



# On primary school teachers' training needs in relation to game-based learning

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## Abstract

This study aimed to explore primary school teachers' training needs in relation to game-based learning. This study used a survey research design. The sample consisted of 410 primary school teachers. A survey was developed in line with the purpose of the study. The data collected through open-ended questions were subjected to content analysis. The teachers reported that they want to use game-based learning approaches in educational activities; however, they do not use because they feel incompetent. The surveyed teachers felt that they need training in the peculiarities of game-based learning approaches, application examples, course planning, course implementation, and evaluation processes.

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**Keywords:** Game-based learning; gamification; teaching methods; primary school teacher

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## 1. Introduction

The Game is a phenomenon that dates back thousands of years and is part not only of human life but of all forms of life. Game is defined as any pleasurable activity that is not linked to a distant goal or a future sense of satisfaction but has its goal within itself (TDK [Turkish Language Institution] Dictionary, 2019).

Games provide important data on the developmental characteristics of children and play a critical role in children's acquisition of new skills. Recognizing this importance, educators use games as the most essential tool in the planning and management of the early childhood education process (Kaya et al., 2017; Koçyiğit & Başara Baydilek, 2015). Games have been proven to be an effective tool in the learning process (Türkoğlu & Uslu, 2016; Gözalan, 2013; Benigno & Farrar, 2012; Howard & McInnes, 2012). With increasing technological games and their use in education especially in recent years, it

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has been acknowledged that game is not only useful in preschool education but can also be used effectively in all periods of life from childhood to adulthood (Kapp, 2012; Van Eck, 2006). This change has broadened the use of game-based learning in the learning process of every age group. Game-based learning refers to the use of any game-based approach primarily for learning rather than entertainment (Noemi & Maximo, 2014). There are four approaches to game-based learning. These approaches are given in Figure 1 and described below (Nousiainen, Kangas, Rikala, & Vesisenaho, 2018).



*Figure 1. Game-based Learning Approaches*

**Educational Games:** They include games designed to accomplish a learning objective and help learners gain targeted knowledge and skills (de Freitas, 2006; Dondi & Moretti, 2007).

**Entertainment Games:** They were not originally intended for educational purposes but later adapted to educational environments due to their motivating effect (Van Eck, 2006).

**Making Games:** They force learners to solve problems and think in different ways within planned learning content and are not planned for game purposes only (Kafai, 2006).

**Gamification:** It refers to the use of game mechanics (such as prizes, scores, badges, and leader tables) in non-game content to attract learners, motivate for activities, improve learning, and solve problems (Farber, 2015; Kapp, 2012).

Teachers play an important role in designing game-based learning processes (Kangas, Koskinen, & Krokfors, 2016; Shah & Foster, 2015). The inclusion and proliferation of game-based learning approaches in learning and teaching plans depend on the extent to which teachers adopt game-based learning approaches. Game-based learning approaches are involved in the education process to the extent that the teacher who plans and implements the process adopts them. There are many factors that affect teachers' acceptance and use of a learning approach. In relation to game-based learning, digital and non-digital game-based learning approaches and the lack of knowledge and skills on how to use these approaches may have an effect on teachers' adoption of game-based learning approaches (Hsu, Tsai, Chang, & Liang, 2017; Hamari & Nousiainen, 2015; Bourgonjon et al., 2013; De Grove, Bourgonjon, & Van Looy, 2012). Teachers who lack the knowledge and skills to use game-based learning approaches avoid using them even if they embrace game-based learning (Allsop & Jessel, 2015). Today, with the widespread use of technology and digital games in education, the tasks expected of teachers have changed and teacher qualifications have been redesigned. Teachers are now expected to serve as instructors, playmakers, guides, and explorers in the context of game-based learning, in addition to their tasks such as pedagogical planner, organizer, mentor, tutor, facilitator, leader, and co-learner. The role of an instructor includes planning and communication, while that of a playmaker encompasses skills in expressing the tasks, roles, goals, and dynamics of a given game. The guide supports students during a game and the explorer discovers and analyses students' views of their playing experiences (Kangas et al., 2016; Hanghøj & Brund, 2011; Hanghøj, 2013). Therefore, it is necessary for today's teachers to have or acquire these qualifications expected of the new generation of teachers. Studies on the use of game-based approaches have shown that game is an effective tool in the learning process. Thus, the widespread use of this effective tool by teachers is essential for the achievement of a desired level of education.

