

CHALLENGE FOR MORE COMPETITION IN EDUCATION: EDUCHALL*

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ABSTRACT

Gamification increases student participation, interest, and motivation levels in learning environments and contributes to the process of learning. This study aims to explore the goal of increasing students' motivation through supporting competition by the challenge method and also to reveal the views of students and teachers regarding Educhall application developed by researchers of the current study. This qualitative study is based on the responses of 28 university students that used Educhall application and took part in a semi-structured interview. In addition, the observations of the teacher were used in the study. The results of the study showed that Educhall strengthened competition in the learning process and increased students' motivation. However, the fact that only one person can be challenged in the Educhall application, that there is no mobile application and the content is limited can be considered as the limitations of the application.

Keywords: *gamification, collaboration, Educhall application, challenge learning*

1. Introduction

Games cause strong emotional reactions such as curiosity, frustration, and joy (Kim, 2012). Playing games in education generally focuses on increasing students' interest in lessons, supports the competitive spirit in the classroom and ensures participation in the learning process by motivating students through use of tools like points, badges, levels and league tables (Ceker & Ozdamli, 2017). Gamification defined as incorporating elements of game in a non-game context, (Deterding et al., 2011) is increasingly attracting more attention from educational researchers with its ability to increase student motivation (Hanus & Fox, 2015). Gamification leads to more participation and fun in the learning process by means of positive feedback and aims to make students more motivated and interested in the lessons (Muntean, 2011).

Gamification is a term traditionally associated with games and is applied to a number of motivational triggers such as rewards and competition (Buckley, Doyle, & Doyle, 2017). Competition is the desire to surpass others in pursuit of resources and rewards by comparing one's potential and achievements with others (Anderson et al., 2007; Jiang, Huang, & Chen, 2012; Ruhl & Lordly, 2017). Gamification can make the teaching process fun, increase motivation, and create a competitive environment. Gamification not only makes students more interested in the subject but also boosts their skills in problem solving, interaction, and collaboration. Of course, in order to ensure that the competitive environment has a positive effect, certain conditions must be met. For example, the success of competition as a motivational tool depends on whether the reward system is perceived as believable, transparent, compelling, and fair (Buckley, Doyle, & Doyle, 2017). It is also important to prevent unpleasant rivalry between students during the announcement of scoreboard at the end of the activity (Ding, Kim, & Orey, 2017). While the literature outlines the promising educational outcomes of gamification such as higher course grades, there appears to be some mixed results as well (Majuri, Koivisto, & Hamari, 2018). Furthermore, most of the previous research in this field had used quantitative approach while scholars have underlined that qualitative approach is needed to help in better understanding main constructs, frameworks and nature of this topic (Martí-Parreño, Méndez-Ibáñez, & Alonso-Arroyo, 2016). By using a qualitative approach, the current study aims to fill these gaps and explores the outcomes of gamification in education through Educhall application among students.

* Received: JAN 31, 2022; Accepted: APR 22, 2022

2. Related Research

We developed Educhall which is a web-based application where teachers can prepare and direct questions, and where students can solve questions and challenge their friends. Educhall application aims to increase motivation and participation by providing a competitive environment. The challenge feature contributes to the competitive environment. In Educhall application, students use one-on-one challenge feature, encourage each other to solve questions and active participation. Educhall will introduce a whole new dimension to gamification as it aims to increase the positive effect of gamification on interaction (Çakıroglu et al., 2017; Ding, Kim, & Orey, 2017), motivation (Abramovich, Schunn, & Higashi, 2013; Lister, 2015), and participation (Cronk, 2012) by strengthening the competitive environment through the challenge method. Therefore, it is important to test the application, of which pilot tests are already completed, in real teaching environments, so that students' views can be determined and limitations and shortcomings that might be encountered in real life, are revealed.

Waterfall Model was used in the development of Educhall. Waterfall model is a software development model in which the software process is linear, that is, the previous phase must be completed in order to move on to the next process. Waterfall model consists of analysis, design, development, testing, implementation and maintenance steps, respectively (Balaji & Murugaiyan 2012). Another distinctive quality of the Waterfall model is that the output of the previous step is always the beginning of the next step. Educhall has been developed using the waterfall model as its requirements are clear and easy to understand, and since in this model, phases are separately processed and do not overlap. Waterfall model is not only understandable and easy to manage, but it is also suitable for small projects (Cusumano & Smith, 1995).

