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ASK-RESPONSE-PLAY-LEARN: STUDENTS' VIEWS ON GAMIFICATION BASED INTERACTIVE RESPONSE SYSTEMS

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Abstract
Interactive Response System (IRS) is a technology which is used to transmit students' responses to teacher via computers, mobile devices or QR code cards. IRS can be used to make courses more interesting with gamification principles. Gamification is defined as using game components in instructional activities. The aim of this study is to present student views about the process of ICT course that was implemented through gamification based question-answer method with different IRSs. Participants of the study are 1st year undergraduate students from the departments of Finance and International Trade. Different IRSs were used such as Kahoot, Socrative and Plickers. Students' views on variables such as instructional process, IRSs, participation and motivation were collected at the end of each lesson. Findings showed that students indicated positive approach to use IRS in lessons. Furthermore, students' views on gamification, positive and negative aspects of IRSs and their differences were included.

Keywords: Interactive response system, IRS, gamification, question-answer method.

INTRODUCTION

"Wisdom begins in wonder" said Socrates. The idea that asking questions would lead students to think critically was introduced by Socrates more than 2000 years ago (Boghossian, 2003) and has come down through formal changes day by day. However, there are basic question-answer method components such as gaining students' attention into the course and making them think at the core of asking questions. It is known that the question-answer method is used as one of the methods that support active learning and contribute to learning in order to reduce the tedium of the standard lecture method (Sevindik, 2010). Question-answer method is a teaching strategy also known as the "Teacher's Socratic Method" (Boghossian, 2003). This is basically about asking questions in a way that will inspire curiosity, getting answers and carrying out teaching and learning activities via knowledge sharing. In any discipline, Socratic thinking can be used to teach students how to examine their ideas in a critical way and to integrate with knowledge (Rud, 1997), as well as to draw attention and arouse curiosity.

Considering the classical way of question-answer method, there is a process such as teacher asks the question, student thinks about it and responses. Cazden (1988), who has major studies about classroom interaction, examined the classroom discourse process which she defined it as the "the language of teaching and learning" with IRE (initiation, response, evaluation) model. Teacher initiates the teaching and learning process, student responses and teacher or another student evaluates it according to the IRE model. In this model, which refers to the concept of social learning theory (Vygotsky, 1978), it is expected that student-teacher and student-student interaction is aimed to be

intense, and it is also aimed to achieve learning from students' interaction with teacher as well as from their peers. Academic evaluation of using this method in teaching and learning process requires more than one researcher according to Cazden (1988) because gathering the classroom discourse data and analyzing them require extremely much time and effort.

Technological developments and their integration in educational environments give the opportunity to use the teaching methods that are critical thinking ways of thousands years ago, more easily and more effectively. When question-answer method is considered, the ways of accelerating this process have also been taken into consideration by instructional technology designers and developers, and the result of these investigations has led to the creation of "response systems". These systems, which were designed specifically to speed up assessment and feedback of teacher-student interaction in classroom discourse, were based primarily on giving the right answer with a clicker device (iClicker). With the development of the structures of programming languages, response systems evolved into "interactive response systems" (IRSs). That is, teacher can transfer questions to the students online through projection device or computer or mobile software. The way that students response depends on the software used. If the students in the class are not able to use computers, mobile devices or internet, the QR code technology is a good example (Plickers). Similarly, there is a FlipQuiz web application in which questions are reflected only through projection device, verbal responses are received from students, feedback and evaluation is done online (FlipQuiz). There are lots of software or web application that can be used when the students have computers, mobile devices and internet facilities (Socrative, Kahoot, Quizlet, TestMoz etc.). When students enter their responses, they receive feedback, they are instantly evaluated, and the teacher can monitor the entire class instantly in these software and applications, which have various usage differences according to each other. One more feature of these IRSs, which is now almost imperative for increasing the learning performance, ensuring active student participation and effective use of the question-answer method, is to incorporate the bases of the new and trendy concept of gamification theory into the teaching and learning process.