In brief, game-based learning is a useful tool in learning; however, games alone do not guarantee learning experiences and the proper implementation of the process depends on the relevant skills of teachers. Having said that, studies have found that teachers need knowledge of how to integrate different game approaches into teaching and learning (Foster & Shah 2015; Koehler & Mishra, 2009). Thus, it is of key importance to identify teachers' skills and possible training needs in relation to game-based learning and to develop and implement teacher training programs. This is also important for the expansion of game-based learning approach. Against that background, this study aimed to explore primary school teachers' training needs in relation to game-based learning.

## 2. Method

This study used a survey research design. The sample consisted of 410 primary school teachers. Table 1 shows the gender distribution of the teachers.

*Table 1. Descriptive Statistics on Teachers' Gender*

<b>Gender</b>	<b>f</b>	<b>%</b>
Female	215	52.4
Male	195	47.6
<b>Total</b>	<b>410</b>	<b>100</b>

As shown in Table 1, the rates of female and male teachers were similar. Table 2 shows the findings of the years of service of the teachers.

*Table 2. Descriptive Statistics on Teachers' Years of Service*

<b>Years of Service</b>	<b>f</b>	<b>%</b>
5 years and less	100	26.8
6 to 10 years	90	21.9
11 to 15 years	143	32.4
16 to 20 years	85	20.7
21 years and more	92	22.4
<b>Total</b>	<b>410</b>	<b>100</b>

The teachers had similar years of service, except those with 11 to 15 years.

### *2.1. Data collection*

A survey was developed in line with the purpose of the study. The survey was composed of open-ended questions because it was aimed at allowing the teachers to answer freely to obtain extensive and detailed data. In the process of constructing survey items, first, the problem was defined and meetings were held with subject matter experts (two experts in curriculum and instruction). After the discussions, a 10-item draft survey was developed. The experts were then asked for their opinion on content validity, page layout, the order of questions and choices, and letter fonts. The survey was administered to ten teachers to conduct a pilot study. The survey was given its final form after the pilot study.

## 2.2. Data analysis

The data collected through open-ended questions were subjected to content analysis. The two experts conducted the analysis. The experts independently coded the survey results. Each of the questions was considered a theme. Subthemes were derived from the codes devised according to these questions. Later, the themes on which the coders agreed or disagreed were identified. The rate of agreement between the coders was calculated using the following formula proposed by Miles and Huberman (1994): (Percentage of Agreement = [Agreement / (Agreement + Disagreement)] x 100). Miles and Huberman (1994) suggested that the intercoder agreement should be at least 0.80 for good qualitative reliability. The percentage of agreement ranged from 0.87 and 1. In the final phase, the data were tabulated.

## 3. Findings

This part presents the findings of the study. The teachers were first asked the question “Do you use educational activities such as game-based learning, gamification, and educational games in your classes?”. Table 3 shows the results of the answers.

*Table 3. Descriptive Statistics on the Inclusion of Educational Activities Such as Game-Based Learning, Gamification, and Educational Games*

	f	%
Yes	3	0.7
No	405	98.8
Partly	2	0.5
<b>Total</b>	<b>410</b>	<b>100</b>

As seen in Table 3, almost all teachers (98.8%) were not using educational activities such as game-based learning, gamification, and educational games in their classes. Table 4 shows the reasons that the teachers stated for not using educational activities such as game-based learning, gamification, and educational games.

*Table 4. Descriptive Statistics on Reasons for Not Using Educational Activities Such as Game-Based Learning, Gamification, and Educational Games*

	f	%
Feeling of incompetence	405	98.8
Lack of adequate technical infrastructure in schools	12	2.9
Disapproval of these approaches	2	0.5
<b>Total</b>	<b>9</b>	<b>100</b>

The feeling of incompetence was the most common reason (98.8%) of the teachers for not using educational activities such as game-based learning, gamification, and educational games.

The teachers were then asked the question “Would you use educational activities such as game-based learning, gamification, and educational games in your classes if the reasons that you stated were eliminated?”. Table 5 shows the results of the answers.

