The Effect of Digital Badges Specialization Level of the Subject on the Achievement, Satisfaction and Motivation Levels of the Students

Assist. Prof. Dr. Serkan Yıldırım
Ataturk University, Department of Computer Education and Instructional Technology serkanyildirim@atauni.edu.tr

Assist. Prof. Dr. Abdullatif Kaban
Bayburt University, Department of Computer Education and Instructional Technology
akaban@bayburt.edu.tr

Assist. Prof. Dr. Gürkan Yıldırım
Bayburt University, Department of Computer Education and Instructional Technology
gyildirim@bayburt.edu.tr

Dr. Embiya Çelik
Ataturk University, Department of Computer Education and Instructional Technology
embiya@atauni.edu.tr

ABSTRACT
Digital badges are the components demonstrating competency and knowledge of the learners. The use of digital badges used to reflect the skills of learners is becoming increasingly widespread in the teaching environments. In addition, these badges are starting to take their places among documents such as certificates and diplomas. In this study, the relationship between digital badges rated in accordance with specialization levels of the same subject and achievement, satisfaction and motivation levels of the students has been investigated. In addition, the relationship between learning styles of the students participating in the study and their academic achievement and satisfaction levels were also presented. In this study, in which proximal parallel pattern of mixed research methods was used, quantitative and qualitative data were reviewed together. The sample of study consists of junior students of Ataturk University, Kazım Karabekir Education Faculty. 13-week study was conducted with a total of 51 participants including 26 female and 25 male students. The data of the study were obtained by academic achievement form, Kolb's learning style inventory III and semi-structured interview form. According to the results of study, it has been seen that digital badges improve academic achievement, students' motivation to learn, attendance to lesson and satisfaction of the students. They also motivate students to make them ready for class, show level of the learners, provide the possibility of self and peer-assessment and they can be also used to demonstrate the level of competence and achievement along with some other documents such as diploma or certificate. As a result, digital badges can be used to better organize the learning process and make students more active learners.

Keywords: Digital badges, Badges, Badge-based teaching

INTRODUCTION
Learning experiences are encountered with their changing structures every day. Technological developments made it possible to create alternative learning environments and perform different teaching practices at various levels in these environments. Developments of computer and internet technologies create the existing infrastructure for both face to face and distance courses to be conducted in a quality manner and allow learning environments to be improved. In this way, learners obtain their alternative learning environments. In addition, today, it is possible to participate in educational activities carried out simultaneously or separately regardless any time, place or platform.

One of the important aspects in the conduct of the learning processes is evaluation. Evaluation is used to reveal what gains learners achieved from learning process, identify deficiencies and make improvements. There are different evaluation approaches used to evaluate the learning status during and end of the learning process. Classically, at the end of evaluation procedures carried out in today's learning environment, learners receive some documents such as certificate or diploma. These documents are used to demonstrate proficiency of the learners. In addition to learning developments, evaluation processes had also some alternative approaches along with technological advancements. Especially advancements experienced in Web 2.0 environments made

significant contributions to the e-learning environments. One of these contributions can be said that the concept of digital badges took their place in the literature (McDaniel, 2012).

Badges, which had existed since the ancient times, were used as icons showing skills of an individual in terms of success, experience and expertise in the area of any case. In this regard, badges can be seen as indicators of identity, experience, expertise and authority (Halavais, 2011). Badges used in military field for centuries show the competence and success of soldiers. Similarly, various badge practices are used in many sport branches. In addition to different areas, badges are also used in learning environments. In the primary education, ribbons given to the students began reading are the most well-known examples of badge practices.

The changes experienced in the learning environment have brought a new dimension to the classic badge understanding. The idea of using digital badges in the evaluation of each learning process and certification of the achievements accomplished at the end of each evaluation process becomes more common. Digital badges are used to certificate the qualifications accomplished by the learners and allow sharing of these qualifications easily in the digital media. Despite being very new, digital badges are seen to have the same functions in several ways with real-world examples. Digital badges are the tools that have metadata providing the information of content, progress and activity results, which can be accessed online, and presenting achievements, interest and status of membership in a visual form (Gibson, Ostashewski, Flintoff, Grant and Knight, 2013). In this respect, digital badges can be considered as a virtualized representation of the badges used for centuries (Halavais, 2011). However, it can be said that these badges can be used more commonly in the learning environments with their new interpretations.

Digital badges are used not only to indicate the level of learning but also to show other qualifications achieved. In particular, they become widespread on social networks and forums. Advancements and growth experienced in the social networks enabled digital badges to be used in many social platforms (foursquare, Google News, theHuffington Post and StackOwerflow etc.) over time (Halavais, 2011; De Paoli, De Uffici, and D'Andrea, 2012). The aim of these digital badges is presenting situations such as use level or sharing rates rather than showing level of learning.

In the literature, some studies have focused on some basic concepts of digital badges. These concepts can be summarized as follows (Bani and De Paoli, 2013; Gibson et al. 2013 Forester 2013-a; Forester 2013-b);

- Developer: Developers determined and develop the standards of digital badges.
- Issuer: They propose digital badges and identify the rules and processes required for providing digital badges.
- Receiver/Earner: Persons entitled to receive badges from the issuer.
- Displayer: These are the 3rd party platforms used for the exhibition of digital badges.
- Ecosystem: Groups consist of all individuals and platforms aware of digital badge system.
- Metadata: Sum of all information including ways, activities and events to gain these badges and their results. In this structure, standards, activities, process, experience, performance or the quality information of experiences take place.

