migueláñez, & García-Peñalvo, 2017). In addition, it is stated that EOU is correlated with OLR (İlic, 2022). In this context, it would be fruitful to scrutinize EOU.

In the next section, the relevant literature on these concepts will be addressed, along with a discussion of the purpose of this study.

Literature and Aim of the Study

Although it was not named by the Higher Education Council, it could be said that the model by Chen, Wang, Kinshuk and Chen (2014) was accepted in the higher education institution where the current research was conducted. In this model, the course content is provided online before the class, and discussions and activities are conducted in the live class. Tests are performed face to face. During the height of the pandemic, tests were conducted online. However, with the introduction of face-to-face exams, the model completely changed. In the flipped classroom approach, learners' readiness for online settings is important. Furthermore, the impact of this variable was completely different in both periods. EOU is another important variable. Several studies focused on the flipped classroom model in the literature (Chen et al., 2014; Forsey et al., 2013; İlic, 2021a; Smith et al., 2014; Tang et al., 2023). On the other hand, most of these studies do not cover the pandemic process. In addition, studies examining OLR during the times of COVID are very limited (Ates-Cobanoglu & Cobanoglu, 2021; Çiğdem & Özkan, 2022; İlic, 2022; Magogwe, Mokibelo, & Karabo, 2022). There was no study that examined the variables in the process, which was carried out entirely with distance education during the pandemic and then as a blended. These conditions and the need for studies investigating OLR levels (Ates-Cobanoglu & Cobanoglu, 2021; Yu, 2018), especially the need for longitudinal studies (İlic, 2021b; Tang et al., 2021), show the lack of literature. Thus, the current study aimed to examine the OLR situations of the learners in purely distance and blended learning environments where the flipped classroom is used. In this context, the following research questions will be addressed:

1. Do EOU scores differ across pre-test, post-test and follow-up tests?
2. Do the overall OLR and sub-dimension scores differ in the pre-test, post-test and follow-up tests?
3. Is there a correlation between EOU and OLR scores of the related period?

METHOD

The Research Model

The time-series design was used in the current study. Time series analysis provides significant information about what has happened in a time series in any field over days, weeks, months, or years (Sevilay, 2022).

In the current research, a quasi-experimental model is employed where measurements are gathered within a single group both prior to and following the implementation. (Cresswell, 2003). The model was selected since it allows the observation of changes in systems such as educational environments (Cresswell, 2002). According to the design, the first measurement was made in the fall term of 2020, when distance edu-

cation was fully implemented, the second measurement was made at the end of this term, and the last measurement was made in the fall of 2021, when blended education was introduced.

The Research Group

The participants were determined with the criterion sampling method. In this method, subjects who meet specific criteria are selected (Yıldırım & Şimşek, 2011). The first of the criteria determined for participation in the research is to be registered as a freshman in one of the formal programs of the faculty of education in the 2020-2021 academic year. The other criterion is to continue the registered program in the relevant semester. In addition to these, attendance in each of the pre-, post- and follow-up tests is another important criterion. One hundred thirty-one students attended in the pre-test, 132 joined in the post-test, and 89 attended in the follow-up test. However, the study group included 51 pre-service teachers who participated in all three tests. The majority of the group is female (66.7%) and the ages of the pre-service teachers are between 18 and 22.

Data Collection Instruments

The data collection process was carried out with a scale. This tool is The E-Learning Readiness Scale for College Students (Yurdugül & Demir, 2017). The scale comprises 6 factors and 33 items. These factors encompass Computer Self-Efficacy, Internet Self-Efficacy, Online Communication Self-Efficacy, Self-Directed Learning, Learner Control, and Motivation towards E-Learning. The scale could be accepted as quite reliable (Cronbach Alpha = .93) (Kline, 2000). The value was calculated as .92 for the pre-test and post-test, and .91 for the follow-up test. Based on the data, the internal consistency of the E-Learning Readiness Scale for College Students can be accepted as high (Kline, 2000). In addition to the findings obtained from this scale, questions about demographic information such as age, gender and EOU were asked. Participants scored the EOU between 1 and 10 points as well.