Gamification concept is defined as the use of game components and mechanics in educational environments (Zichermann & Cunningham, 2011). Gamification concept, which is formed by considering the positive contributions of the components in the games such as competition, challenge, points, leaderboard, nicknames, avatars etc., takes place the concept of game based learning in educational environments. Gamification is only using game components in teaching activities because it is not actually a game. Social aspects of game mechanics have positive effects on student and teacher satisfaction (Maxwell, 2016). Gamification-based IRSs offer students the opportunity to choose their own characters, nicknames and avatars, climb up levels, earn points and badges during the question-answer process. Secondary school students who participated gamification based activities which were designed according to the Keller's ARCS model (1987), were more successful and their views were positive than the students who did not participated those activities (Turan, Avinc, Kara & Goktas, 2016). Students had positive attitudes (Galbis Cordova, Marti Parreno & Curras Perez, 2017), students' view showed that gamification activities improved motivation, learning and fun and reduced exam anxiety (Kocadere & Cağlar, 2015) and students who participated gamified assessment had more positive perception in terms of motivation, attention and learning performance (Barrio, Munoz-Organero & Soriano, 2016) in undergraduate level studies. Undergraduate 3rd grade students who took the digital ethics course with gamification based IRS (Socrative) were more successful and they were willing to use more interactive educational technology tools in their courses (Garcias & Marin, 2016). Moreover, the views of higher education teachers about using gamification activities in courses were positive and they were willing to use gamification (Sanchez-Mena, Marti-Parreno & Aldas-Manzano, 2016).

The first three weeks of the Information and Communication Technologies course in all departments of the Faculty of Economics and Administrative Sciences consist of theoretical subjects such as hardware, software and internet. It has been observed that the processing of these theoretical subjects by lecture method in which the application parts are maintained in the computer laboratory

environment reduces the motivation of the students and creates a boring environment. For this reason, it is thought that, it will be possible to utilize applications that make the course more attractive and use the advantages of being in computer laboratory in the course. Gamification-based IRSs were used to increase the effectiveness of question-answer method and to make it more enjoyable. The aim of this study is to present student views about the process of ICT course that was implemented through gamification based question-answer method with different IRSs. Following questions were examined in this study:

- What are the satisfaction level of students about each of used 3 IRSs?
- What are the most liked and disliked features of the 3 IRSs?
- What are the contributes of the 3 IRSs to teaching and learning process?
- Are the students intentioned to use IRSs in other courses?
- How do the students compare the 3 IRSs in terms of their different features?

METHOD

The current study employs exploratory case study which is a qualitative method. Factors related to a case are examined in the case study and it is important to find out how the context and participants were affected in that case (Yin, 2013). The most common reason why case studies widely used in the field of educational technologies is that "how" and "why" questions are frequently used in both case studies and educational technology studies (Willis, 2008).

1st grade students from the Faculty of Economics and Administrative Sciences, departments of Finance and International Trade are the participants of this study. 50 boys (45%) and 61 girls (55%) participated in this study. 57 students study in International Trade and 54 students study in Finance departments (Table 1).

Table 1: Participant Information

Gender	**f**	**%**
Boys	50	45
Girls	61	55
Department	**f**	**%**
International Trade	57	51
Finance	54	49
Total	111	100

Questions regarding the subject to be processed every week during the implementation process were prepared before the course time and the transfer was made to the related IRS. IRS based question-answer activities lasted for 3 weeks, a different IRS were used each week. The distribution of IRSs, participants and subjects of the lesson according to the weeks are given in Table 2.

Table 2: Number of Participants for Each IRS

	1st week – Hardware		2nd week – Software		3rd week – Internet	
	Kahoot		**Socrative**		**Plickers**	
	f	**%**	**f**	**%**	**f**	**%**
Boys	40	44	17	38	23	45
Girls	51	56	28	62	28	55
Total	91	100	45	100	51	100

During the lessons, questions were asked to the students using IRSs in the framework of question-answer method. The lesson was followed by the questions in the IRS and the subject was narrated on the basis of the answers given by the students. At the end of each course, students were interviewed

about the IRS with questionnaires prepared by the researchers. Not all students participated in all of 3 activities because of attendance is not obligatory for students in that Faculty. 91 students participated in the Kahoot application, 45 students participated in the Socrative 45 and 51 students participated in the Plickers activities. The number of students participating in all three applications is 35.

