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Üniversite Öğrencilerinin Web Tabanlı Biçimlendirmeye Yönelik Değerlendirme Sistemini Kabul Durumlarının İncelenmesi

Fatma Gizem KARAOĞLAN YILMAZ*, Ramazan YILMAZ**, Tuğba ÖZTÜRK***

Makale Bilgisi	ÖZET
Geliş Tarihi: 10.04.2020	Bu araştırmada, öğrencilerin biçimlendirmeye yönelik değerlendirmelerinin yapılabileceği bir "Web Tabanlı Biçimlendirmeye Yönelik Değerlendirme (WTBYD)" sistemi geliştirilmiştir. Bu sistem, öğrencilerin performanslarına yönelik madde bazında ayrıntılandırılmıştır ve test bazında ölçüt-referanslı anlık dönütler sağlamaktadır. Çalışmada, öğrencilerin geliştirilen WTBYD'yi kabul durumlarının incelenmesi amaçlanmıştır. Araştırma ters-yüz öğrenme modeli yaklaşımı ile işlenen Bilgisayar I dersi kapsamında 381 üniversite öğrencisi üzerinde gerçekleştirilmiştir. Araştırmanın uygulama süreci 12 hafta sürmüş olup, her haftanın sonunda öğrenciler WTBYD'ye katılmıştır. Araştırma verileri web tabanlı değerlendirme sistemini kabul ölçeği ile toplanmıştır. Araştırma bulguları WTBYD'yi kabul yapısının; yarar algısı, kullanım kolaylığı, bilgisayar öz-yeterliği, sosyal etki, içerik algısı, beğenme durumu, ilgi durumu ve kullanım niyeti bileşenlerinden oluştuğu görülmüştür. Araştırmadan elde edilen bulgular doğrultusunda WTBYD'yi geliştirme ve kullanma noktasında öğretmenlere, öğretim tasarımcılarına, karar vericilere ve araştırmacılara çeşitli önerilerde bulunulmuştur.
Kabul Tarihi: 02.09.2020	
Erken Görünüm Tarihi: 29.09.2020	
Basım Tarihi: 30.09.2020	
Anahtar Sözcükler: Anlık dönüt, web tabanlı biçimlendirmeye yönelik değerlendirme, kabul durumları	

Examining University Students' Acceptance of Web-based Formative Assessment System

Article Information	ABSTRACT
Received: 04.10.2020	In this research, a Web-based Formative Assessment System (WBFAS) was developed for students to support their formative assessment on their learning experiences. The system provides students with instant feedback which is detailed based on items and criteria-referenced based on tests. The present research aims to examine students' acceptance of WBFAS. The research was conducted on 381 university students who are enrolled in Computer I course designed with Flipped Classroom model. The implementation of the research lasted 12 weeks, and at the end of each week students participated in WBFAS. The data of the research were obtained with the scale of acceptance of web-based assessment system. It has been found that the structure of acceptance of WBFAS was consisted of elements of computer self-efficacy, ease of use, social influence, perceived content, state of enjoyment, state of interest, perceived usefulness and usage intention. Based on the findings derived from the research, several suggestions were proposed for teachers, instructional designers, decision-makers and researchers regarding the development and use of WBFAS.
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1. INTRODUCTION

Today, in line with the developments in digital technologies, the amount of information has been growing rapidly, and individuals and societies have been experiencing a digital transformation. It is important that today's learners -as expressed as

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the learners of 21st century- could adapt to the changing conditions of society and life. In this sense, the knowledge and abilities such as technological literacy, problem solving skills, creativity, critical thinking, interpersonal skills, leadership, cognitive flexibility are seen as fundamental proficiencies today (Care, 2018; World Economic Forum, 2016).

The digital transformation which is experienced at individual and social terms together with the developments in information and communication technologies affects education. Accordingly, learning process and environments have begun to be designed based on digital technologies and 21st century learner abilities. In this respect, in the recent years, the studies on web-based assessment approaches and systems have been accelerated (McCarthy, 2017; McLaughlin, & Yan, 2017; Hooshyar et al., 2016). This assessment approach, called as web-based formative assessment system (WBFAS), is applied using web-based tools and systems in the instruction process. In this approach, by identifying learning inadequacies/difficulties/mistakes of the students it is aimed at taking precautions to prevent these undesired experiences. In WBFAS, it can be ensured that students are enabled to review their learning process by giving them instant and detailed feedback. This, at the same time, facilitates individualization of instruction. Students have the opportunity to participate in WBFAS whenever and wherever they want. So, this creates a facility for flexible learning.

WBFAS could be useful for understanding the learning process and outputs of learners. However, one of the important factors affecting whether this type of assessment approaches reach their aim is related to what extent students accept WBFAS approach. It is seen that there are only a few studies on acceptance and use of WBFAS in the literature. Different from existing studies, in the present research, a WBFAS system where students receive feedback which is detailed based on items and criteria-referenced based on tests is developed. Within the scope of the research, student's level of acceptance of this system is analyzed. In this manner, this research has a unique value, and it is thought that findings obtained from this research will improve the flow and depth of the research with respect to the design and use of WBFAS systems.

1.1. Theoretical Background

1.1.1. Self-assessment, web-based formative assessment and feedback

Formative assessment are the evaluations which are performed any time during the instruction process and which provide feedback to the learner to improve learning (Sadler, 1989). This assessment type is mostly used by teachers to give feedback to the students during the learning process. The results obtained from the formative assessment can be used to improve student success and make changes in the instruction process and strategies (Dunn & Mulvenon, 2009). Formative assessment enables a student to observe his/her learning process.

WBFAS is an assessment in which feedback is provided automatically and instantly to the learner through web-based system and tools. WBFAS can be differentiated from traditional formative assessment applications with regard to aspects that WBFAS can be applied at any time and place desired, provide instant feedback to the student, the assessment can be individualized and WBFAS can be repeated as much as wanted. WBFAS can be used for objectives such as ensuring student's participation in the online learning process, increasing student's motivation, allowing the student to monitor and assess his/herself. And this is of importance and value with regards to enabling individualization of instruction. There has been an increasing interest in WBFAS in recent years in terms of enabling individualized instruction, targeting constant development of students and handling student's assessment with an integrative manner throughout the process.