Data Collection

The data collection process was carried out throughout the 2020-2021 and 2021-2022 fall terms. The data collection phase for the pre-test was applied at the beginning of the 2020-2021 fall semester. At the end of the same term, the OLR post-test was employed. During this period, the entire process was conducted completely online due to the pandemic. The next academic year was initiated as blended. Accordingly, some of the courses were conducted remotely and some of them were conducted face-to-face. However, for the courses falling in both categories, materials have been uploaded to the learning management system as in the pandemic process. On the other hand, all exams were conducted face to face. After finishing the first period conducted in this manner, the OLR was used as a follow-up test. There are 131 students attending the pre-test and 132 teacher candidates participating in the post-test. However, 89 students attended the follow-up test. The study group was determined as 51 by eliminating the candidates who did not take part in all the tests. This situation does not pose a problem in terms of the validity of the study, on the contrary, it is considered appropriate in terms of construct and criterion validity since it includes pre-service teachers who participated in all three tests.

Data Analysis and Interpretation

The data were checked for normal distribution before the analysis. Firstly, kurtosis and skewness must be between +2 and -2 (George, 2011). This prerequisite was met for all variables as well. However, multiple conditions should be assessed for normality (Çokluk, Şekercioğlu & Büyüköztürk, 2010). Histograms, quantiles methods and Kolmogorov-Smirnov tests were used as well. According to these methods, it has been determined that the data shows normal distribution. Thus, parametric tests were utilized. The research questions and the analyzes used to investigate the questions are shown in Table 1.

Limitations

The current research has certain limitations. Some of these are research design, the participants, the data collection instrument, and the data.

Findings

Three headings are used to scrutinize the findings. Primarily, the variation in EOU across time is presented. The same findings are used for OLR and sub-dimension variables as well. Last, findings on the relationships between OLR and EOU are given.

EOU

A one-way repeated measures ANOVA was used to investigate the differences among the EOU levels. No significant difference was determined across at least two groups for the EOU variable ($F_{(2, 68)} = 2.130$, $p = .124$). The results are presented in Figure 1.

Based on the results shown in Figure 1, it was a surprising finding that the follow-up test score ($\overline{x}_{\text{follow-up}} = 6.84$) was lower than the others ($\overline{x}_{\text{pre-test}} = 7.25$, $_{\text{post-test}} = 7.35$). This could be due to the negative attitudes of the teacher candidates towards even the smallest mistakes they made after mastering the system.

Table 1: Research Questions and Relevant Analyses

Research Problems	Type of Analysis
1. Do EOU scores differ across pre-test, post-test and follow-up tests?	Repeated measure ANOVA
2. Do the overall OLR and sub-dimension scores differ in the pre-test, post-test and follow-up tests?	Repeated measure ANOVA
3. Is there a correlation between EOU and OLR scores of the related period?	Pearson Correlation

OLR and sub-dimensions

A one-way repeated measures ANOVA revealed no significant difference across groups regarding OLR scores ($F_{(2, 68)}$ = 1.199, p = .306). This was an unexpected finding. On the other hand, it was found that the OLR levels of the participants increased over time, even if it was not significant ($\overline{x}_{follow\text{-}up}$ = 179.10 > $\overline{x}_{post\text{-}test}$ = 177.67 > $\overline{x}_{pre\text{-}test}$ = 174.02). It was suggested that this could be due to the fact that individuals spent more time in online environments. The low level of this increase may be due to the fact that teacher candidates give more importance to face-to-face education in blended education.

A one-way repeated measures ANOVA was conducted to determine the difference between groups regarding computer self-efficacy. The results are presented in Table 2.

As given in Table 2, significant differences were determined across at least two groups. When the scores were scrutinized, it was revealed that the computer self-efficacy levels of the participants increased over time ($\overline{x}_{pre\text{-}test}$ = 22.51, $\overline{x}_{post\text{-}test}$ = 26.76, $\overline{x}_{follow\text{-}up}$ = 27.18). It can be said that this situation may be due to the fact that individuals are constantly taught online.