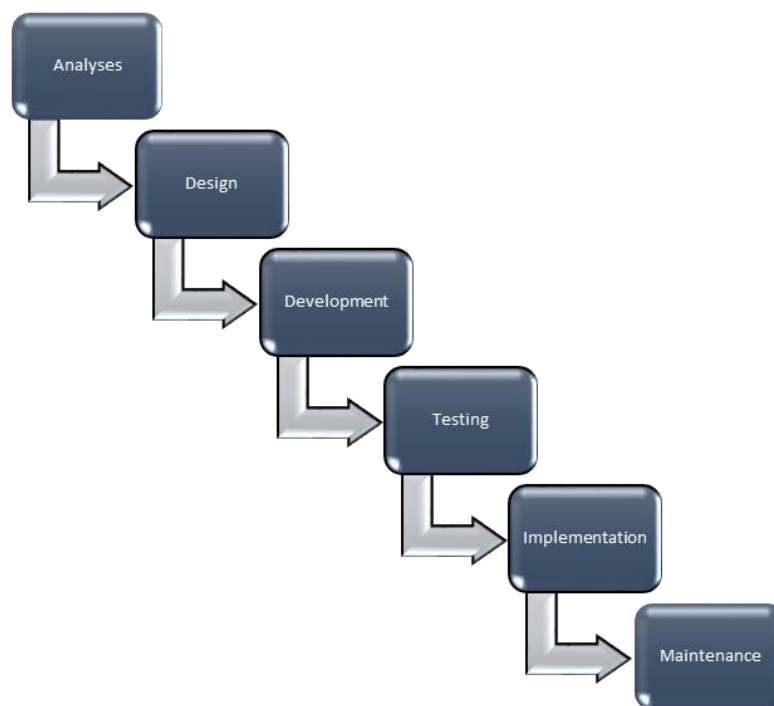


Figure 1: Waterfall Model

3. Purpose of Study

What are the student opinions regarding the use of Educhall application in the teaching process?

- What are the advantages and limitations of Educhall educational application?
- What are the suggestions for possible improvements or corrections that can be made to improve Educhall Challenge application?

c. What are the teacher's observations regarding the implementation of Educhall software in the teaching process?

4. Method

The methodological approach of the current research is a qualitative action research, since it aims to establish the limitations of the challenge-based educational gamification application called Educhall and to remove such limitations in order to ensure a more efficient use in the learning process. Qualitative action research are carried out to identify and solve problems or to improve current situations (Aksoy, 2003; Kindon & Elwood, 2009). Since in this study, the researcher was also the person who developed the application and used it during the teaching process, he was able to observe its shortcomings in application.

4.1 Data Collection and Procedures

28 students taking the Introduction to Computer class at a university located in the Turkish Republic of Northern Cyprus in the 2018-2019 fall semester, participated in the study. 60% of the participants were male and 40% were female.

In the study, semi-structured individual interview forms consisting of 4 open-ended questions were used to collect qualitative data. The individual interview forms prepared by the researcher were examined by four specialist lecturers and a pilot test was carried out to measure the answerability of the questions. The pilot test showed that the questions of the semi-structured interview were answerable. 28 students were individually interviewed on a voluntary basis to collect data. The voices of the respondents were recorded upon their permission during the interviews. In addition, the instructor who applied the Educhall method took notes during the classroom activities and shared his observations regarding the application.

The audio records of the individual interviews were transcribed to carry out a qualitative content analysis. Content analysis is a method where similar or related

data is divided into codes and categories to build themes and make data more interpretable (Yildirim & Simsek, 2008).

5. Application

Waterfall model was used in its development process. The said model consists of analysis, design, development, testing, implementation and maintenance steps (Balaji & Murugaiyan, 2012).

5.1 Analysis

The analysis phase, which helps system and business analysts to define both functional and non-functional requirements, is usually the step where a complete and comprehensive description of the behaviour of the software is made (Bassil, 2012). There are many gamification softwares prepared for use in educational processes. This software is unlike its counterparts in that it was developed to offer an environment to students where they can challenge one another. This will lead to a stronger competition atmosphere and thus stronger motivation levels. The application is student-centered under the surveillance of the teacher and allows the students to participate in competitions to test themselves, to challenge their peers, and ultimately to allow students to encourage each other. There will be two types of user roles in the system; teacher and student. The teacher will be able to create lessons from the management panel and add quizzes. The teacher will determine the types of questions, the duration of the quizzes, scoring system, accessibility, and the maximum number of attendance. If accessibility is limited to a group or class, the target audience that the student can challenge will also be limited. The students are supposed to enter the competition, take the quiz and after seeing the score, challenge other participants by email. This will help peers to encourage each other in solving questions and contribute to the competitive environment. A suitable algorithm has been created for the program in line with this goal.