In the literature, there are different tools and methods used for WBFAS. The methods such as game-based assessment, peer assessment, e-portfolio creation, online discussions and cooperative assessment are used in this process (Gikandi et al., 2011; Hooshyar et al., 2016; McLaughlin & Yan, 2017). Furthermore, one of the most preferred methods in formative assessment is self-assessment. Self-assessment is a process that learner assesses how much he/she learned something based on his/her criteria and makes a judgement. (Leach, 2012). Web-based self-assessment is an assessment where students can test themselves to make a valid and reliable judgement about their level of knowledge and ability, and one or several supportive activities such as graded scoring keys can be found. The main objective of self-assessment is to allow learners to determine strong and weak aspects of their performance and enhance their learning (McMillan, 2007). Thus, self-assessment has a crucial role in formative-based assessment (Andrade & Valtcheva, 2009). The keyword for effective self-assessment is feedback.

Feedback is a special explanation to give information regarding a specific study of the learner (Brookhart, 2008). It is anticipated that feedback is used by instructors to format the instruction and by learners to format their own learning process (Black & Wiliam, 2009). Feedback gives the information about at which level the learner is in the process of formative-based assessment and what the learner needs to know. Feedback initiates the motivation factor by developing the control sense of the learners on their own learning (Brookhart, 2008). Furthermore, it is stated that there is a correlation between the regular feedbacks provided on learner's academic performance and the progress of his/her next academic performance (Tuckman, 1999).

It has been remarked that formative-based assessment done to form the instruction attracts little interest, especially in a traditional learning environment, although it is continuously emphasized that it significantly contributes to the learning-instructing process (Pachler et al., 2010; Wang, Wang, & Huang, 2008). Because, in traditional formative assessment, providing personalized feedback is a process that requires time-consuming and serious efforts (Cukusic, Garaca, & Jadric, 2014).

Moreover, constraints such as the time limit in the curriculum and crowded classrooms can also be obstacles. On the other hand, especially assessment practices in web-based/technology-based formative assessment has advantages in providing instant and adaptable feedback to the learners. The learners can participate in formative assessment activities in flexible time and location and can do self-assessment by obtaining feedback. In the present study, WBFAS in the form of multiple-choice tests on the topics of that each week are conducted to the learners at the end of the week. In these tests, by applying formative assessment where learners can receive feedback, which is detailed based on items and criteria-referenced based on tests, it is aimed that learners can do self-assessment.

1.1.2. Web-based formative assessment acceptance

Technology Acceptance Models (Davis, 1989) could be utilized for examining structures affecting acceptance and adoption of an emerged technology by the target group. Terzis and Economides (2011) remark that the acceptance of learners is essential in order to acquire expected benefits from formative-based assessment systems. Accordingly, Terzis and Economides (2011) revealed an acceptance model in order to present learners' behaviour on web-based assessment (CBA) use and intention towards technology acceptance models.

There are eight factors in this model that are developed to identify learners' intentions to use CBA systems. These factors are perceived enjoyment, "perceived usefulness, perceived ease of use, perceived computer self-efficacy", social influence, facilitative conditions, goal expectancy, and content in order (Yurdugül & Bayrak, 2014, p. 184). Perceived usefulness is the level of belief towards that learners' use of assessment system improves their performance. Perceived ease of use refers to learners' belief towards using the system with less effort (Davis, 1989). Computer self-efficacy is learners' belief towards their abilities on computer use (Compeau & Higgins, 1995). Social influence refers to the effect of immediate surroundings (teacher, manager, parents, peer, etc.) on learner's behavior and beliefs (Terzis & Economides, 2011). Content is explained as the relation of the questions in the assessment system with the content of the subject (Terzis & Economides, 2011).

It is important to understand why a tool and/or learning environment designed for instruction is adopted or not since the goal is actually not only to create the tool and learning environment but also to ensure their use and sustainability (Usluel & Mazman, 2010). Drawing on this, learners' acceptance status of WBFAS developed is analyzed within the scope of the research.

1.2. Literature Review

In their research, Karay et al. (2012) compared the effect of CBA and paper-based assessment methods on the acceptance of formative assessment. As a result of a research study carried with medicine students, no difference was observed on the general acceptance of two types of assessment on pre-clinic phase of medicine education. However, in the clinic phase, a significant difference was observed in favor of CBA. As a result of the research, it is stated that providing immediate feedback could increase the acceptance of CBA. In their study, Terzis and Economides (2011) studied the effect of gender on the acceptance of CBA. The results of the research showed that the factors of perceived ease of use and perceived playfulness are essential for women on acceptance. On the other hand, perceived playfulness and perceived usefulness are the most crucial aspects for men. This shows that in the condition where the content of CBA is clear and enjoyable, the acceptance level could be high. In their research, Terzis et al. (2012) analyzed the effect of student's personality aspects on CBA acceptance. As a result, students' personality traits are found effective on acceptance.

In the research of Terzis et al. (2012, p. 718), the effect of emotional feedback on CBA acceptance was studied. It was observed that emotional feedback has a direct effect on Behavioral Use Intention". It was determined that "emotional feedback has effect on playfulness, benefit and ease of use. In their research, Terzis et al. (2012) analyzed the factors effective on students' CBA continuance acceptance. The results of the research showed that ease of use and enjoyment factors are effective on CBA's continuance acceptance. In their research, Terzis et al. (2013) compared the difference between cross-cultural issues in CBA acceptance. In this context, they compared the students' CBA acceptance in Greece and Mexico. The results of the research show that the structure of CBA acceptance is valid for both cultures and "Greek students' behavioral intention is triggered mainly by Perceived Playfulness and Perceived Ease of Use, while Mexican students' behavioral intention is caused by Perceived Playfulness and Perceived Usefulness" (Terzis et al., 2013, p.411).