A new understanding of proficiency certification has been emerged along with the use of digital badges in learning environments. The adequacy of the outcomes such as diploma and certificates has been a matter of debate although they are considered as a representation of achievement accomplished in the learning environments. In this context, digital badges are determined to be used in business environments and education institutions as an alternative to the existing evaluation methods (Halavais, 2011). Evaluation tools such as diplomas and certificates can be a wealth of information about the process. However, they cannot give complete information about skills of the people. In certificates such as high school diploma or computer operator certificate, there isn't sufficient information about skills and knowledge of the student (workers, craftsmen, developers, etc.). Therefore, digital badges help individuals to be better evaluated in the business environments and give them to show their skills that can be useful in the business world (Watters, 2012). In addition, it has been thought that digital badges are able reveal knowledge of the students better than standard test and letter grades (Katie, 2012).

Digital badges in learning environments can be presented in different ways. Various badges can be prepared that can categorized individuals based on their knowledge level of a topic or course as beginner, intermediate, advanced or expert. There are also single-level badges showing expertise or skills of people on various subjects. In addition, issuance of badges can be differentiated. Digital badges can be given either phase by phase during the education process or at the end of the process.

Today, although the use of digital badges in the learning environments is not that much, they are believed to be used more widely in the future. It is quite possible to use badges obtained from institutions and organizations in recruitment and promotion processes. In addition, badges obtained in different settings can be kept (Katie, 2012) and used as certificates and diplomas in some applications such as university admissions or recruitment processes requiring applicants to show their qualifications. For example, it has been recommended to fill the gaps of the students having difficulties about finishing the school on its regular time by accepting equivalence of the certificates and digital badges (Watters, 2012). For such a process, digital badges should be issued credibly and the institutions issuing these badges should be supervised by an accredited organization.

Digital badges have some aspects that require attention to be paid such as necessity of standard evaluation as well as reliability in addition to its positive features like availability and more descriptive presentation of competence. Lindgren and McDaniel (2012) have stated that digital badges can be used for increasing the responsibilities of students and affecting their learning motivations in a positive way. Similarly, Halavais (2011) says that the power of badges in terms of ensuring the learning motivation can be used for teaching a certain behaviour or proficiency. According to the results of the study conducted by McDaniel (2012), badges have positive impacts on the motivation and performance when they are used to reward interaction and high level of social behaviors. In addition, Mahle (2011) indicates that badges improve attendance rates of the students.

There are a limited number of studies regarding scientific information of digital badges and their effects on learning processes. Therefore, determination of the effect of digital badges to learning processes and views of learners towards this certification and grading structure is important. This study mainly aims to put forward the views of learners, who were graded with digital badges. Within the scope of study, the effect of digital badges obtained based on level of expertise on achievement, motivation and satisfaction of the learners was investigated. For this purpose, the following research questions were asked;

1. What are the effects of digital badges on the academic achievement levels of the participants?
   a. What is the level of the participants' academic achievement?
   b. Is there any difference between the academic achievements of the participants in terms of gender?
   c. What is the status of the participants in terms of earning badges?
   d. Is there any relationship between academic achievements and status earning of a badge of the participants?
   e. Does the relationship between status of earning a badge and academic achievement of the participants differentiate by their genders?
   f. Does the relationship between status of earning a badge and academic achievement of the participants differentiate by their learning styles?

2. What are the views of the participants regarding digital badges?
   a. What are the views of the participants towards the advantages and disadvantages of digital badges?
   b. What are the views of the participants regarding impacts of digital badges on their levels of motivation?
   c. What are the views of the participants regarding impacts of digital badges on their academic achievements?
   d. What is the meaning of digital badges for the participants?
   e. What are the views of the participants towards to use of digital badges as an evaluation tool in classrooms?
   f. What are the views of the participants towards the relationship between digital badges and other achievement certification methods?

METHOD
In this study, the effect of digital badges, which are received according to the level of expertise in a course, on achievement, motivation and satisfaction levels of the learners is investigated. In addition, the relationship between learning styles and achievement and satisfaction levels of the students participated in this study was also revealed. In this study, one of the mixed research methods; proximal parallel pattern was employed. Proximal parallel pattern is a method used where qualitative and quantitative research processes are conducted together, an independent resolution process is realized and a general interpretation process is done (Creswell and Plano Clark, 2011).

Sample
The sample of study consists of junior students of Ataturk University, Kazım Karabekir Education Faculty. 13-week study was conducted with a total of 51 participants including 26 female and 25 male students. The study

group was determined according to the method of selection purposes. Büyüköztürk, Çakmak, Akgün, Karadeniz and Demirel (2010) define the purposive sampling method as a method without any possibility and selection. In addition, it is considered as an ideal method for in-depth studies (Büyüköztürk et al, 2010).

Badges
Badges in three different levels were issued within the scope of this study. The levels were identified based on knowledge covered by the badge. These badges were classified as beginner, intermediate and advanced. Levels of the badges were determined based on the opinions of course curriculum and experts. Levels and contents of the badges are given in Table 1.