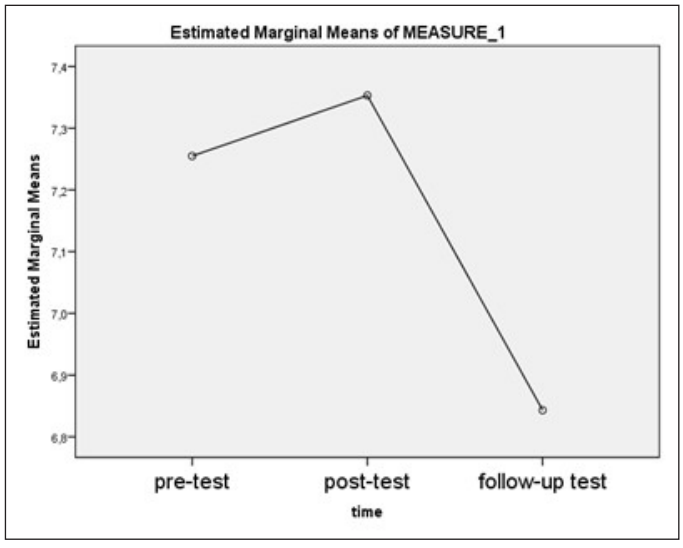

Figure 1: Change of EOU over time.

No significant difference was found across the groups regarding Internet self-efficacy ($F_{(2, 68)}$ = .637, p = .531). It can be said that this situation is also seen in scores and there is no change in general ($\overline{x}_{pre\text{-}test}$ = 24.69, $\overline{x}_{post\text{-}test}$ = 25.27, $\overline{x}_{follow\text{-}up}$ = 24.76). However, it is an interesting finding that there is no increase in a situation where individuals are exposed to the internet so much. It can be said that this finding may be related to the OLR levels of the participants.

A one-way repeated measures ANOVA showed no significant difference among at least two groups regarding online communication self-efficacy ($F_{(2, 68)}$ = .566, p = .569). It was determined that this insignificant difference increased, albeit slightly based on the time of the measurement ($\overline{x}_{follow\text{-}up}$ = 27.55 > $\overline{x}_{post\text{-}test}$ = 27.35 > $\overline{x}_{pre\text{-}test}$ = 26.75). It is thought that this may be due to individuals constantly using online communication tools.

A one-way repeated measures ANOVA was applied to investigate the differences among the self-directed learning levels. The scores are shown in Table 3.

As shown in Table 3, a significant difference was identified among at least two groups regarding self-directed learning. It has been determined that this difference is due to the decrease in self-directed learning levels of teacher candidates over time ($\overline{x}_{follow\text{-}up}$ = 44.76 < $\overline{x}_{post\text{-}test}$ = 46.69 < $\overline{x}_{pre\text{-}test}$ = 47.73). The decrease in this efficacy, which is expected to increase over time, is an interesting finding. It is thought that this situation may be related to the finding in the OLR levels of the participants.

Similar to the findings on Internet self-efficacy, no significant difference was determined for the learner control variable ($F_{(2, 68)}$ = .986, p = .368). Also, it was surprising that the mean scores that were expected to increase remained at the same level or even decreased ($\overline{x}_{pre\text{-}test}$ = 23.88, $\overline{x}_{post\text{-}test}$ = 24.41, $\overline{x}_{follow\text{-}up}$ = 23.55).

Table 2: ANOVA Results on the Computer Self-Efficacy Scores over time

Source	df	SD	MS	F	p<
Time	2	680.876	340.438	24.602	.001
Subjects	50	2649.542	52.991		
Residual	100	1383.791	13.838		
Total	152				

Table 3: ANOVA Results on the Self-Directed Learning Scores

Source	df	SD	MS	F	p<
Time	2	230.157	115.078	6.574	.05
Subjects	50	4139.804	82.796		
Residual	100	1750.510	17.505		
Total	152				