Multiple-choice and open-ended questionnaires were used to obtain students' views of the IRSs used in courses. They were created by examining previous studies and resources about gamification components (Edutrends, 2016), the characteristics of IRS tools and the examples used in training and questionnaires. They include questions about the level of satisfaction with the tools, and the use of tools in the process of learning and teaching environment. They were applied to the students after the expert views was received. The questionnaire about the Kahoot environment applied in the first week consists of 7 questions, the questionnaire about the Socrative environment applied in the second week and the Plickers environment applied in the third week consists of 8 questions. 8th question was added to get student views about the application used in the week and the comparison of the IRS used in the previous week/weeks.

The data obtained with multiple choice questions in the questionnaire were analyzed by descriptive analysis and data collected by open ended questions were analyzed by content analysis. Views on each of the 3 IRSs were taken from the total number of attended students. In the comparison of 3 IRSs, only 35 students' views participating in all 3 activities were analyzed and interpreted.

FINDINGS

Satisfaction Level of Students about 3 IRSs

Frequencies and percentages about satisfaction level of students related with the IRSs are given in Table 3. In the questionnaire, "1" stands for "I did not like at all" and "5" stands for "I really like".

Table 3: Frequencies and Percentages for the Satisfaction Level of Students for Each IRS

IRS	1		2		3		4		5		Average
	f	%	f	%	f	%	f	%	f	%	
Kahoot (n=91)	1	1.1	3	3,3	11	12	17	18,7	59	64,9	4,4
Socrative (n=45)	0	0	1	2,2	7	15,5	16	35,5	21	46,7	4,3
Plickers (n=51)	0	0	0	0	5	9,8	19	47,3	27	53	4,4

The average rating of the 91 students who participated in the Kahoot application was 4.4. 64.9% of the respondents (59) stated that they liked very much, 18.7% (17) liked it, 3.3% (3) disliked it and 1.1% did not like it at all. 11 people (12%) marked the middle option. It can be said that the Kahoot application is enjoyed by the participants. The average satisfaction rate of 45 students who participated in the Socrative application was 4.3. 46.7% (21) of the participants really liked it, 35.5% (16) liked and 2.2% of them did not like (1). 7 people (15.5%) gave the middle option. It can be said that the Socrative application is also liked by the students who participated in the activity. The average satisfaction rate of 51 students who participated in the Plickers application was 4.4. 53% of respondents (27) stated that they liked the application very much and 47.3% (19) liked it. 5 people marked the middle option (Table 3). Findings show that the majority of students who participated in the Plickers application liked to use it.

Most Liked and Disliked Features of the 3 IRSs

There are 2 sections for the most liked features of the 3 IRSs. One is obtained with checkboxes and the other one is obtained with open ended question. In the first one, students marked checkboxes in the questionnaire to state their most liked features for the question "Which feature or features of the IRS did you like?" Frequencies and percentages of the responses are given below in Table 4.

Table 4: Frequencies and Percentages of the Features of the IRSs Students Liked

Features	Kahoot (n=91)		Socrative (n=45)		Plickers (n=51)	
	f	%	f	%	f	%
Ease of use	47	51,6	31	68,9	36	70,6
Earning points	36	39,6	0	0	0	0
Competitive environment	58	63,7	16	35,5	24	47
Learning the correct answer immediately	53	58,2	27	60	31	60,8
Fun	69	75,8	26	57,8	43	84,3
None	1	1,1	2	4,44	0	0

75.8% (69) of the students using Kahoot stated that they liked the fun, 63.7% (58) of them liked the competitive environment, 58.2% (53) of them liked immediately learning the correct answer, 51.6% (47) of them liked the ease of use and 39.6% (36) of them stated that they liked earning points feature of the Kahoot application. There is 1 student who did not like any of the features. 68.9% (31) of the students using the Socrative stated that they liked the ease of use, 60% (27) of them liked immediately learning the correct answer, 57.8% (26) of them liked the fun, and 35.5% (16) of them liked the competitive environment. 2 students did not like any of the features and it appears that any student has not pointed out the ability to earn points. 84.3% (43) of the students using Plickers application stated that they liked the fun, 70.6% (36) of them liked the ease of use, 60.8% (31) of them liked immediately learning the correct answer, and 47% (24) of them liked the competitive environment. There is no student marked the "None" and "Earning points" options. According to the findings, Kahoot has the highest percentage in the features of fun and competitive environment; ease of use and fun features have the highest percentages in Socrative; and in Plickers fun and ease of use features are the most liked ones. In the 3 IRSs, it is seen that the feature with the lowest percentage is earning points.