Table 1. Digital Badge Levels and Basic Subjects Included in These Badges

Beginner Level Badge	Intermediate Level Badge	Advanced Level Badge
4 Weeks	4 Weeks	4 Weeks
• Basic Knowledge ○ Internet and Its Features ○ Server-Client Structure ○ What is HTML? ○ Versions, tags and features ○ Special characters ○ Main structure of HTML page • Basic level tags ○ Head tags ○ Body tags • What is Asp.Net? ○ .Net Framework and its components • Installing Visual Studio • Visual Studio window and its features ○ Creating a new project ○ The concept of Web Form and its use ○ The Concept of User Control and its use • C# • The most common C# codes used in the Asp.Net form ○ Page routing ○ Changing the font of a control in the page • The most common C# codes used in the Asp.Net form ○ Displaying the date ○ Sending E-mail ○ Adding html code on the form ○ Creating a warning message window ○ Auto page routing ○ New features come with C# 5	• Standard Asp.Net Controls ○ Advertisement Controls ○ Lists ○ Buttons ○ Calendar ○ Check Box ○ Opened check box • Standard Asp.Net Controls ○ Uploading a file ○ Hidden files ○ Link control ○ Picture control • Standard Asp.Net Controls ○ Button with picture ○ Picture map ○ Displaying text ○ Link button ○ Listing control ○ HTML displaying • Standard Asp.Net Controls ○ Building wizard ○ Packaging controls ○ Creating dynamic control ○ Selection button ○ Selection button list ○ Placing dynamic domain to the page that can be displayed from cache ○ Dynamic table control ○ Text entry box ○ Advanced wizard ○ Displaying XML file on the form	• Data controls ○ Calling data from database ○ Calling data from XML file ○ Data inquiry by Linq and SQL ○ Site map data source ○ Creating graphical report ○ Listing data by HTML design • Data controls ○ Listing data ○ Displaying record details ○ Form view ○ Displaying the data by pages ○ Inquiry of data by controller • Verification controls ○ Comparison control ○ Controls that can be customized ○ Range control ○ Regular expression control ○ Necessity control ○ Validation • Navigation Controls ○ Creating a menu ○ Creating site map menu ○ Tree menu • User login controls ○ Creating database of the members ○ Creating new membership ○ Login to the site ○ Displaying user name ○ Log into and log out of the site

Implementation Period
The study lasted 13 weeks. 4-week periods were designed for each badge. To earn the badge, a student is required to be successful at the end of a 4-week training program. In the first week, students were informed about the characteristics of each badge, acquisition processes, evaluation criteria and implementation steps.

The study was conducted on the Internet Based Programming course. This course has a very broad curriculum containing elements from advanced C# commands to basic HTML knowledge, which are required for development of static or dynamic web projects. It also includes a variety of web applications. Digital badge application was carried out throughout the course. From the second week of the course, necessary training activities to earn badges were conducted. Training practices were performed by presenting theoretical knowledge and performing application activities.

Badge application assignments and practical exams including achievements of all students were performed for acquisition of each badge. Badge application assignments were given in the first week of the period of winning each badge. In addition to these assignments, students were also informed about, description, scope and applications of the badge. Evaluation exam was performed at the end of the 4th week of badge winning period. This exam consists of multiple-choice and open-ended questions that contain all the gains. Open-ended questions were answered by an application on the computer. The practical exam taken by all participants at the same time was evaluated by two experts. The success score was determined as at least 85 points out of 100 points for badge application assignment and practical exam. The average score a student should be 85 in order to earn a badge. The evaluation processes were conducted separately for each badge with similar steps.

Data Collection Tools
In the study, one of the qualitative data collection tools; the interview method was used in order to obtain the views of participants towards the application. Büyüköztürk et al. (2010) have stated that they use the interview method to collect in-depth information about a research. These interviews can be used with other data collection tools as well (Büyüköztürk et al., 2010). A semi-structured interview form including 7 questions was prepared within the scope of study. The interview form was preferred since it has a flexible structure and it allows us to conduct an in-depth research (Büyüköztürk et al., 2010).

Learning Style Inventory developed by Kolb and translated by Gencel (2007) into Turkish was used to determine learning styles of the participants. The reliability coefficients of Turkish inventory ranged from 0.76 to 0.84.

In this study, the academic achievements of participants were evaluated by midterm and final exams prepared by researchers and faculty members within the subjects of the course. The midterm exam covers the contents of beginner and intermediate level badge. The subjects of final exam cover the contents of all badges. The scores of midterm and final exams were calculated separately based on the average performances showed in these periods. Two-level academic achievement assessment processes were applied to determine the success of the participants. In the first step, a written exam was performed. The written exam consists of 5 multiple-choice and 20 open-ended questions. In the second step, a practical exam is conducted. Both in midterm and final exams, questions within same taxonomic levels were asked.

Data Analysis
The data obtained through interviews with the participants involved in this study were analyzed using content analysis method. Content analysis is an analysis method often preferred for analysis of interviews and observations (Büyüköztürk et al., 2010). In addition, content analysis is used as an effective research technique for arrangement, classification of the texts and producing theoretical results from these texts (Cohen, Manion and Morrison, 2007).

The learning styles of participants were determined based on the analysis of the learning styles inventory developed by Kolb. The academic achievements of participants were evaluated by midterm and final exams. The quantitative data was analyzed by SPSS 18 software package; while statistics such as percentage and frequency were analyzed by Shapiro Wilk normality test, Mann-Whitney U test and t-test. The findings were generated by analyzing qualitative and quantitative data separately. These findings were brought together in the interpretation period.

Limitations of the Study
This study was conducted within the scope of face-to-face classes. Today, considering comprehensive changes occurring in e-learning environments, these face-to-face classes can be considered as a limitation. In addition, the study group consists of undergraduate students.