Lin and Lai (2019) analyzed the effect of self-arrangement on CBA acceptance model factors. In the results of study, it is noted that perceived performance expectancy and social influence considerably affect CBA acceptance. The effort expectancy of the students who have low self-arrangement abilities has significantly higher level of effect on behavioral intention compared to the students who have high self-arrangement abilities. Furthermore, it is noticed that the students who have high self-arrangement skills are significantly effective on CBA behavioral intention.

1.3. Problem

In the literature, there are several research studies regarding students' acceptance towards CBA. In these studies, researchers have attempted to put forward a model in order to identify the general acceptance of students. Also, in some studies, it is seen that acceptance cases are compared in terms of several variables such as self-arrangement. However, there is a gap in the

literature on how different feedback types, such as immediate feedback has an effect on CBA acceptance (Karay et al., 2012; Terzis et al., 2012). In addition, it is observed that today WYBYD has begun to be utilized with the widespread use of web-based tools. Nevertheless, when the literature is analyzed, it is observed that research findings on the acceptance of WBFAS are needed. Accordingly, in the present study, a WBFAS system is developed where university students can perform their formative self-assessment and receive feedback, which is detailed based on items and criteria-referenced based on tests. In this research, students' acceptance of WBFAS is analyzed.

2. METHOD

Quantitative method was used in the present study. Descriptive methodology was used to explore the status of the students' acceptance and use of WBFAS.

2.1. Participants

The participants of the research consisted of 381 undergraduate students studying in a Turkish public university enrolled in Computer I course. The students took their Computer I course according to FC model. At the end of each week, students participated in formative assessment with regard to the topic of the week in a learning management system. Students were from the departments of Turkish Language and Literature, Contemporary Turkish Dialects and Literature, History, Turkish Language Education, Elementary Mathematics Education, Political Science, and Public Administration. 134 of students (35.2%) are male and 247 of them (64.8%) are female. Students participated voluntarily. The ages of the students vary between 18 and 25.

2.2. Data Collection Tools

The data of this research was collected from a personal data collection form and a web-based assessment system acceptance scale.

2.2.1. Personal data collection form

The form was developed by the researchers of the present study. In the form, several questions regarding demographic information of the participants such as gender, department and age are addressed.

2.2.2. Web-based assessment system acceptance scale

The scale developed by Yurdugül and Bayrak (2014) and revised by Alır (2015) is used in order to identify the students' web-based assessment acceptance. The scale consists of eight dimensions which are "perceived usefulness, perceived ease of use, computer self-efficacy, social influence" (Terzis & Economides, 2011a, p. 1032), perceived relationship with the course content, perceived enjoyment, interest and behavioral intention. 5-point likert scale ranks from 'I don't agree' (1) and 'I totally agree' (5). The Cronbach Alfa confidence values of scale factors which are re-calculated for this research range from .82 to .91. The high score obtained from the scale indicates that students have high acceptance status for WBFAS.

Whether the scale data demonstrates normal distribution or not was examined and it was observed that the data distribute within the range of +1 to -1. Hence, it was seen that the data shows normal distribution. KMO (Kaiser-Meyer-Olkin) coefficient and Bartlett Sphericity test were used to ensure the sample and data are suitable for factor analysis. According to Hair et al. (1998), it is noted that if KMO is higher than .060 and Bartlett test is significant, then data is suitable for factor analysis. KMO coefficient was calculated as .87 for web-based assessment system acceptance scale. It is determined that since the value is higher than .60, the data is suitable for factor analysis. The Bartlett test for the scales was meaningful ($p < 0.05$). Thus, the questionnaires were deemed suitable for factor analysis.

2.3. Web-based Assessment Environment and Study Process

The research was carried out in Computer I course, which was designed according to Flipped Classroom (FC) model. In accordance with the FC model, the first stage of the course was delivered online. Moodle, a learning management system (LMS), was used as a learning environment in the research. Online courses were held in Moodle LMS. The researchers were asked to upload the videos of the week on the LMS to let the students prepare for the topics. In accordance with the FC model, the second stage of the course was delivered face to face in the computer laboratory. Students practiced applications on the subjects in the computer lab. At the end of the relevant week, students conducted formative assessment application over LMS. The learning process proceeded in a similar way over the course of 12 weeks. Within the scope of the course, students learned about basic computer hardware, operating systems, word processor, presentation and spreadsheet software. The formative assessment application was prepared using Moodle's quiz tool. The screenshot of the WBFAS system is presented in Figure 1.

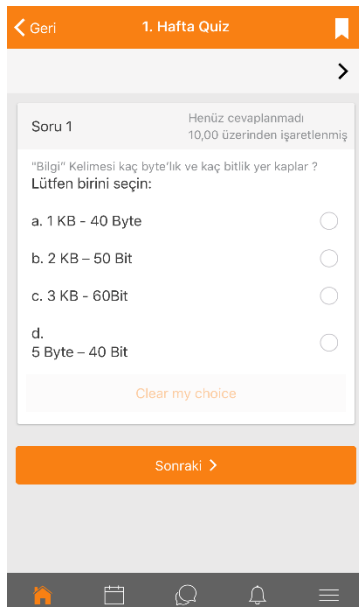


Figure 1. Screenshot of WBFAS

The exam was prepared in the form of multiple-choice test. A quiz consisting of 30 questions was prepared every week. Feedback was provided to each distracter question. When the student answered the question incorrect, an explanatory feedback was provided instantly to clarify why his or her answer was wrong. Thus, the student could see which subjects he/she is lacking. When the student completes the exam, a report showing which questions the student answers correct and which ones wrong, what score the student gets from the exam is presented to the student. The aim in the formative assessment is to enable the students to review their learning process, then discover and correct what he or she knows incorrect and missing. In this manner, it is designed in a way that the students can re-take formative assessment as much as they want. The students can practice the exam whenever and wherever they want and there is no time-limit for the exam practice. The students can answer the questions by contemplating on them as much as they want. In other words, whenever the students sit for the exam, the order of the questions are randomly assigned.

2.4. Data Analysis

Data set of the research was analyzed in terms of suitability for the factor analysis. For this purpose, the data set was analyzed with regards to sample size, normality, linearity and multiple-linearity, and it was found that data set was suitable for factor analysis.