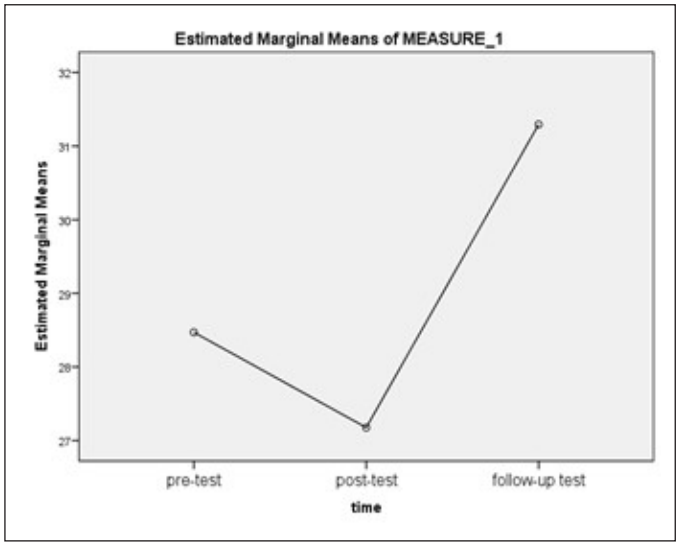

Figure 2: Change of Motivation over time.

A one-way repeated measures ANOVA was used to search the differences across the motivation levels of the study group. The motivation status of the participant is in Figure 2.

As given in Figure 2, significant differences were determined between at least two groups for the motivation variable ($F_{(2, 68)} = 4.346$, $p < .05$). It is thought that the motivation of the participants decreased due to being exposed to distance education completely towards the end of the term. Conversely, it could be suggested that after the transformation to blended education, the decline could have reversed and increased the motivation of participants.

Correlation between the Ease of Use and OLR Scores

All correlations between ease of use and OLR scores of the related period were determined as moderate (Cohen, 1997). First, a moderate relationship was found between the OLR pre-test and EOU ($p < .01$, $r = .418$). Post-test scores of the variables were moderate as well ($p < .01$, $r = .487$). The same moderate correlation was also determined for the follow-up test scores ($p < .01$, $r = .439$).

DISCUSSION

The aim of the study was to examine the OLR levels of pre-service teachers in purely online and blended education systems. Within this context, the readiness of 51 pre-service teachers was investigated. The findings would contribute to the determination of student readiness in flipped learning environments in distance education, which became the new normal in education with the pandemic. This will enable a more thorough examination of OLR, a critical factor in the success of online environments.

The findings demonstrated that the OLR levels of the participants did not change with the adoption of blended education. This finding was inconsistent with the findings in the literature (Chung, Subramaniam, & Dass, 2020; Martin, Stamper, & Flowers, 2020; Çiğdem & Özkan, 2022; İlic, 2021b; Magogwe et al., 2022; Yurdugül & Demir, 2017). Previous studies reported that individuals required orientation to online learning content for an increase in their readiness. An increase in readiness was found between the beginning and the end of the period when only distance education was implemented. However, it was observed that the OLR levels of the participants decreased after the transition to blended education. Thus, it could be suggested that the system became stagnant after development, and the pre-service teachers started to underestimate their achievements.

In the study, a significant difference was determined regarding computer self-efficacy. It was found that pre-service teachers exhibited progress in these skills over time. This finding overlaps with the existing studies (Hung et al., 2010; İlic, 2022). Since even the time spent online contributes to the OLR (Smith, 2004; Smith et al., 2003; Venkatesh & Davis, 2000), this finding was not a surprise.

In contrast to the difference found in computer self-efficacy, no difference was identified in internet self-efficacy. It was observed that the mean scores were similar. This finding contradicts with the literature (Hung et al., 2010; İlic, 2022). Since spending time on the internet is associated with OLR and Internet self-efficacy (Fırat & Bozkurt, 2020; İlic, 2022), the finding was quite interesting. It could be suggested that this finding could be due to the OLR levels of the teacher candidates.

In the study, no difference was determined in online communication self-efficacy. Since there is a high correlation between internet self-efficacy and online communication self-efficacy (Yu, 2018), the finding was normal. Besides, albeit insignificant, online communication self-efficacy increased during the application. This finding was in line with the existing research (İlic, 2022). However, it should be noted that these findings were determined for individuals who were constantly online. This could be associated with the transition to blended education. Furthermore, undesired online communications that individuals have experienced (İlic, 2021b) could also have affected these outcomes.