FINDINGS
In this study, the effect of digital badges received based on the level of expertise in the course on the motivation, satisfaction and achievement levels of the students and views of learners towards these digital badges were investigated. The sample of study consists of junior students of Ataturk University, Kazım Karabekir Education

Faculty. The study was conducted with a total of 51 participants including 26 female and 25 male students within the range of 22-26 years old. Qualitative and quantitative data in the study were analyzed separately. In the quantitative findings of the study, the statistical significance level was accepted as 0.05 for each statistical test. Results are organized considering the research questions.

Academic Achievement
1. What is the effect of digital badges on the academic achievement levels of the participants?
1.1. What is the level of the participants' academic achievement?

The academic achievements of participants were evaluated by midterm and final exams prepared by researchers and faculty members. Each exam was performed in both written and practical ways. Achievement scores were calculated by averaging the scores obtained from the written and practical exams. Academic performances of the participants are given in Table 2.

Table 2. Academic Scores of the Participants

Participants		Midterm Score	Final Score
Male	X	56.04	77.48
	Std.	12.58	25.67
Female	X	58.27	77.84
	Std.	12.62	15.03
General	X	57.18	77.67
	Std.	12.53	20.72

As it can be seen in Table 2, the average scores of the participants are 57 and 77 for midterm and final exams, respectively.

1.2. Is there any difference between academic achievements of the participants by their genders?

Academic achievements of the participants were investigated within the scope of gender variable. As it can be seen in Table 2, academic achievements of the participants were similar to each other by their genders. Before performing the comparison, distribution of the midterm and final scores was analyzed and Shapiro Wilk normality test was performed on success scores. According to test results, midterm exam scores showed normal distribution, while final exam scores showed abnormal distribution (Table 3).

Table 3. Normality Test Results of Midterm and Final Scores by Gender (Shapiro Wilk)

	Male			Female		
	statistic	sd	p	statistic	sd	p
Midterm Score	.951	25	.261	.976	26	.789
Final Score	.664	25	.000	.919	26	.043

The relationship between midterm scores by gender was analyzed by t-test. T-test results are given in Table 4.

Table 4. T Test Results of Midterm Scores by Gender

Sex	N	$\overline{X}$	S	sd	t	P
Male	25	56.04	12,58	49	0,631	.531
Female	26	58.27	12,63			

As it can be seen in Table 4, there is no significant difference between midterm scores of the groups by gender variable (t (49) =0.631 p>.05).

The relationship between final scores by gender was analyzed by Mann-Whitney U test which do not require parametric test assumptions. The analysis results are given in Table 5.

Table 5. Mann Whitney U Test Results Final Scores by Gender

Group	N	Mean	Sum	U	p
Male	25	27.80	695.00	280.00	.394
Female	26	24.27	631.00		

As it can be seen in Table 5, there is no significant difference between final scores of the groups by gender variable (U=280.00, p>.05).

1.3. What is the status of the participants in terms of earning badges?

Another information indicating the level of success of the participants is the badges that they have earned. Each participant is required to reach a certain level of success to be able to have badges. The badges, which are categorized as beginner, intermediate and advanced levels, reflect the theoretical knowledge and practical skills of the participants. Beginner and intermediate level badges cover the subjects of midterm exam, while advanced level badge covers the subjects of final exam. The statuses of earning the badges are given in Table 6.

Table 6. Status of Participants in terms of Earning Badges

	Badge Level					
	Beginner		Intermediate		Advanced	
Status	Male	Female	Male	Female	Male	Female
Badge Earners	8	19	17	22	7	7
Couldn't Earn a Badge	17	7	8	4	18	19

As it can be seen in Table 6, female participants are much more successful than male participants in terms of earning beginner level badges, which require basic knowledge of the subjects. This achievement level got closer in intermediate level badges and balanced in advanced badges. A total of 27 participants earned to have beginner level badges. On the other hand, 39 participants earned intermediate level badges. However, only 14 participants gained advanced level badges that require advanced level skills.

1.4. Is there any relationship between academic achievements and statuses of earning a badge of the participants?

In the study, the academic achievements of the participants depending on winning a badge were investigated. First, their midterm and final scores were analyzed by their statuses of winning badges. Shapiro Wilk normality test results are listed in Table 7.

Table 7. Normality Test Results of Midterm and Final Scores Who Earn Badges by Condition (Shapiro Wilk)

Academic Achievement	Beginner Badge Level						Intermediate Badge Level						Advanced Badge Level					
	Couldn't Earn a Badge			Badge Earners			Couldn't Earn a Badge			Badge Earners			Couldn't Earn a Badge			Badge Earners		
	ist.	sd	p	ist.	sd	p	ist.	sd	p	ist.	sd	p	ist.	sd	p	ist.	sd	p
Midterm	.929	24	.092	.980	27	.860	.863	12	.053	.975	39	.540						
Final													.783	37	.000	.792	14	.004

As seen in Table 7, the academic achievement scores analyzed depending on gaining an advanced level badges didn't show normal distribution. On the other hand, the academic achievement scores analyzed depending on gaining beginner and intermediate level badges showed normal distribution.

Within the scope of study, the relationship between academic achievement and status of earning beginner and intermediate level badges has been analyzed and academic success scores of the participants were analyzed using independent sample t-test. The analysis results are given in Table 8.