3. FINDINGS

3.1. Acceptance of WBFAS

Students' acceptance status of WBFAS system was analyzed in accordance with the goal of the research. For this purpose, primarily, descriptive statistics related to the factors in the web-based assessment system acceptance structure were calculated. The findings are shown in Table 1.

Table 1.
Results for the Measurement Model

Construct items	Mean	Standard deviation	Factor loading (>0.7)	Cronbach a (>0.7)	Composite reliability (>0.7)	Average variance extracted (>0.5)
Perceived Usefulness	11.09	2.82		0.921	0.90	0.75
Item1			0.901			
Item2			0.860			
Item3			0.841			
Perceived Ease of Use	11.53	2.90		0.910	0.94	0.85
Item1			0.931			
Item2			0.916			
Item3			0.921			
Computer Self-Efficacy	11.49	2.67		0.878	0.92	0.80
Item1			0.919			
Item2			0.902			
Item3			0.870			
Social Influence	11.06	2.65		0.816	0.89	0.73
Item1			0.867			
Item2			0.828			
Item3			0.869			
Content	11.31	2.63		0.857	0.91	0.77
Item1			0.870			
Item2			0.890			
Item3			0.887			
Enjoyment	7.20	2.02		0.879	0.94	0.89
Item1			0.945			
Item2			0.945			
Interest	7.25	1.98		0.877	0.94	0.89
Item1			0.944			
Item2			0.944			
Behavioral Intention	10.48	3.10		0.922	0.95	0.86
Item1			0.917			
Item2			0.930			
Item3			0.944			

On looking at Table 1, it is seen that the values of Factor loading, Cronbach a, Composite Reliability, and Average Variance Extracted are over the threshold levels. In other words, it could be said that validity and reliability of factors and factor items are acceptable. The correlation values between the factors in the model are presented in Table 2.

Table 2.
Correlation Values between the Factors in the Model

		Perceived Usefulness	Perceived Ease of Use	Computer Self-Efficacy	Social Influence	Content	Enjoyment	Interest	Behavioral Intention
Perceived Usefulness	r	1							
Perceived Ease of Use	r	.757**	1						
Computer Self-Efficacy	r	.695**	.812**	1					
Social Influence	r	.799**	.767**	.736**	1				
Content	r	.809**	.753**	.728**	.819**	1			
Enjoyment	r	.775**	.716**	.698**	.764**	.749**	1		
Interest	r	.789**	.667**	.676**	.765**	.775**	.859**	1	
Behavioral Intention	r	.735**	.613**	.615**	.735**	.687**	.809**	.839**	1

** . Correlation is significant at the 0.01 level (2-tailed).

On looking at Table 2, correlation values between scale structures vary between .613 and .859. According to Pallant (2001), the situation when correlation values are $r = .10$ to $.29$ shows small, when $r = .30$ to $.49$ shows moderate and when $r = .50$ to 1.0 shows strong relationship. The structural patterns as part of the acceptance model established by Terzis and Economides (2011) are given in Figure 2.

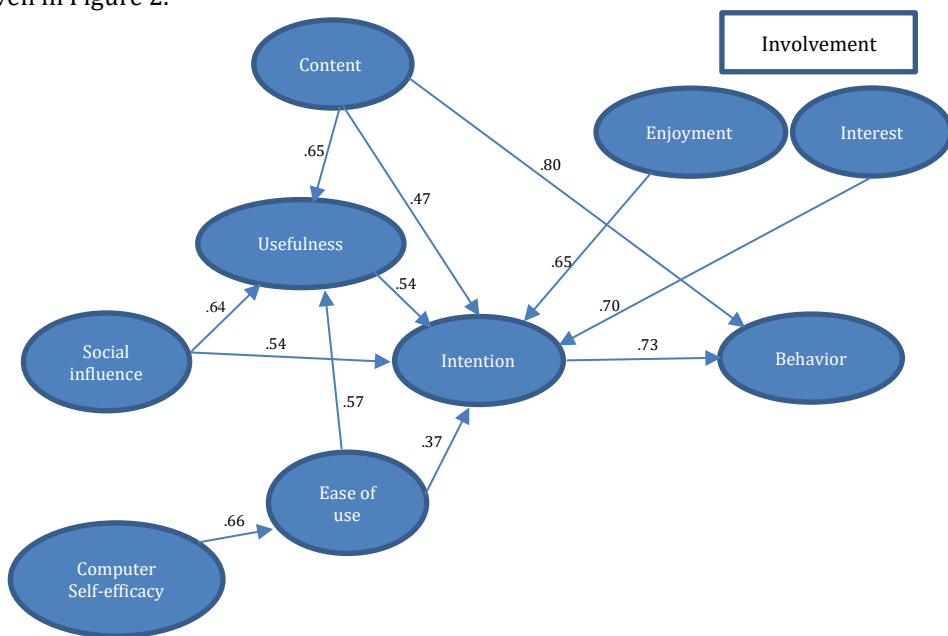


Figure 2. The pattern and parameter estimates of web-based formative assessment acceptance model

The estimate values obtained in Figure 2 are statistically significant at 0.05 level. Accordingly, it is found that all effects specified in the model that are put forward for students’ formative assessment are statistically significant. These estimate values are constructed and presented in Table 3 based on the results of path analysis.

Table 3.

The Parameter Values and Trial Results of Web-based Formative Assessment Acceptance Model

Affecting Variable	Affected Variable	R ²	Result
Perceived ease of use	Behavioral Intention	0.37*	Has effect
Perceived Usefulness	Behavioral Intention	0.54*	Has effect
Social influence	Behavioral Intention	0.73*	Has effect
Content	Behavioral Intention	0.47*	Has effect
Enjoyment	Behavioral Intention	0.65*	Has effect
Interest	Behavioral Intention	0.70*	Has effect
Perceived ease of use	Perceived usefulness	0.57*	Has effect
Content	Perceived usefulness	0.65*	Has effect
Social influence	Perceived usefulness	0.64*	Has effect
Computer self-efficacy	Perceived Ease of Use	0.66*	Has effect

As given in Table 3, it is found that social influence variables (such as family, teacher and peer guidance) has the most effect ($b=0.73$; $P\leq 0.05$) over the learners' use of intention of WBFAS. Next, it was observed that interest in the system ($b=0.70$; $P\leq 0.05$) and the state of the enjoyment by the system ($b=0.65$; $P\leq 0.05$) respectively have the most effect. It was observed that the perceived usefulness ($b=0.54$; $P\leq 0.05$) that students get by using the system has fourth most effect over intention. It is also noted that the fact that students see the system contents as important ($b=0.47$; $P\leq 0.05$) and find the use of system easy ($b=0.37$; $P\leq 0.05$) are other important factors affecting the intention of students on the use of system.