"Are there another features you liked?" question was asked to the students and open-ended responses were taken. A total of 16 students from Kahoot application reported their views, 5 of them stated that they liked the colored interface of the Kahoot, and 2 of them liked teaching with playing. The following each statement were written by one student; ranking, multiple choice questions, scoring not only with the correct answer but also with speed of reply, the specification of choices in a shape form, timing, and requires neither notebook nor pen (Table 5).

Table 5: Student Statements for What They Liked in Kahoot

Feature	n
Colors (Being colorful)	5
Teaching with fun	2
Ranking system	1
Being as multiple choice test	1
Scoring with not only correct answer but also speed of reply	1
Fast responding	1
Responses as geometric shapes	1
Timing	1
Requires neither notebook nor pen	1

A total of 10 students who used the Socrative application reported different features in addition to the features they liked. 3 of them stated that they liked the immediate feedback about the answers of the questions. Seeing other students' responses, comparing others' answers with their own answers, showing and hiding responses on projection device when requested, no timing, simple interface design and seeing statistically the distribution of the answers on the screen were the features that students stated for the open-ended question (Table 6).

Table 6: Student Statements for What They Liked in Socrative

Feature	n
Feedback Includes feedback Immediate feedback (faster)	3
Response Seeing others' responses Comparing the responses with others' Showing and hiding responses when requested	3
No timing	1
Simple interface design	1
Includes open-ended question type	1
Seeing statistically the distribution of the answers	1

For the Plickers application, a total of 6 students stated that they liked different features. It seems that 2 of them liked QR codes. Immediate feedback, preventing students to see others' responses, technology-free environment and multiple choice questions are the features that students liked (Table 7).

Table 7: Student Statements for What They Liked in Plickers

Feature	n
QR code system (card use)	2
Immediate feedback	1
Preventing students to see others' responses	1
Technology-free environment	1
Includes multiple choice questions	1

According to the findings obtained from the analysis of the answers of the question "Which features you did not like and why?" it is seen that 47 of the students used Kahoot application did not stated any negative features. 7 out of the 27 students did not like to read the questions from the projection screen and not to see questions and answers on the user screen, 6 of them did not like the shape figures on responses, 6 of them did not like the scoring system (scoring according to the response speed), 5 of them did not like the timing. Four choices for each question, the technical problems when they are connected with the phone, and the fact that the previous questions cannot be displayed again are the negative views of the students about Kahoot application (Table 8). Moreover, sample sentences about Kahoot are given below stated by students:

"Timing problem and inequitable scoring"

"There is no opportunity to discuss about previous question"

"It is not meaningful that responses are formed as geometric shapes"

"It is a problem to read the question from main screen, it would be nice to read it from our devices"

Table 8: Student Statements for What They Do Not Like in Kahoot

Feature	n
There is nothing I did not like	47
View of the questions and responses Reading questions from projection screen Not being able to see questions and answers from user device	7
Answer choices are in geometric shapes (triangle, square, circle etc.)	6
Scoring Inequitable scoring Scoring with the response speed	6

Giving less points Earning points	
Not enough time to answer the question	5
Four multiple choices	1
Technical problems	1
Delays when connected with mobile device	
Not being able to see the question that answered again	1

26 students who used Socrative did not state any negative views. 6 students out of 16 stated that they did not like scoring (ranking and not scoring), 3 students stated that there is no competitive environment, 2 students stated the delay in the transition to the next question, 2 students did not like open ended questions. Uncolored interface design, low enjoyment level and no timing feature are also the negative views of the students about Socrative application (Table 9). Sample sentences about Socrative are given below stated by students:

"There would be earning points for each question"
"I did not line the turning hexagon shape while passing the other question"
"I think it is a little boring that there is no timing while answering the questions"

Table 9: Student Statements for What They Do Not Like in Socrative

Feature	**n**
There is nothing I did not like	26
Scoring system Ranking Not giving points	6
There is no competitive environment	3
Speed (It keeps waiting while passing to next question)	2
Open-ended questions	2
Design (it is not colorful)	1
Fun level is low	1
No timing for questions	1