Table 8. T-Test Analysis Results of Midterm Scores by the Status of Earning Beginner and Intermediate Level Badges

	Badge Earning Status	N	$\overline{x}$	S	sd.	t	P
Beginner Badge Level	Badge Earners	27	59.52	12.28	49	1.431	.159
	Couldn't Earn a Badge	24	54.54	12.54			
Intermediate Badge Level	Badge Earners	39	59.54	12.02	49	2.558	.014
	Couldn't Earn a Badge	12	49.50	11.42			

As it can be seen from the results given in Table 8, there is a difference of 5 points between those who received beginner level badges and those who didn't earn these badges in terms of their average academic achievements. Although, those who earned these badges seem more successful, the difference between these two groups is statically insignificant (t (49) =1.432, p>.05). There is a difference of 10 points between those who earned intermediate level badges and those who didn't earn these badges in terms of their average academic achievements. Those who earned these badges achieved better scores. In addition, there is a statically significant difference between these two groups in terms of academic achievement scores (t (49) =2.258, p<.05).

The relationship between academic achievement and status of earning a badge of the participants was analyzed by Mann Whitney U test which does not require assumptions of parametric tests. The analysis results are given in Table 9.

Table 9. Mann Whitney U Test Analysis Results of Final Scores by the Status of Earning Advance Level Badges

Group	n	$\overline{X}$	Mean Rank	Sum Rank	U	p
Badge Earners	14	89.21	37.11	519.50	103.50	.001
Couldn't Earn a Badge	37	73.30	21.80	806.50		

As presented in Table 9, the academic scores of those who earned advanced level badges are 17 points higher than those who didn't earn these badges. There is no statically significant difference between academic achievement scores of these two groups (U=103.50, p<.05).

1.5. Does the relationship between status of earning a badge and academic achievement of the participants differentiate by their genders?

The relationship between status of earning a badge and academic achievement of the participants was analyzed by their genders. The relationship between status of earning beginner and intermediate level badges and academic achievement of male students in addition to the relationship between midterm scores, status of receiving advanced level badges and their academic achievements were analyzed by Mann Whitney U test using their final scores. The analysis results are presented in Table 10.

Table 10. The Relationship between Academic Achievement of Male Participants and Their Status of Earning Beginner, Intermediate and Advance Level Badges, Mann Whitney U Test

Group		n	Mean	Sum	U	p
Beginner	Couldn't Earn a Badge	17	12.21	207.50	54.50	.430
	Badge Earners	8	14.69	117.50		
Intermediate	Couldn't Earn a Badge	8	8.56	68.50	32.50	.038
	Badge Earners	17	15.09	256.50		
Advanced	Couldn't Earn a Badge	18	10.47	188.50	17.50	.006
	Badge Earners	7	19.50	136.50		

As given in Table 10, there is no statically significant relationship between midterm scores and status of earning a beginner level badge of the male students (U=54.50, p>.05). On the other hand, there is a significant relationship between midterm scores and status of earning an intermediate level badge of the male students (U=32.50, p<.05). Similarly, there is a significant relationship between final scores and status of earning an advance level badge of the male students (U=17.50, p<.05).

The relationship between status of earning beginner and intermediate level badges and academic achievement of female students in addition to the relationship between midterm scores, status of receiving advanced level badges and their academic achievements were analyzed by Mann Whitney U test using their final scores. The analysis results are given in Table 11.

Table 11. The Relationship between Academic Achievement of Female Participants and Their Status of Earning Beginner, Intermediate and Advance Level Badges, Mann Whitney U Test

Group		N	Mean	Sum	U	p
Beginner	Couldn't Earn a Badge	7	10.79	75.50	47.50	.271
	Badge Earners	19	14.50	275.50		
Intermediate	Couldn't Earn a Badge	4	9.88	39.50	29.50	.302
	Badge Earners	22	14.16	311.50		
Advanced	Couldn't Earn a Badge	19	11.53	219.00	29.00	.029
	Badge Earners	7	18.86	132.00		

There is no significant relationship between midterm scores and status of earning a beginner or intermediate level badge of the female participants (U=47.50, p>.05; U=29.50, p>.05, respectively). However, there is a significant relationship between raw final scores and status of earning an advanced level badge of the female participants (U=29.50, p<.05).

1.6. Does the relationship between status of earning a badge and academic achievement of the participants differentiate by their learning styles?

Another variable focused on within the scope of the study is learning style. In Table 12, learning styles of the participants and their academic achievements by their learning styles are given.

Table 12. Learning Styles of Participants and Academic Achievement Status

Learning Style		Midterm Score	Final Score
Converger	$\overline{X}$	62,00	78,50
	N	2	2
	Std.	2,83	12,02
Assimilator	$\overline{X}$	51,78	75,00
	N	9	9
	Std.	10,34	14,26
Diverger	$\overline{X}$	58,78	78,94
	N	32	32
	Std.	13,28	19,99
Accommodator	$\overline{X}$	55,62	75,37
	N	8	8
	Std.	12,57	31,95
General	$\overline{X}$	57,18	77,67
	N	51	51
	Std.	12,53	20,72

As it can be seen in Table 12, the majority of the participants have diverging learning styles. In addition, only two participants have converging learning styles.

The midterm and final scores of the participants by their learning styles were analyzed by Kruskal Wallis H Test. Kruskal-Wallis H Test results are listed in Table 13.

Table 13. The Kruskal Wallis H Test Results

	Learning Style	N	$\overline{X}$	sd	x^2	p
Midterm	Converger	2	35.75	3	3.70	.295
	Assimilator	9	18.50			
	Diverger	32	27.83			
	Accommodator	8	24.69			
Final	Converger	2	22.00	3	1.685	.640
	Assimilator	9	20.67			
	Diverger	32	27.27			
	Accommodator	8	27.94			

According to Kruskal-Wallis H test results, there is no significant difference bot in midterm and final exam scores in terms of learning styles of the participants (Midterm: x2 (sd=3 n=51) =3.70, p>.05, Final: x2 (sd=3 n=51) =1.68, p>.05).