It is possible to assert that what affects the perceived usefulness towards the use of WBFAS would be an important finding in acceptance model. It was observed that the most important variable that is effective over the perceived usefulness that use of system would provide to the students was perceived relationship with the course content ($b=0.65$; $P\leq 0.05$). It was also observed that a further factor that is significant over perceived usefulness is social influence ($b=0.64$; $P\leq 0.05$) variable (such as family, teacher and peer guidance). Easiness to use the system ($b=0.57$; $P\leq 0.05$) is another factor effective over the perceived usefulness of students. The fact that students' having a high level of computer self-efficacy ($b=0.66$; $P\leq 0.05$) indicates that the system could be used more easily by the students.

It was observed that the most important factor effective over the attitude of students towards the use of system was social influence ($b=0.82$; $P\leq 0.05$). Therefore, recommendation of people who are close to the students such as a family, a teacher and a peer towards using the system is important. As perceived content, the situation that the question contents/feedback in the system are deemed important and beneficial ($b=0.80$; $P\leq 0.05$) by the students significantly affects the attitude of students towards the use of system. A further factor effective on the attitude of students towards the use of system is intention of use ($b=0.73$; $P\leq 0.05$). Accordingly, if students significantly have an intention to use the system, then their intention could considerably be observed in their behaviors to use.

4. DISCUSSION AND CONCLUSION

In this research, a WBFAS was designed for students so that they can do a formative assessment on their learning experience in Computer I course. In the system where WBFAS is used, students can receive feedback which is detailed based on items and criteria-referenced based on tests regarding their performance. Within the scope of the research, factors affecting behavioral intentions of the students towards the use of WBFAS were analyzed. The results are presented as follow.

The findings of the research reveal that the relations among perceived usefulness, perceived ease of use, computer self-efficacy, social influence, perceived relationship with the course content, enjoyment, interest and behavioral intention dimensions that were situated in WBFAS acceptance model are at high level. Based on the results of the research;

- The factors effective on behavioral intention are identified as social influence, enjoyment, interest, perceived usefulness, perceived content, and perceived ease of use.
- The factors effective on perceived usefulness are identified as perceived content, social influence, and perceived ease of use.
- The factor effective on perceived ease of use is identified as computer self-efficacy.

It is observed that the most important factor which is effective on behavioral intention is social influence. Consequently, social factors have critical role on enabling students to develop their acceptance and use of WBFAS. Peers of students and teachers act as the social determinants. Behavioral examples, attitudes, intentions, recommendations and advices of peers and teachers towards the use of WBFAS are influential on other students' use of WBFAS. Accordingly, favourable social factors will also develop behavioral intention of students. Mazman, Usluel and Çevik (2009) explain that social influence affects directly or indirectly the intention of use and emphasize that peer influence is significant.

A further factor effective on behavioral intention is interest. Boosting interest of the students towards WBFAS will affirmatively affect the behavioral intention towards the use of WBFAS. In this sense, it is important to develop an interface and contents that can attract the attention of the students while designing WBFAS system. These are the components aiming at enhancing the interaction between student-content and student-interface. Improving the interaction between student-content and student-interface will also favourably affect the students' state of enjoyment from the system of WBFAS. Enjoyment is another factor effective over behavioral intention. It is considered that the results of the present research are consistent with the literature. In some studies, it is observed that enjoyment and interest factors are dealt under the perceived playfulness. According to the results of the research, it is found that perceived playfulness is one of the factors affecting behavioral intention (Moon & Kim, 2001; Terzis & Economides, 2011a; Wang et al., 2009).

The fact that WBFAS system supports the perceived usefulness of the students is important over the development of behavioral intentions. In this manner, in order to improve the perceived usefulness of students, it is necessary that the feedback regarding formative assessment questions and question choices in the system contribute to the learning process of the students, allowing them to learn new matters and to realize their learning deficiencies. Furthermore, it is crucial that questions are associated with the topic content of relevant week. Therefore, it is critical to pay attention to these issues with regard to the design of questions and feedback. These, at the same time, will improve positively the perceived content of the students. The more perceived content of the students is supported, the more behavioral intention is supported. In other words, it is observed that perceived content affects positively the behavioral intention in CBA, as the results of the present research confirms (Terzis & Economides, 2011a; Terzis et al., 2013; Nikou & Economides, 2017b).

A further factor affecting behavioral intention is the ease of use. The research shows that perceived ease of use is effective on the intention of use of CBA system (Terzis & Economides, 2011a; Terzis, Moridis, & Economides, 2013; Terzis, Moridis, Economides & Mendez, 2013; Nikou & Economides, 2017a, 2017b). Similarly, in the present research it is found that the ease of use of WBFAS system affects behavioral intention. It is important that the use of WBFAS system should be easy. The fact that system can work properly with different hardware such as desktop computer, tablet, and smartphones and that the design of interface is efficient, productive and attractive will increase the ease of use. As a matter of fact confirming this finding, Nikou and Economides (2017b) concluded that the user interface affects the ease of use.

The factors effective on students' perceived usefulness towards WBFAS system are identified as perceived content and social influence. In this sense, the fact that use of interface is easy, design of the content is efficient (questions and feedback), and the peer and teachers of the students provide affirmative opinion and guidance regarding the use of system will increase the perceived usefulness of the system. These are, at the same time, the factors affecting behavioral intention. In the research of Terzis and Economides (2011a), it is seen that perceived content is one of factors effective over perceived usefulness. In their research, Nikou and Economides (2019) concluded that the elements (perceived content, ease of use etc.) associated with output quality which is specified as instructional design factors are effective on perceived usefulness.