A computer, an internet connection, a domain name as it will be web-based, a WordPress platform installed on a Linux server, WordPress themes and plugins will be needed for the development of the Educhall program. WordPress is a PHP based open source content management system distributed free of charge. With WordPress, responsive web pages compatible with mobile devices can be created using paid or free themes and add-ons suitable for the content (Kean, 2013; Wordpress, 2018).

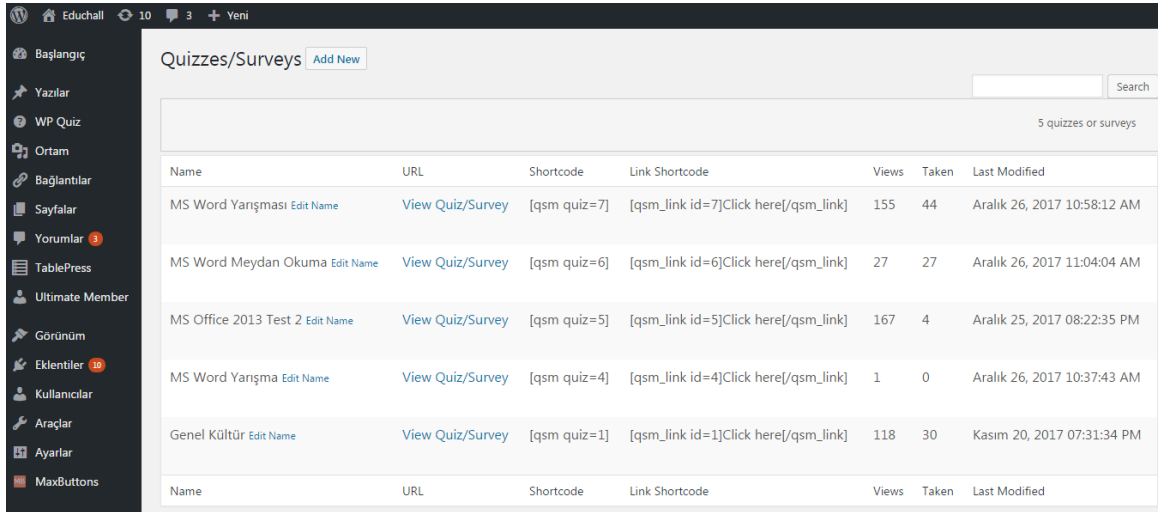
It will be sufficient for the users to have a web browser and a device with an internet connection to participate in the Educhall application. Users must have basic computer skills in order to participate in activities after creating membership in the Educhall application.

5.2 Design

At this stage, the basic structure was developed to ensure an easy use experience and to meet the requirements in the analysis stage. Accordingly, colours, patterns, menus, sliders and footers were added in line with the established design principles. The locations of buttons to be used for sign-ins, sign-ups, score tables, course lists, and user manuals were agreed upon.

5.3 Development

The Educhall web application was developed on a Linux server using a free WordPress theme called Edu-Care. Colours, patterns, menus, sliders and footers were added in line with the established design principles. In addition, a free WordPress survey creation plugin called "Quiz and Survey Master" was used to create a quiz where students can challenge each other. In addition, html and css were used to create the visuals of the pages and to show the competition data, while php coding was used to allow students to challenge each other via mail.



Name	URL	Shortcode	Link Shortcode	Views	Taken	Last Modified
MS Word Yarışması Edit Name	View Quiz/Survey	[qsm_quiz=7]	[qsm_link id=7]Click here/[qsm_link]	155	44	Aralık 26, 2017 10:58:12 AM
MS Word Meydan Okuma Edit Name	View Quiz/Survey	[qsm_quiz=6]	[qsm_link id=6]Click here/[qsm_link]	27	27	Aralık 26, 2017 11:04:04 AM
MS Office 2013 Test 2 Edit Name	View Quiz/Survey	[qsm_quiz=5]	[qsm_link id=5]Click here/[qsm_link]	167	4	Aralık 25, 2017 08:22:35 PM
MS Word Yarışma Edit Name	View Quiz/Survey	[qsm_quiz=4]	[qsm_link id=4]Click here/[qsm_link]	1	0	Aralık 26, 2017 10:37:43 AM
Genel Kültür Edit Name	View Quiz/Survey	[qsm_quiz=1]	[qsm_link id=1]Click here/[qsm_link]	118	30	Kasım 20, 2017 07:31:34 PM

Figure 2: Management Panel of the Application



Figure 3: Educhall Homepage


5.4 Test

When Educhall was ready, three lecturers who are specialists in their areas, were asked to test the application.

In addition, experiments were conducted in the classroom supervised by a group of 6 people and one of the researchers. The program was finalized in line with the feedback received.