2. What are the views of participants regarding digital badges?

Within the scope of the study, the views of participants for badge-based assessment activities were obtained. Their views were categorized as advantages, disadvantages, motivation, academic achievement, meaning, badge sharing, satisfaction and assessment tool.

2.1. What are the views of the participants towards the advantages and disadvantages of digital badges?

The participants stated that the using of digital badges have some advantages in the learning environments. Participants views were grouped under headings such as motivation, competition, self-assessment and participating in the class. They also state that digital badges improve the motivation, interest to teaching activities and competition among peers of the students. In addition, according to participants, digital badges have a role of encouraging students to re-organize their own learning processes. Some examples of the views of participants regarding advantages of digital badges are as follows;

Badge-based assessment is an encouraging evaluation method that allows students to see their progress and make necessary changes in their behaviors.

These badges have an advantage of motivating students for active participation in the course. At the same time, students can see their progresses in the course by the badges they earn.

Earning badges as a result of the scores collected weekly provided a better understanding of the course and the growing interest towards the course.

It motivates students to the course. Students compete with each other for these badges; therefore, they pay more attention to the course.

The person needs to be in an effort to get the badge. Therefore, students have to do their bests to earn these badges and plan their own learning processes.

Participants discussed some of the disadvantages associated with digital badges. These disadvantages are categorized as stress, jealousy, loss of motivation and losses incurred as a result of failing to meet the criteria. Some participants could not be included in the evaluation activities due to various reasons and so they couldn't get any badges. They have said that they get upset because of a failure to earn badges in such cases. One participant implied that the process of earning a badge is stressful. A few participants argued that the case, in which there is a possibility of not earning any badges, may have negative impacts on the motivation of the student. Some examples of the views of participants regarding disadvantages of digital badges are as follows;

We lose our chance to receive a badge when we fail to attend a practice…

Although it seems simple to have a weekly exam, it is stressful indeed. In fact there is plenty of time, but still affecting.

Competition between individuals can go further. It reduces the solidarity between individuals. A sense of jealousy can occur in those who didn't receive a badge.

The motivation of students can drop down in case they don't receive any badges.

2.2. What are the views of the participants regarding impacts of digital badges on their levels of motivation? In the study, the views of participants regarding the effect of digital badges on their motivation levels were investigated. The majority of the participants stated that these badges affect their motivation positively, award themselves and they realize that they learn. They also stated that finding a chance to see their progress by practices motivate them, digital badges encourage them to study in a planned way and participate in the course and finally a competition occurs between peers to earn these badges. The examples of views of participants towards motivation are as follows;

Digital badges increase my motivation for the course. We have taken programming classes before, but I come to this one more willingly compared to previous classes.

I get prepared for the class before the practice to receive a higher score.

Since these badges make it mandatory to attend the class, we don't miss any subjects and even though the award received is a digital badge, it is another source of motivation because students enjoy receiving such awards.

I'm looking at the subjects again before coming to class. Furthermore, I understand the subjects better by exercise activities. In addition, the badge that I received increased my attention for the course.

Since earning a badge shows how we are specialized in the course, they make me feel I learn the subject, so I become well-motivated.

At least I study for the course every week regularly.

It motivates because competing with other students for badges leads us to turn in better homework assignments.

According to participants, digital badges have also some disadvantages on their motivation level. Two of the participants stated that their motivations were reduced since they couldn't earn any badges. The examples of views of the participants regarding disadvantages of digital badges are as follows;

> My motivation drops down when I can't earn a badge.

> Since there is a competitive classroom environment, you fall behind other when you miss something.

2.3. What are the views of the participants regarding impacts of digital badges on their academic achievements?

In the study, the views of participants regarding the effect of digital badges on their achievement levels were analyzed. Almost all of the findings indicate that digital badges positively affect the academic achievement. Participants stated that they perform more active participation in the course and get prepared for the course before coming to the class to earn a badge; so this increases their achievement. Two of the participants stated that their attendance rates are higher for this class compared to other courses to earn badges and higher attendance rates increase their academic achievement. There was no participant stated that digital badges negatively affect the academic achievement. The views of participants regarding academic achievement are as follows;

> It affects my success positively. Because it motivates me and at the same time, I learn everything step by step by exercise activities in the course.

> It affects my achievement in a positive way, because it allows us to come to the class well-prepared. We get prepared for the course before the class to earn a badge.

> Students pay more attention to the class to earn a badge and turn in better assignments. Therefore, it is a beneficial assessment tool.

> It improves my academic achievement level since I don't miss any classes. I think they don't have any other advantage for my success.

2.4. What is the meaning of digital badges for the participants?

In the study, the views of participants regarding what digital badges mean for them were analyzed. Those who earned digital badges state that these badges represent their achievement levels and show their progresses compared to other students. They also consider these badges as an award. Those who couldn't win badges couldn't attribute any meaning to these badges. The examples of views of participants regarding what meaning they attribute to digital badges are as follows;

> The badge I earned represents my achievement in the course.

> It makes me think that I am successful in the course and I consider it as a gift from my teacher.

> It affects my success and status in the class.

> I didn't feel anything since I haven't earned any badges.