Students' having high level of computer self-efficacy is a factor ensuring the perceived ease of use with regard to the use of WBFAS system. Therefore, it is important that teachers who want to utilize similar applications in the education process should support students' computer self-efficacy. In their research, Terzis et al. (2013) concluded that computer self-efficacy is effective on perceived ease of use. In their research, Nikou and Economides (2017b, 2019) found that students' computer self-efficacy on mobile learning is effective over perceived ease of use.

The present research is carried out with undergraduate students who are taking Computer I course. By doing similar studies in different subjects/courses, the results can be compared. In a similar way, by carrying out a similar study with the groups such as students in secondary school or high school, the results of the model with regard to the age factor can be compared. Along with the students, it is also important to analyze behaviors of the teachers on the acceptance and use of WBFAS systems since the teachers have a critical role in students' behaviors on use under the social effect condition. Finally, with the variables which are likely to affect the attitude of educational components on use of WBFAS system such as computer literacy, computer anxiety, attitude, and gender, the learners' attitude on acceptance and use of WBFAS system could be examined.

Research and Publication Ethics Statement

Subjects of the research voluntary participated to the study. Name of the participants were kept anonymous.

Contribution Rates of Authors to the Article

Authors equally contributed to the article.

Statement of Interest

The authors of the present article declare that there is no conflict of interest.

5. REFERENCES

- Alır, A. (2015). *Investigating secondary school students' acceptance of web based formative assessment system and students' interaction with different feedback types*. Doctoral dissertation, Hacettepe University, Ankara, Turkey.
- Andrade, H., & Valtcheva, A. (2009). Promoting learning and achievement through selfassessment. *Theory into Practice*, 48(1), 12-19.
- Black, P. J., & William, D. (2009). Developing the theory of formative assessment. *Journal of Personnel Evaluation in Education*, 21(1), 5-31.
- Brookhart, S. M. (2008). *How to give effective feedback to your students*. Alexandria, VA: ASCD
- Care, E. (2018). Twenty-first century skills: From theory to action. In E. Care, P. Grifn, & M. Wilson (Eds.), *Assessment and teaching of 21st century skills: Research and applications*. Cham: Springer.
- Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: development of a measure and Initial test. *MIS Quarterly*, 19(2), 189-211.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13, 319-340.
- Dunn, K. E. & Mulvenon, S. W. (2009). A critical review of research on formative assessment: The limited scientific evidence of the impact of formative assessment in education. *Practical Assessment, Research & Evaluation*, 14(7), 1-11.
- Gikandi, J. W., Morrow, D., & Davis, N. E. (2011). Online formative assessment in higher education: A review of the literature. *Computers & Education*, 57(4), 2333-2351.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (1998). *Multivariate data analysis* (Vol. 5, No. 3, pp. 207-219). Upper Saddle River, NJ: Prentice hall.
- Hooshyar, D., Ahmad, R. B., Yousefi, M., Fathi, M., Horng, S. J., & Lim, H. (2016). Applying an online game-based formative assessment in a flowchart-based intelligent tutoring system for improving problem-solving skills. *Computers & Education*, 94, 18-36.
- Karay, Y., Schaubert, S. K., Stosch, C., & Schuettpelz-Brauns, K. (2012). Can computer-based assessment enhance the acceptance of formative multiple choice exams? A utility analysis. *Medical Teacher*, 34(4), 292-296.
- Leach, L. (2012). Optional self-assessment: Some tensions and dilemmas. *Assessment & Evaluation in Higher Education*, 37(2), 137-147.
- Lin, J. W., & Lai, Y. C. (2019). User acceptance model of computer-based assessment: moderating effect and intention-behavior effect. *Australasian Journal of Educational Technology*, 35(1), 163-176.
- Mazman, S. G., Usluel, Y. K., & Çevik, V. (2009). Social influence in the adoption process and usage of innovation: Gender differences. *International Journal of Behavioral, Cognitive, Educational and Psychological Sciences*, 1(4), 229-232.
- McCarthy, J. (2017). Enhancing feedback in higher education: Students' attitudes towards online and in-class formative assessment feedback models. *Active Learning in Higher Education*, 18(2), 127-141.
- McLaughlin, T., & Yan, Z. (2017). Diverse delivery methods and strong psychological benefits: A review of online formative assessment. *Journal of Computer Assisted Learning*, 33(6), 562-574.
- Nikou, S. A., & Economides, A. A. (2017a). Mobile-based assessment: Integrating acceptance and motivational factors into a combined model of self-determination theory and technology acceptance. *Computers in Human Behavior*, 68, 83-95.
- Nikou, S. A., & Economides, A. A. (2017b). Mobile-based assessment: Investigating the factors that influence behavioral intention to use. *Computers & Education*, 109, 56-73.
- Nikou, S. A., & Economides, A. A. (2019). Factors that influence behavioral intention to use mobile-based assessment: A STEM teachers' perspective. *British Journal of Educational Technology*, 50(2), 587-600.
- Sadler, D.R. (1989). Formative assessment and the design of instructional systems. *Instructional Science*, 18(2), 119-144.

Terzis, V., & Economides, A. A. (2011a). The acceptance and use of computer based assessment. *Computers & Education*, 56(4), 1032-1044.

Terzis, V., & Economides, A. A. (2011). Computer based assessment: Gender differences in perceptions and acceptance. *Computers in Human Behavior*, 27(6), 2108-2122.

Terzis, V., Moridis, C. N., & Economides, A. A. (2012). How student's personality traits affect Computer Based Assessment Acceptance: Integrating BFI with CBAAM. *Computers in Human Behavior*, 28(5), 1985-1996.

Terzis, V., Moridis, C. N., & Economides, A. A. (2012). The effect of emotional feedback on behavioral intention to use computer based assessment. *Computers & Education*, 59(2), 710-721.

Terzis, V., Moridis, C. N., & Economides, A. A. (2013). Continuance acceptance of computer based assessment through the integration of user's expectations and perceptions. *Computers & Education*, 62, 50-61.