In the research, a significant difference was revealed across the measurements in self-directed learning. However, it was determined that the difference was due to the decrease in the skill over time. The finding was inconsistent with the literature (Hoang & Hoang, 2022; İlic, 2022). Active use of online learning environments requires high self-directed learning skills (Daniel & Moore, 2000; Li & Yang, 2016). Thus, this study finding was interesting. This finding on self-directed learning could be due to the stagnation of the OLR levels and the lack of attendance in real classroom environments. Because unlike conventional face-to-face education, online learning does not ensure participation (Cheon, Lee, Crooks, & Song, 2012; Li & Yang, 2016; Rotellar & Cain, 2016).

The present study findings revealed no difference in learner control. This finding was consistent with the literature (İlic, 2022). Learner control entails the control of the individual in self-learning (Shyu & Brown, 1992). Learners who could control self-learning could achieve better learning outcomes (Hung et

al., 2010; Merrill; 1984; Reigeluth & Stein, 1983). However, the flexibility and freedom in online learning environments could harm learning when compared to conventional education (Lin & Hsieh, 2001). Thus, the reasons behind this finding should be investigated further.

The study findings demonstrated the motivations of the learners in e-learning changed over time. Motivation is considered as the most important variable in OLR (Federico, 2000; Khan, 2009; YÖK, 2020). Thus, it should be emphasized. It was found that the motivation of the pre-service teachers decreased during online education and increased during blended education. This finding contradicts with the study reports by the İlic (2022). On the other hand, the study finding was consistent with the fact that the learners were frustrated in the process due to several difficulties experienced by the participants during the online application of the flipped classroom (İlic, 2021a). It was quite normal that the motivation of the students, who were eager to return to face-to-face education and the old normal, increased with the blended education.

In the research, a significant relationship was revealed between OLR and EOU. Related finding overlaps with the literature (İlic, 2022). Also, EOU is a significant variable in technology acceptance models (Venkatesh & Davis, 2000), leading to this finding. It was also revealed that the EOU of the study group decreased over time, although the difference was not significant. Available resources are crucial for the employment of technologies in education (Sánchez-Prieto et al., 2017), and for the EOU. Thus, it was surprising to determine a contradictory finding since it was expected to increase in time. It could be suggested that this was due to the increasing experience of the novice participants over time and starting to describe even the smallest mistakes as problems associated with ease of use. Thus, the EOU variable should be emphasized in future studies on learner readiness.

CONCLUSION and SUGGESTIONS

In brief, it was found that the OLR levels of the teacher candidates that were expected to improve in the study, remained the same. Similar to OLR, it was determined that individuals' Internet self-efficacy, online communication self-efficacy, and learner-control levels did not change. The sub-dimensions that exhibited expected findings were e-learning motivation and computer self-efficacy. It was determined that both variables increased during the process. On the other hand, the only value exhibited reduction was self-directed learning. The findings on EOU showed that the variable was correlated with OLR. It was also determined that the EOU score decreased over time. It could be suggested that the current findings were significant in reflecting the OLR of individuals in completely online and blended education. It should be noted that achieving successful outcomes in such environments is not solely reliant on technology but rather heavily dependent on effective pedagogy (Schmid et al., 2023), emphasizing the importance of using technology as a catalyst, as argued by Clark (1994). In this context, future studies could contribute to the literature:

- Studies investigating the online satisfaction levels of the participants could be conducted in addition to OLR.
- Qualitative studies delving into the driving forces of the present findings could be carried out.
- Longitudinal research examining different states of OLR can be set.
- Further modeling studies that would consider several variables could be conducted.

Certain evidence-based practical recommendations could be listed as follows:

- Institutions should develop learning environments based on the OLR levels of the learners.
- OLR levels of learners should be increased with the development of action plans that would also improve the ease of use of individuals for a better pedagogy.
- The transition to blended learning should be accompanied by the consideration of individuals who, as evidenced by findings, may exhibit a decline in their academic performance, taking into account characteristics such as self-directed learning, by educational institutions.

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