2.5. What are the views of the participants towards the use of digital badges as an evaluation tool in the classroom?

In the study, the views of participants regarding the use of digital badges as an evaluation tool in the classroom were analyzed. The majority of the participant stated that digital badges can be used as an evaluation tool especially in practice-based classes and they might be willing to attend these classes. One of the participants stated that he doesn't want to attend the class conducted with digital badge applications. He says that such applications cause a stressful environment. The example views are as follows;

> Yes, I want; however, not for all the classes. They would be more useful in software courses such as programming.

> I think they would be quite useful for classes that have a programing logic, and I want them to be used in such classes.

They should be applied to other classes as well to have a better understanding of the courses.

Yes, I absolutely want it; because, it facilitates the learning process.

We are under a lot of pressure, but maybe I pay more attention to the class and understand the subjects better.

2.6. What are the views of the participants towards the relationship between digital badges and other achievement certification methods?

Considering the relationship between digital badges and other achievement certification methods; some of the participants stated that digital badges can be used instead of some other certification methods such as diploma and certificates. On the other hand, some of the participants indicated that since digital badges have different levels, they reflect the status of achievement better and give more detailed information compared to other certification methods. They also stated that if these badges are given by official institutions, they would be more valuable. The example views are as follows;

I think digital badges represent the achievement or failure of the students as much as certificates and diplomas do. Of course the issuer of the badge should be neutral and objective.

It does make more sense to use badge-based evaluation methods rather than certificate or diploma documents. Certificates and diplomas are issued for the whole training program, whereas digital badges are issued step by step for each subject.

It is better to progress level by level. For example, those who score 85 and 90 points from the same exam receive the same certificate, respectively. However, different digital badges are given based on different success levels.

Diplomas and certificates have a validation. Digital badges have no validity. I think they are not equal to each other.

I don't want a badge-based application to be used instead of diploma. However, I would like to have them instead of certificates so I can use them for my job applications.

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

In this study, the effects of digital badges on the course achievement and motivation of the students and views of students regarding these badges were investigated. During the process, academic achievement of participants has increased. Considering the views of participants and results of the exams containing questions within the same taxonomic level, we can say that teaching activities performed with digital badges increase the achievement level of the students. Similarly, McDaniel, Lindgren and Friskics (2012) indicated that digital badges increase the achievement level of the students, while Davidson and Goldberg (2009) stated that these badges both increase and improve the academic achievement levels of students. In addition, since there is no difference between different genders in terms of academic achievement, it can be said that the effect of digital badges on both gender groups are same.

Learning styles have no impact on the achievement level of the learners during teaching activities conducted with digital badges. There was no significant difference in terms of academic achievement of the students by their learning styles in the group, which includes mostly students with diverging learning style. This shows that learning styles have no effect on the academic achievement level of the learners during teaching activities conducted with digital badges. Speece (2012) implies that the effect of learning style on success is so little.

Earning a badge can be a true indicator of academic achievement. Students study harder in order to gain digital badges and they get prepared for the course before coming to the class. They also make an effort to attend the course and classroom activities. Similarly, Bani and De Paoli (2013) argued that digital badges reflect the improvements. Katie (2012) indicates that training programs performed with digital badges are effective for evaluations. In addition, it can be also noted that digital badges may change study habits of the students in the direction wanted. Digital badges are objects that are desired by the students. Students make various changes in their lives to earn these badges and review their study habits. Students identify ways to earn badges according to their preferences in general and they implement their decisions. Gibson et al. (2013) have stated that digital badges provide a continuous improvement for students and support their performance of the students.

Teaching activities that use digital badge affects the motivation of the students in a positive way. It can be said that digital badges have positive effects on motivation of the learner with its features such as they are considered as awards of the course, they provide students to be aware of what they are learning, allow them to review their peers and trigger competition in the classroom. This may be caused by that learners can see what badges their peers earn and what knowledge-skill level these badges represent. Gibson et al. (2013) and Abramovic, Schunn and Higashi (2013) stated that the motivation of learners are positively affected by digital badges. In addition, digital badges help learners to be satisfied and realize their achievements. This may be associated with that students may certify their achievements with digital badges whenever they want.

Digital badges create a competitive environment in the classroom, encourage students for course participation and give the opportunity of self-evaluation. This may be associated with considering digital badges as a reward earned and educational efforts spent to obtain these badges. Similarly, Ash (2012) indicates that digital badges are that perceived by learners as rewards. Achievements and peer competition affect learners' study habits. Learners spend more efforts and study harder to obtain badges. Davidson and Goldberg (2009) argued that digital badges help to create desired learner behaviors. According to Flemming and Levie (1993), more cognitive effort spent affect learning in a positive way. However, due to some reasons other than academic limitations, some negative situations such as stress and loss of motivation can be seen in learners in case of failures to receive a badge.

Digital badges constitute positive attitudes toward learning processes. The desire of learners to use digital badges in their future learning lives and their expectations of having these badges in application-based courses support this argument. Similarly, McDaniel, Lindgren and Friskics (2012) stated that learners exhibit a positive attitude towards digital badges.

Digital badges issue by accredited institutions can be used as achievement certificates. Digital badges reflect the adequacy of a course or knowledge of expertise. Therefore, it seems possible to use these badges like other certification methods showing the level of achievement and expertise. Digital badges are considered as tools that can fill the deficiency of other certification methods and reflect the achievements of students correctly (Watters, 2012). Gibson et al. (2013) stated that digital badges have become an alternative grading system. In addition, digital badges can be used to depict individual skills and abilities (Foster, 2013-b).