Terzis, V., Moridis, C. N., Economides, A. A., & Mendez, G. R. (2013). Computer based assessment acceptance: A cross-cultural study in Greece and Mexico. *Journal of Educational Technology & Society*, 16(3), 411-424.

Tuckman, B. (1999). A tripartite model of motivation for achievement: Attitude, drive strategy. Paper presented at *American Psychological Association Conference*, Boston, MA.

Usluel, Y. K., & Mazman, S. G. (2010). Eğitimde yeniliklerin yayılımı, kabulü ve benimsenmesi sürecinde yer alan öğeler: bir içerik analizi çalışması. *Çukurova Üniversitesi Eğitim Fakültesi Dergisi*, 3(39), 60-74.

World Economic Forum (2016). What are the 21st-century skills every student needs?. Retrieved June 23, 2018 from <https://www.weforum.org/agenda/2016/03/21st-century-skills-future-jobs-students/>

Yurdugul, H., & Bayrak, F. (2014). The acceptance of web based formative assessment system for primary school students. *Educational Sciences and Practice*, 13(26), 167-186.

6. GENİŞ ÖZET

Bu araştırmada, üniversite öğrencilerinin biçimlendirmeye yönelik değerlendirme yapabilecekleri ve ortaya koydukları performanslarına ilişkin bir Web Tabanlı Biçimlendirmeye Yönelik Değerlendirme (WTBYD) sistemi tasarlanmıştır. Araştırmada, öğrencilerin bu sistemi kabul ve kullanma durumları incelenmiştir.

WTBYD'in istenilen yer ve zamanda uygulanabilmesi, öğrenciye anlık dönüt sağlaması, değerlendirmenin bireyselleştirilmesi, istenildiği kadar tekrarlanabilmesi açısından geleneksel biçimlendirici değerlendirme uygulamalarından farklılaşabilmektedir. WTBYD öğrencinin online öğrenme sürecine olan katılımını sağlamak, motivasyonunu artırmak, öğrencinin kendini izlemesine ve değerlendirmesine olanak tanımak gibi amaçlar için kullanılabilir. WTBYD sonucunda öğrenciye özgü öneriler yapılabilir. Bu da öğretimin bireyselleştirilmesini sağlaması adına önem ve değer taşımaktadır. Bireyselleştirilmiş öğretime olanak tanınması, öğrencinin sürekli gelişmesini hedeflemesi ve öğrencinin değerlendirilmesini bir süreç boyunca bütüncül olarak ele alması açısından son yıllarda WTBYD'e yönelik artan bir ilgi söz konusudur.

Bu çalışmada, öğrencilerin bu sistemi kabul ve kullanma durumları araştırılmıştır. Ortaya çıkan yeni bir teknolojinin hedef kitle tarafından benimsenmesini ve kabulünü etkileyen yapıların incelenmesi Teknoloji Kabul Modelleri yardımıyla gerçekleştirilmektedir (Davis, 1989). Terzis ve Economides (2011) biçimlendirmeye yönelik değerlendirme sistemlerinden beklenen faydanın alınabilmesinde öğrenenlerin kabul durumlarının önemli olduğunu belirtmektedir. Bu doğrultuda Terzis ve Economides (2011) teknoloji kabul modelleri doğrultusunda öğrenenlerin bilgisayar tabanlı değerlendirme (CBA) kullanım davranışını ve niyetini ortaya koymak amacıyla bir kabul modeli ortaya koymuştur. Öğrenenlerin CBA sistemlerini kullanma niyetlerinin belirlenmesi amacıyla geliştirilen bu modelde toplam sekiz faktör yer almaktadır. Bu faktörler sırasıyla; algılanan eğlenebilirlik, algılanan yarar, algılanan kullanım kolaylığı, bilgisayar öz-yeterlik algısı, sosyal etki, kolaylaştırıcı koşullar, amaç beklentisi ve içerik faktörleridir (Yurdugul & Bayrak, 2014). Algılanan yarar, öğrenenin değerlendirme sistemini kullanmasının öğrenme sürecindeki performansını geliştireceğine yönelik inanç düzeyidir. Algılanan kullanım kolaylığı, öğrenenin sistemi çaba gerektirmeden kullanabileceğine yönelik inancı olarak tanımlanmaktadır (Davis, 1989). Bilgisayar öz-yeterliği, öğrenenin bilgisayar kullanma becerilerine yönelik inancıdır (Compeau & Higgins, 1995). Sosyal etki öğrenenin davranış ve inançlarına yönelik çevrenin (öğretmen, yönetici, ebeveyn, akran, etc.) etkisi olarak tanımlanmaktadır (Terzis & Economides, 2011). İçerik ise değerlendirme sisteminde yer alan soruların ders içeriğiyle ilişkisi olarak ifade edilmiştir (Terzis & Economides, 2011).

Araştırma Bilgisayar I dersi kapsamında gerçekleştirilmiştir. Öğrencilerin 134'ü (%35.2) erkek, 247'si (%64.8) kadındır. Öğrenciler araştırmaya gönüllü olarak katılmıştır. Öğrencilerin yaşları 18-25 aralığında değişmektedir. Ders kapsamında öğrencilere temel bilgisayar donanımı, işletim sistemleri, kelime işlemci programı, elektronik hesaplama programı, elektronik sunum programı ve İnternet kullanımı konuları ele alınmıştır. Araştırmada öğrenme yönetim sistemi olarak Moodle

kullanılmıştır. Ders konuları haftalık olarak öğrenme yönetim sisteminde öğrencilerin erişimine açılmıştır. Öğrencilerin ders konularına çalışmaları için video ve e-kitap şeklinde ders içerikleri hazırlanmıştır. Ders konuları ve içerikleri ilgili haftanın başında öğrencilerin erişimine açılmıştır. Böylece öğrenciler yüzyüze dersten önce ders konularına çalışabilmıştır. Yüzyüze dersler ise bilgisayar laboratuvarında işlenmiştir. Öğrenciler burada ders konuları ile ilgili uygulamalar gerçekleştirmişlerdir. Haftanın sonunda ise öğrenme yönetim sisteminde web tabanlı biçimlendirici değerlendirme sistemi öğrencilerin erişimine açılmıştır.