*Table 5. Descriptive Statistics on Teachers’ Wish to Use Educational Activities Such as Game-Based Learning, Gamification, and Educational Games in Their Classes*

	<b>f</b>	<b>%</b>
Yes	407	99.2
No	3	0.8
<b>Total</b>	<b>410</b>	<b>100</b>

As shown in Table 5, almost all teachers (99.2%) answered yes to the question. The teachers were later asked the question “Have you received training in game-based learning, gamification, educational games, game-based technological tools, and so forth?”. Table 6 shows the results of the answers.

*Table 6. Descriptive Statistics on Receiving Training*

	<b>f</b>	<b>%</b>
Yes	15	3.7
No	395	96.3
<b>Total</b>	<b>410</b>	<b>100</b>

As seen in Table 6, an overwhelming majority of the teachers (96.35%) did not receive training in game-based learning, gamification, educational games, game-based technological tools, and so forth. Table 7 presents the data on the subjects of training that the teachers received.

*Table 7. Descriptive Statistics on the Subjects of Training*

<b>Subject of Training</b>	<b>f</b>	<b>%</b>
Gamification training	10	66.7
Game-based technological tools training	5	33.3
<b>Total</b>	<b>15</b>	<b>100</b>

66.7% of the teachers received training in gamification and 33.3% received training in game-based technological tools.

The teachers were asked the question “Did you start using games and gamification activities in your classes after the training that you received?”. Table 8 shows the results of the answers.

*Table 8. Descriptive statistics on Teachers’ Use of Games and Gamification Activities in their Classes*

	<b>f</b>	<b>%</b>
Yes	3	20.0
No	10	66.7
Partly	2	13.3
<b>Total</b>	<b>15</b>	<b>100</b>

More than half of the students (66.7%) did not start using games and gamification activities in their classes even after they received training. Table 9 shows the reasons for teachers not to use gamification and game-based learning activities.

*Table 9. Descriptive Statistics on Reasons for Not Using Gamification and Game-Based Learning Activities*

	<b>f</b>	<b>%</b>
Feeling of incompetence after the training	10	66.7
Shortness and inadequacy of the training	9	60
The small number of sample activities	8	53.4
Lack of adequate technical infrastructure in schools	4	26.6
Disapproval of these approaches	2	13.3
<b>Total</b>	<b>15</b>	<b>100</b>

The teachers reported that they did not use gamification and game-based activities even after the training mostly because they felt incompetence after the training (66.7%), the training was short and inadequate, (60%), and there was a small number of sample activities (53.4%). The teachers were later asked the question “Do you feel a need for training in game-based learning, gamification, educational games, game-based technological tools, and so forth?”. Table 10 shows the results of the answers.

*Table 10. Descriptive Statistics on Teachers’ Feeling of Need for Training*

	<b>f</b>	<b>%</b>
Yes	406	99.02
No	3	0.73
Partly	1	0.25
<b>Total</b>	<b>15</b>	<b>100</b>

Almost all teachers (99.02%) reported that they need training in game-based learning, gamification, educational games, game-based technological tools, and so forth.

The teachers were asked the question “If teachers were to be given training in game-based learning, gamification, educational games, game-based technological tools and so forth, what processes do you think should be followed in the training and how do you think the training should be given?”. Table 11 shows the results of the answers.

*Table 11. Descriptive statistics on teachers’ views on the process and implementation of training to be planned*

	f	%
Identifying training needs	382	93.2
Designing a training program in line with the defined needs	350	85.4
Incorporating practical activities into training	323	78.8
Giving in-service training	312	76.1
Training should be attendance-based	222	54.2
Giving sample classes in classrooms	35	8.5
Creating a platform for sharing experiences after training	14	3.4

The teachers mostly reported that training needs should be identified during the preparation of the teacher training (93.2%), a training program should be developed in line with the defined needs (85.4%), the training should incorporate practical activities (78.8%), and in-service training seminars should be organized (76.1%).

The teachers were asked the question “If teachers were to be given training in game-based learning, gamification, educational games, game-based technological tools and so forth, what subjects do you think should be included in the training?”. Table 12 shows the results of the answers.