As a result, digital badges;
- Increase the success of the student in the course. Digital badges are attractive as they strive to achieve an engagement of students. Therefore, students spend effort to achieve these badges and their achievement levels increase. Learning style does not constitute any differences in academic achievement. In this regard, digital badges can be used for improving attendance and achievement of the students in addition to the level of readiness for the class.
- Increase learner motivation. The motivation of students who earn a badge increases. The badges earned make students feel that they are successful, their achievement is rewarded, and they earned this reward in a fair and valid process. Therefore, digital badges can be used to increase motivation of students, create a happier learning environment and make students more active in the learning process.
- Show the level of academic achievement. Since digital badges are earned by those who meet the specific learning objectives, these badges indicate the level of success. Digital badge holders can easily evaluate the success of their own levels and peers. Digital badges can be used to reflect achievement levels of learners, prepare different instructional practices based on different levels of achievements and create competition among peers.
- Regulate the study habits. Digital badges are objects that are desired by the students. Students make various changes in their lives to earn these badges and review their study habits. Students identify ways to earn badges according to their preferences in general and they implement their decisions. Therefore, digital badges can be used to improve study habits of the students and as a tool that encourage them to demonstrate their self-regulation behaviors.
- The views of students toward digital badges and their satisfaction levels are positive. In addition, they want to be a part of badge-based teaching activities to be conducted in the future. This indicates that students attribute positive meanings to digital badges in general. These emotions can be used to organize courses and as encouraging tools while performing activities both in and out of classroom.
- Used as a certificate showing the achievement and rank of the student. Digital badges are considered to have similar properties as diplomas, certificates and achievement letters showing the achievements and ranks of the holder. In this regard, digital badges can be used instead of certificates and diplomas showing the competency. However, it is important to remember that digital badges should be issued by

accredited institutions. Digital badges with these specifications can be used as competence documents in the personnel selection processes of public or private institutions.

In this study, the effect of digital badges on teaching processes and views of the students investigated. According to results of the study, digital badges are powerful factors that can affect activities conducted in and out of classroom in a positive way. This study, in which effect of badges given based on different levels of a subject is investigated, can be diversified by activities containing evaluations of badges belonging different subjects. In addition, studies to be conducted in different groups will be useful in the evaluation of the results.

REFERANCES

Abramovich, S., Schunn, C., & Higashi, R. M. (2013). Are badges useful in education?: it depends upon the type of badge and expertise of learner.*Educational Technology Research and Development*, *61*, 217-232.

Bani, M., & De Paoli, S. (2013, June). Ideas for a new Civic Reputation System for the Rising of Digital Civics: Digital Badges and Their Role in Democratic Process. In *Proceedings of the 13th European Conference on eGovernment: ECEG 2013* (p. 45). Academic Conferences Limited.

Büyüköztürk, Ş., Çakmak, E. K., Akgün, Ö. E, Karadeniz, Ş., & Demirel, F. (2010). Bilimsel Araştırma Yöntemleri, PegemA Akademi, Ankara.

Cohen, L., Manion, L., & Morrison, K. (2007). Research methods in education (6th ed.). New York, NY: Routledge.

Creswell, J. W. & Plano Clark, V. L. (2011). Designing and Conducting Mixed Methods Research (2nd ed.) SAGE Publications, Inc.

Davidson, C. N., Goldberg, D. T., (2009). The Future of Learning Institutions in a Digital Age. The MIT Press Cambridge, Massachusetts London, England

De Paoli, S., De Uffici, N., & D'Andrea, V. (2012). Designing badges for a civic media platform: Reputation and named levels. In*Proceedings of the 26th annual BCS interaction specialist group conference on people and computers* (pp. 59-68). British Computer Society.

Fleming, M. L., & Levie, W. H. (Eds.). (1993). *Instructional message design: Principles from the behavioral and cognitive sciences*. Educational Technology.

Foster, J. C. (2013). The promise of digital badges. *Techniques: Connecting Education & Careers*, *88*(8), 30-34. http://www.nocti.org/pdf/news/techniques/Nov%202013%20-%20The%20Promise%20of%20Digital%20Badges.pdf

Gencel, İ. E. (2007). Kolb'un deneyimsel öğrenme kuramına dayalı öğrenme stilleri envanteri-III'ü Türkçeye uyarlama çalışması. *Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 9(2), 120-139.

Gibson, D., Ostashewski, N., Flintoff, K., Grant, S., & Knight, E. (2013). Digital badges in education. *Education and Information Technologies*, 1-8.

Halavais, A. (2011) "A Genealogy of Badges", *Information, Communication and Society* 15(3): 354-373.

Katie, A. (2012). 'Digital Badges' Would Represent Students' Skill Acquisition Retrieved from http://www.edweek.org/dd/articles/2012/06/13/03badges.h05.html (Access Date: 21.01.2015)

Lindgren, R., & McDaniel, R. (2012). Transforming Online Learning through Narrative and Student Agency. *Educational Technology & Society*, *15*(4), 344-355.

Mahle, M. (2011). Effects of interactivity on student achievement and motivation in distance education. Quarterly Review Of Distance Education, 12(3), 207-215.

McDaniel, R., Lindgren, R., & Friskics, J. (2012). Using badges for shaping interactions in online learning environments. In *Professional Communication Conference (IPCC), 2012 IEEE International* (pp. 1-4). IEEE.

Speece, M. (2012). Learning style, culture and delivery mode in online distance education. Us-China Education Review, 1-12.

Watters, A. (2012). Show Me Your Badge. *Campus Technology*, *26*(4), 8-12.