34 students who used Plickers did not state any negative views. 5 students out 16 stated as a negative feature that the risk of wrong scanning the QR code card, 3 students stated the scoring system and 2 students stated seeing the student responses from the main screen. Allowing students to interact each other during the activity, time waste, uncolored and bad interface design of the main screen, hard to use, and not seeing the previous question are the negative features stated by the students (Table 10). Sample sentences about Plickers are given below stated by students:

"Some students talk too much, it is hard to hear. My attention scattered because of this."
"Sometimes scanning was late"
"I feel disgraceful because of our responses are visible to everyone"
"Holding the card wrong reluctantly makes the scanning process hard"

Table 10: Student Statements for What They Do Not Like in Plickers

Feature	**n**
There is nothing I did not like	34
The risk of scanning the card wrongly	5
Scoring system	3
Seeing others' responses on the screen	2
Activity environment allows students to interact each other	1
It causes time waste	1

Design	1
It is not colorful	1
It is hard to use	1
Not being able to see the question again	1

Contributes of the 3 IRSs to Teaching and Learning Process

"Which contributes do you think that these IRS activities provide for teaching and learning environment?" question asked to the students. Frequencies and percentages of the answers are given in Table 11.

Tablo 11: Students' Views about the Contributions of the IRSs to Teaching and Learning Process

Features	**Kahoot (n=91)**		**Socrative (n=45)**		**Plickers (n=51)**	
	f	**%**	**f**	**%**	**f**	**%**
It made the lesson funny	78	85,7	34	75,5	45	88,2
It increased my attention	47	51,6	21	46,7	33	64,7
It provided better learning	56	61,5	32	71,1	36	70,6
It increased my participation	49	53,8	22	48,9	37	72,5
It increased my motivation	49	53,8	16	35,5	34	66,7
It increased my interaction with instructor	45	49,5	23	51,1	23	45,1
It provided retention of my knowledge	44	48,4	24	53,3	31	60,8
None	0	0	1	2,2	0	0

It was found that 85.7% (78) of the students who used Kahoot stated that it made the lesson funny, 61.5% (56) of them stated that it provided better learning, 53.8% (49) of them stated that it improved the attendance and motivation, 51.6% (47) of them stated that it increased attention to the course, 49.5% (45) stated that it increased the interaction with the instructor, and 48.4 (44) of them stated that it improved the retention of their knowledge.

75.5% (34) of the students who used Socrative stated that made the lesson funny, 71.1% (32) of them stated that it provided better learning, 53.3% (24) of them stated that it provided retention of their knowledge, 51.1% (23) of them stated that it increased the interaction with the instructor, 48.9% (22) of them stated that it increased the participation to the course, 46.7% (21) of them stated that it increased the attention to the course, and 35.5% (16) of them stated that it increased the motivation.

88.2% (45) of the students who used Plickers stated that it made the lesson funny, 72.5% (37) of them stated that it increased attendance to the course, 70.6% (36) of them stated that it provided better learning, 66.7% (34) of them stated that it increased motivation, 64.7% (33) of them stated that it increased attention to the course, 60.8% (31) of them stated that it provided retention of their knowledge, and 45.1% (23) stated that it increased the interaction with the instructor (Table 11).

According to the findings obtained, the highest percentage for all three IRSs is that "it made the lesson funny." The vast majority of students think that the IRS makes the lesson funny. The expression with the lowest percentage is "increase motivation" in Socrative, "increase the interaction with the course instructor" in Plickers and "retention of the knowledge" in Kahoot.

"Are there any other contributes of IRSs to you or the lesson?" question were asked to the students and open-ended responses were taken. After the content analysis, three themes were determined according to the views of students; contributes to student, contributes to learning and contributes to the lesson. Detailed statements and frequencies (number of students stated the contribution) for each theme are given in Table 12 for Kahoot, Table 13 for Socrative and Table 14 for Plickers.