5.5 Implementation

Educhall gamification application based on the challenge-method, was tested on 44 students who took theoretical introduction to computer classes together, but laboratory classes separately for three weeks, in the form of one laboratory class per week. Before the application, teachers prepare 2 different multiple-choice quizzes with pictures relating to that week's topic. Questions will be rated according to their level of significance. Teachers also set a finishing time and a background music for each quiz. Teachers also share the link of the application via the learning management system, with the students. Before the start of the application, the teacher asks the students to pick a paper from a box filled with all the students' e-mail addresses. The students solve the quiz in the link shared with them, see their respective scores and challenge their friends in the e-mail written on the paper. A mail goes to the challenged person and the challenged person responds by clicking on the link. At the end of each quiz, the students receive a feedback on the total score and the questions they answered. According to the challenge results, top five students are displayed on the Educhall site and on the course page in the learning management system. In addition, at the end of the activity, the scoreboard showing the scores of all students, is displayed on the Educhall website.

Fernando size meydan okuyor  Gelen Kutusu x



Educhall <info@educhall.atataspolat.com>

Alıcı: bana 

Fernando size MS Word Yarışması isimli Bilgi Yarışmasında Meydan Okudu.

Bu yarışmadan Fernando toplam 20 puan aldı.

Kendine güveniyorsan sende bu yarışmaya katılmak için aşağıdaki linke tıkla.

<http://educhall.atataspolat.com/meydan-okuma/>

Figure 4: Challenge e-Mail

5.6 Maintenance

Additional maintenance activities might be needed, including adapting the software to the environment, meeting new user requirements, and increasing software reliability (Stellman & Greene 2005). In the light of the data obtained as a result of the research, necessary arrangements, new additions, improvements, and updates will be made.

Microsoft Word 2013 – Ömer Sami Kaya



MS Word Yarışması Adlı Yarışmanın Kazananları		
Derece	Adı Soyadı	Toplam Puan
1.	gökberk	30 Points
2.	MERVE	30 Points
3.	Yusuf ÇİÇEK	30 Points
4.	çağın Özturan	30 Points
5.	İsmail Dağı	30 Points

Yarısmaya Başla

MS Word Bilgi Yarışması: Sonuçları Tam Liste (Güncelleme: 28.12.2017)

Figure 5: Competition Results

6. Findings and Discussion

6.1 Students' Opinions about Advantages of Educhall Application

Students' views on the advantages of Educhall application are shown in Table 1. According to the students, the application was useful because it was fun (N = 11), created competition (N = 8), reinforced learning (N = 5), was educational (N = 4), and provided an opportunity to establish success levels (N = 3).

Q1: "I think it's a very fun activity. You are both having fun and learning. "

Q2: "It was a really nice and educational game."

Q3: "Challenge activity is nice, it makes it easier to learn in a competitive environment"

Q4: "It helps us understand how much we learned. Also, because it is a game, it makes us more interested in the lesson."

Q5: "I think this activity helps to consolidate the knowledge we learned in the lesson."

Table1: Students' Thoughts Regarding Educhall's Advantages

Category	Factor	F
Educhall's Advantages	Fun	11
	Competitive	8

Environment				The fun nature of the Educhall application increased the motivation levels of the students towards the lesson. This result is consistent with the results of the study performed by Lister (2015) in which the effect of gamification on student motivation and performance was examined. The success ranking systems serve as a source of motivation, as the efforts are displayed to allow immediate recognition (Dominguez et al., 2013). Students also emphasized how Educhall creates a competitive environment. It is known that competition environment in gamification increases student motivation. It can be said that the challenge feature of Educhall in particular is effective in this result. Similarly, in a study
Reinforces Knowledge		5		
Educational		4		
Knowledge Detection	Level	3		

conducted by Camilleri, Busuttil, and Montebello (2011), it was stated that the use of games and game tools in learning increased motivation through competition.

6.2 Students' Opinions about the Limitations of Educhall Application

Findings from individual interviews conducted to determine the limitations of the Educhall application are shown in Table 2. According to the students, the most important limitation was that they could “challenge only by e-mail” (N = 10). Other limitations were Content Limit (N = 8), Visuals (N = 7), Duration (N = 4) and Feedback (N = 3).

Table2: Students' Opinions about Limitations of the Educhall Application

Category	Factor	F
Educhall's Limitations	Challenge Only by Mail	10
	Limited Content	8
	Visuals	5
	Period	4
	Feedback	3

Q2: "I think it is the most important limitation is that I can challenge only one person and only by mail."

Q6: "The number of questions in the challenge is very low. Content should be improved"

Q4: "The images used for the questions are low quality."