*Table 12. Descriptive Statistics on Teachers’ Views on the Subjects and Content of Training*

Subject of Training	f	%
<b>General</b>		
What are the approaches to gamification and game-based learning?	402	98.0
Examples of game activities	350	85.4
Introduction and use of game-based technological tools	200	48.8
Activities to develop positive attitudes towards gamification and game-based learning	25	6.1
Role-playing skills	15	3.7
Student recognition techniques	10	2.4
<b>Course planning process</b>		
* Planning course activities for GBL	407	99.2



* Planning individualized activities for GBL	390	95.1
Integrating gamification and game-based learning approaches into courses	375	91.5
<b>Course implementation process</b>		
* Performing course activities for GBL	401	97.8
* Providing motivation to students for GBL	250	61.1
* Helping students take responsibility for GBL	150	36.6
* Process control during GBL activities	125	30.5
* How to give students feedback during GBL activities	102	24.9
* Time management in GBL	45	11.1
* Involving students in the learning process in GBL	25	6.1
<b>Evaluation process</b>		
* Process evaluation approaches in GBL	371	90.5
* End-of-course evaluation approaches in GBL	355	86.6
* Defining individualized evaluation criteria in GBL	112	27.3
* Game-based learning		

As shown in Table 12, the surveyed teachers reported that they felt a need for training in the peculiarities of game-based learning approaches, application examples, course planning, course implementation, and evaluation processes.

#### 4. Discussion

An overwhelming majority of the surveyed teachers did not receive training in game-based learning, gamification, educational games, game-based technological tools and so forth. A very small number of teachers received training and reported that they were not using game-based learning approaches in educational activities because they did not consider their knowledge and skills adequate. Games and game-based learning which are useful methods for education at every stage of life play a critical role in teaching new skills to children (Türkoğlu & Uslu, 2016; Dicheva, Dichev, Agre, & Angelova, 2015; Hamari, Koivisto, & Sarsa, 2014; Laskowski & Badurowicz, 2014; Koçyiğit & Başara Baydilek, 2015; Kapp, 2012). Given that the surveyed teachers are primary school teachers, it is a major drawback that they are not able to use game-based learning approaches, which are important tools for the development of children that they teach. To overcome this drawback, it is necessary to take steps to improve teacher competencies in game-based learning approaches.

The teachers reported that they want to use game-based learning approaches in educational activities; however, they do not use because they feel incompetent. The proliferation of game-based learning approaches depends on the extent to which teachers embrace these approaches. The more teachers adopt game-based learning approaches the

more these approaches are used. Based on the findings of this study, it can be said that the teachers have adopted game-based learning approaches; however, they do not use them. The lack of knowledge and skills in using game-based learning approaches might have a negative impact on teachers' use of these approaches even if they adopt. To sum up, teachers who lack the necessary competencies for game-based learning approaches avoid using them even if they embrace them (Hsu, Tsai, Chang, & Liang, 2017; Allsop & Jessel, 2015; Hamari & Nousiainen, 2015). To spread the use of game-based learning approaches that teachers adopt but do not use, teachers' lack of knowledge and skills should be addressed through in-service training programs for professional teachers and preservice education activities for student teachers. However, the new primary school teaching curriculum put into effect in the 2018-2019 academic year include no course on game-based learning approaches (YÖK [Council of Higher Education], 2018). The current course on Game and Physical Activities Teaching is not related to teaching games and game-based learning approaches but is related to teaching a course in primary school education curricula. Student primary school teachers' competence in game-based learning approaches depends on whether instructors of the Teaching Principles and Methods course teach these approaches. Thus, it is of utmost importance to teach student teachers game-based learning, which is an important method in children's education. Accordingly, it is recommended that the primary school teaching curriculum should be revised.

The surveyed teachers felt that they need training in the peculiarities of game-based learning approaches, application examples, course planning, course implementation, and evaluation processes. In their study on teacher competencies in game-based pedagogy, Nousiainen et al. (2018) reported similar findings to the present study. It can thus be said that the present study correctly identified teachers' training needs for developing competencies for game-based learning approaches. These results corroborate the findings of previous studies (Kangas et al., 2016; Hamari & Nousiainen, 2015; Bourgonjon et al., 2013)

Thus, it is of key importance to identify teachers' skills and possible training needs in relation to game-based learning and to develop and implement teacher training programs in order to spread the use of game-based learning approaches. A reasonable approach to tackle this issue could be to develop and implement a teacher training program. This study surveyed primary school teachers. Further research might survey teachers from different disciplines.

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