Table 12: Students' Statement about the Contributes of the Kahoot

Contributes to student	It increased my interest (8) It is interesting (5) It provided focusing on lesson (I gather my attention) (5) I lost my prejudice to the course after the activity (2) It prevents the course to be boring (2) It reduced the fear to the course (1)
Contributes to learning process	It made it easy to learn (it provided better comprehension) (7) It has teaching ability (5) It provided to learn with fun (it provided fun with learn) (3) It provided strengthen the knowledge It makes the course more efficient It provided faster comprehension of the content
Contributes to the lesson	It accelerated the course process It provides active participation for all students It provides easy communication and interaction It provides a comfort environment

Table 13: Students' Statement about the Contributes of the Socrative

Contributes to student	It prevents from boring (3) It increased my interest to the course (3) It gains attention
Contributes to learning process	It made easy to learn (it provides easy understanding) (7) It has teaching ability (3) It provided faster learning (It accelerated my learning) (2) It provided learning with fun (2)
Contributes to the lesson	It created a more friendly environment It provided active participation for all students

Table 14: Students' Statement about the Contributes of the Plickers

Contributes to student	It provided me to follow the lesson effectively (It provided better following) (2) It keeps student's attention in lesson (It prevents sleeping) (2) It increased my attention to the lesson I was interested It provided me to participate the lesson actively It provided me to get more and clear knowledge It provided us to like the lesson
Contributes to learning process	It makes easy to learn (6) It has teaching ability (4) Learning with fun (3) It makes the complicated content more understandable It provides faster learning
Contributes to the lesson	We learn more information in less time (It accelerates the course time) (2) It provides better relationships because we do it altogether The lesson is faster and more effective It provides a friendly environment

It is seen from the findings that the students generally think that the use of IRS in the lessons improves the interest to the course, makes the content easier to learn, teaches, prevents students from getting bored and gives them amusing learning.

Students' Intention to Use IRSs in Other Courses

According to the findings 82.4% (75) of the students used Kahoot stated that they wanted the IRS to be used in other courses, 14.3% (13) of them did not want to use it and 3.3% (3) of them did not give any idea. 88.9% (40) of the students who used Socrative stated that they want to use it in other courses, 11% (5) of them did not want to use it and 4.4% (2) of them did not state any idea. 80.4% (41) of the students who used Plickers stated that they wanted to use it in other courses, 17.6% (9) of them did not want to use, and 4% (2) of them did not give any idea (Table 15). The vast majority of students wanted the IRSs to be used in other courses.

Table 15: Students' Intention to Use IRSs

IRSs	Yes		No		No idea	
	f	%	f	%	f	%
Kahoot (n=91)	75	82,4	13	14,3	3	3,3
Socrative (n=45)	40	88,9	9	11,1	2	4,4
Plickers (n=51)	41	80,4	3	17,6	2	4

There are 13 students in Kahoot, 5 students in Socrative and 9 students in Plickers that do not want to use IRS in other courses. Students stated their reasons for not using an IRS in other courses and their answers are given below in Table 16.

Table 16: Students' Reasons for Not to Use IRSs

Kahoot	The attention of the students can be dispersed fast and easily. It can be hard to comprehend course content in other courses. It would not be appropriate for all courses. I do not want to use like this way. It would be good after lecture for practicing. It is hard to see the shapes from the screen. I think this activity is fine only for this course.
Socrative	It can be stressful in compelling courses. It is efficient for this course but I do not think it would be efficient in other courses.
Plickers	It will cause time waste. It will cause chaos because of crowded classes. It may cause disperse of attention.

Comparing the 3 IRSs (Kahoot, Socrative, Plickers)

Students were asked to compare the 3 IRSs according to their different features (interface design, evaluation, gamification etc.). According to the responses of the students who participated all of the activities, 12 students preferred Plickers, 7 of them preferred Kahoot and 3 of them preferred Socrative. 3 students stated that they prefer all of them, 3 of them stated that 3 IRSs are same and 1 of them stated that only the graphical interfaces of the IRSs are different. 6 students did not specify any idea (Table 17).

Table 17: Comparing the 3 IRSs

	Kahoot	Socrative	Plickers	All of them	No idea	Total
Preference	7	3	12	3	6	n=35
				3 (all of them are same) 1 (only graphics are different)		

Sample sentences which students stated for the open-ended question are given below:

"I really liked Kahoot application. I also liked Plickers but Socrative was not interesting at all."

"There is actually no difference in terms of interface design, question types or evaluation."