Web tabanlı biçimlendirici değerlendirme sisteminin amacı öğrencilerin ilgili haftanın konularıyla ilgili kendilerini değerlendirmelerini, performanslarını test etmelerini sağlamaktır. Web tabanlı biçimlendirici değerlendirme sistemi Moodle'in sınav uygulaması ile geliştirilmiştir. Her hafta konularla ilgili çoktan seçmeli sorulardan oluşan bir biçimlendirici değerlendirme uygulaması hazırlanmıştır. Biçimlendirici değerlendirme sistemi sınav bitiminde öğrencilerin cevapladığı sorularla ilgili doğru ve yanlış cevabı göstermektedir. Ayrıca yanlış cevap seçeneğini işaretleyenler içinde yanlışın olası nedeni ve bu yanlışın gidermek için hangi konuya tekrar bakması gerektiği ile ilgili dönüt ve ipuçları verilmektedir. Söz konusu web tabanlı biçimlendirici değerlendirme sistemi 12 hafta boyunca öğrenciye uygulanmıştır.

Öğrencilerin web tabanlı değerlendirme sistemini kabul durumlarını belirlemek amacıyla Yurdugül ve Bayrak (2014) tarafından geliştirilen Alır (2015) tarafından revize edilen ölçek kullanılmıştır. Web tabanlı değerlendirme sistemi kabul ölçeği; algılanan yarar, algılanan kullanım kolaylığı, bilgisayar öz-yeterliği, sosyal etki, içerik, hoşlanma, ilgi ve davranışsal niyet olmak üzere 8 boyuttan oluşmaktadır.

12 haftalık süreç sonunda söz konusu web tabanlı biçimlendirici değerlendirme sistemi ile ilgili öğrencilerde kabul ve kullanım algısının oluştuğu düşünülmüştür. Bunu belirlemek amacıyla Web Tabanlı Değerlendirme Sistemini Kabul Ölçeği öğrencilere uygulanmıştır. Araştırma verileri 381 üniversite öğrencisinden elde edilmiştir. Öğrencilerin bu sistemi kabul yapısı; yarar algısı, kullanım kolaylığı, bilgisayar öz-yeterliği, sosyal etki, içerik algısı, hoşlanma durumu, ilgi durumu ve kullanım niyeti bileşenlerinden oluşmaktadır. Araştırmadan elde edilen bulgular doğrultusunda üniversite öğrencilerinin web tabanlı biçimlendirici değerlendirme sistemini kabul durumları incelenmiştir. Öğrencilerin geliştirilen biçimlendirici değerlendirme için ortaya konulan modelde belirtilen tüm etkilerin istatistiksel olarak anlamlı olduğu bulunmuştur. Ayrıca, öğrenenlerin web tabanlı biçimlendirici değerlendirme sistemini kullanma niyeti üzerinde sosyal etki değişkeninin (aile, öğretmen ve akran yönlendirmesi gibi) en fazla etkiye ($b=0.73$; $P\leq 0.05$) sahip olduğu görülmektedir. Ardından sırasıyla sisteme duyulan ilginin ($b=0.70$; $P\leq 0.05$) ve sistemden hoşlanma durumunun ($b=0.65$; $P\leq 0.05$) en büyük etkiye sahip olduğu görülmektedir. Öğrencilerin sistemi kullanmaktan elde edecekleri yarar algısının ($b=0.54$; $P\leq 0.05$) niyet üzerinde dördüncü büyük etkiye sahip olduğu görülmektedir. Öğrencilerin sistemdeki içeriklerin önemli görmesi ($b=0.47$; $P\leq 0.05$) ve sistemin kullanımının kolay olması ($b=0.37$; $P\leq 0.05$) öğrencilerin sistemi kullanma niyetlerini etkileyen diğer önemli faktörler olduğu görülmektedir. Web tabanlı biçimlendirici değerlendirme sistemini kullanmaya yönelik yarar algısını nelerin etkilediğinin de kabul modelinde önemli bir bulgu oluşturacağı düşünülmüştür. Sistemi kullanmanın öğrenciye sağlayacağı yarar algısı üzerinde etkili olan en önemli değişkenin içerik algısı ($b=0.65$; $P\leq 0.05$) olduğu görülmektedir. Yarar algısı üzerinde önemli olan bir diğer faktör ise sosyal etki ($b=0.64$; $P\leq 0.05$) değişkeni (aile, öğretmen ve akran yönlendirmesi gibi) olduğu görülmektedir. Sistemin kullanımının kolay olması ($b=0.57$; $P\leq 0.05$) da öğrencilerin yarar algısı üzerinde etkili olan bir diğer faktördür. Öğrencilerin bilgisayar öz-yeterliklerinin gelişmiş olması ($b=0.66$; $P\leq 0.05$) sistemin öğrencilerce daha kolay kullanılabileceğini göstermektedir. Öğrencilerin sistemi kullanma davranışı üzerinde etkili olan en önemli faktörün sosyal etki ($b=0.82$; $P\leq 0.05$) olduğu görülmektedir. Buna göre öğrencilerin aileleri, öğretmen, akran gibi yakınlarının sistemi kullanmaya yönelik tavsiyeleri önemlidir. İçerik algısı olarak öğrencilerin sistemde yer alan soru içeriklerinin/dönütlerin öğrencilerce önemli görülmesi, işine yarar olması ($b=0.80$; $P\leq 0.05$) öğrencilerin sistemi kullanma davranışlarını önemli ölçüde etkilemektedir. Öğrencilerin sistemi kullanma davranışı üzerinde etkili olan diğer faktör ise kullanım niyetidir ($b=0.73$; $P\leq 0.05$). Buna göre öğrencilerin niyetlerinin yüksek olması önemli ölçüde kullanma davranışına yansımaktadır.

Araştırmadan elde edilen bulgular doğrultusunda öğretmenler, öğretim tasarımcıları, karar vericiler ve araştırmacılar için çeşitli önerilerde bulunulmuştur.