Q7: "Short period"

Q8: "During challenging, it does not show the correct answer when a wrong answer is given."

The students emphasized that it is a limitation that challenges can be sent only by e-mail. The reason for this may be that the student can challenge only one person by e-mail, that e-mail boxes are not constantly checked

by the users and also the need to know the competitor's e-mail address. Furthermore, the students mentioned that the content was limited. We believe that the fact that 6 different quizzes related to one topic only was uploaded to the system, was effective in this perception.

6.3 Students' Suggestions as to How to Further Improve the Educhall Application

Table 3: Suggestions of Students Regarding the Educhall Application

Category	Factor	F
Educhall Suggestions	Must Have Mobile Version	12
	It must be possible to challenge more than one people	11
	Response Time Should Affect the Score	10
	Diversity of Questions Should Increase	9
	Design Should Be Improved	6
	Must be possible to send feedback	4

Table 3 contains the suggestions of the students about how to improve the Educhall gamification practice. Accordingly, students' suggestions are as follows; There Must Be a Mobile Version (N = 12), Design Must be Improved (N = 11), Response Time Must Affect the Score (N = 10), It Must be Possible Challenge More Than One Person (N = 9), Increase Question Diversity (N = 6), Must be Possible to Send Feedback (N = 4). Some important statements of the students about the subject are as follows.

Q8: "I think the variety of questions should increase; the questions should also be included in the videos."

S12: "It should be possible to challenge more than one person and also through the social media"

Q4: "The response time should be taken into account when calculating the total score."

Q15: "I think it would be much better if there was also a mobile version of the application."

Q19: "The visual design of the web page could be better"

Students continuously stated that Mobile Version should be developed in order to improve the Educhall application. According to Digital in 2017 global overview report, more than half of the world's individuals use at least one smartphone, and more than half of the world's web traffic comes from mobile devices. These results show that the use of mobile devices is increasing in the world. Therefore, it can be said that it may be beneficial to develop the mobile application for students so that they can use the Educhall application whenever or wherever they want.

6.4 The Observations of the Teachers about the Implementation of Educhall Application

The instructor who made the practice in the classroom stated that the use of the Educhall application increased the students' participation in the classroom, their interests, and motivation. In a study by Sánchez Mena and Martí Parreño (2017), it was shown that the fact that gamification of education could increase students' motivation, encouraged the teachers to use gamification in their classes. The study showed that due to the challenging feature of Educhall application, a strong competition environment was created among students. It

also demonstrated that an automation atmosphere emerged, where the students encouraged each other to participate. However, the teachers stated that during the implementation of Educhall in the classroom, there may be problems in determining the person to be challenged. In addition, the instructor suggested that the challenge option in Educhall be made on platforms that students can see instantly instead of e-mail.

7. Conclusion and Recommendations

7.1 Conclusion

This study aims to reveal the limitations, disadvantages, in-class applicability, application advantages, and suggestions with regards to the use of Educhall application in the teaching processes. The students stated that the application makes the lesson fun and the competition environment motivates the students. It also became clear that it is necessary to develop a mobile version of the Educhall, to make it possible to challenge more people at the same time, to increase the variety of questions and to ensure that response time is taken into account in scoring. It has been determined that Educhall increases the competition in the classroom with its challenge feature and affects participation and motivation positively, but there are difficulties in determining the person to be challenged. The results suggest that the challenge method can increase student participation in educational processes, and increase their motivation levels by strengthening the competitive environment through a gamification process. With small improvements, the Educhall will introduce a novel understanding to learning process and to student-student interaction via its challenge feature. Particularly, the fact that the students create a working network by challenging each other is sure to add a new dimension to both in and outside the classroom learning activities.

7.2 Suggestions for Future Research

The results obtained in this study are very important for improving the mobile version of Educhall and eliminating the problems. In the next step, the Educhall can be transferred to the mobile platform, the scoring system can be updated, it can be made possible to allow the users challenge more than one person, the design can be improved, the questions' variety can be increased and question pools can be created for different topics and levels. Challenge features can be made possible through additional channels. Also, in the selection of the person to be challenged, a test can be applied to prevent challenging a student that already took the quiz. Likewise, a feedback module can be developed to increase educational benefits.

In this study, qualitative research methods were used. It is recommended that the study be carried out with empirical studies and mixed research methods in which quantitative and qualitative research methods are used together. This research is limited to the web-based version of Educhall. The results of the study make it clear that it is important to develop a new Educhall version, to apply the improved version in real environments with wider groups and to report the results. Also, we believe that the fact that the results of this study are obtained through real environment experiences can help other researchers to develop educational software in the future.

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