"Socrative has a rich visual design, Kahoot is good in scoring and Plickers is easy to use. It would be great to see all of these IRSs in one application."

"Plickers was better than others because we did not use the computer. We only raised our cards."

DISCUSSION AND CONCLUSION

This study aimed to get students' views about using gamification based IRS tools in Information and Communication Technologies course by using question-answer method. Data were collected and analyzed in such a way as to answer research questions. The findings show that satisfaction levels for gamification-based IRS tools are high. The percentage of IRSs favored by the number of students participating in each activity was high for each IRS. In the Wong's (2016) study, the majority of students said that they liked to answer questions with IRS (Poll Everywhere). Similarly, McLoone, Villing & O'Keeffe (2015) stated that students liked to use student response systems (iClicker). The current study is also parallel to other studies in terms of satisfaction level.

According to the findings, the fun and easy-to-use features of the IRSs have emerged as the most popular features stated by the students. Moreover, it was seen that the students got interested the use of different technologies such as the QR code cards, liked the colorful interfaces, and gave importance to the immediate feedback in the answers given to the open-ended questions. The study by Mendez & Slisko (2013) supports the results of this research. In the mentioned study, the students stated that it was easy to use Socrative. Likewise, ease of use for Socrative was emphasized in the work done by Dervan (2014). The study by Fotaris, Mastoras, Leinfellner & Rosunally (2016) and Zarzycka-Piskorz (2016) indicated that the Kahoot environment was funny for the students. McLoone, Villing & O'keeffe (2015) reported that SRSs were considered to be an effective way of giving feedback. The results of the current study are consistent with previous studies' results.

Considering the contributes of the IRSs, students state that IRSs make the lessons funny and provide better learning, and they also state that Plickers application increases participation in the courses. Furthermore, as a result of the answers given by the students to the open-ended questions about the contributions of the IRSs, the contributions to the course are related to increasing the interest, facilitating the learning, being instructive, and preventing frustration and learning by amusing. Mendez & Slisko (2013) stated that university students learned concepts easily with Socrative, Socrative increased learning, and made the course interesting. In the study done by Fotaris et al. (2016), Kahoot developed the comprehension of students and it was found that participation rate was high in Kahoot activities. Lai, Huang & Huang (2016) stated that Plickers increased learning performance in their study. Dervan (2014) stated that Socrative provided better learning experience while Garcias & Marin (2016) stated that Socrative increased participation to the course. The current study results are supported with different studies conducted by different IRSs.

According to the findings about disliked features of the IRSs, students state that they want to see the questions on their own devices and they do not prefer to be evaluated according to their response speed, and they do not want to have technical problems while using IRSs. Furthermore, students are willing to be in a competitive environment. Thus, while planning the lesson, IRSs should be examined, different features of IRSs should be taken into consideration and then they should be decided to use in teaching and learning environments according to these criteria.

According to the findings, the vast majority of the students stated that they wanted the IRS to be used in other courses. Turan, Avinc, Kara and Goktas (2016) also stated that the students wanted to use gamification based tools in other courses. The reason for this is that the students have stated that the IRSs are funny and they make the lesson funny. Accordingly, it can be said that the students want to use the fun or amusing tools or environments in all courses. Furthermore, among the reasons why IRSs are preferred by students, there are also the providing the participation in classes, facilitating learning, and increasing attention.

Plickers is the most preferred IRS according to the students who participated all of the 3 activities. Kahoot is the second one and Socrative is the least preferred IRS. It can be said that students prefer the tools and environments that is physical materials and can be used to make them active in courses as well as in Plickers activities. Socrative is the least preferred IRS because of students want to use different technologies in order to engage in course such as Plickers and also they want to use tools that have colorful and attractive interface design such as Kahoot. As conclusion, gamification based interactive response systems can be used in teaching and learning process for undergraduate students.

Finally, there are some suggestions for further research when the current study results were evaluated;

- The effect of using IRS with question-answer method on some variables (motivation, achievement, active participation) can be examined with empirical studies.
- IRS use with question-answer method can be examined in other courses and with different age groups.
- Studies can be carried out on teacher and student views on the use of IRS in different teaching methods and in different phases of the course (introduction, evaluation, etc.) and on the effects of different variables.

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