Turkish Prospective Teachers' Perceptions Regarding the Use of Computer Games with Educational Features

Gulfidan Can
Department of Instructional Technology, Utah State University, Logan UT, 84322, USA
Tel: (435) 797 6922
gulfidan@cc.usu.edu

Kursat Cagiltay
Department of Computer Education and Instr Technology, Middle East Technical University, Ankara Turkey
Tel: +90 312 2103683
Fax: +90 312 2101006
kursat@metu.edu.tr

ABSTRACT

Teachers' perceptions are critical to the success or failure of integrating computer games with educational features into classrooms. Consequently, it is essential to gather information about concerns they might have in regard to using these games in the classroom. This study was conducted to investigate the perceptions and future plans of a group of prospective computer teachers in Turkey. One-hundred sixteen students, from four different universities' Computer Education and Instructional Technology (CEIT) departments, participated in this study. The results of the study reveal that the prospective computer teachers who participated have positive perceptions regarding the use of computer games with educational features in education. Moreover, most of the participants plan to use such games in their future professions, according to their responses. However, some of the participants have doubts, especially concerning the issues of classroom management and the educational effectiveness of computer games currently on the market.

Keywords

Computer games, Educational games, Technology integration, Prospective teachers

Introduction

Computer games have emerged as a popular leisure-time activity for many students (Buchman & Funk, 1996; Cesarone 1998; Durkin & Barber, 2002; Media Analysis Laboratory, 1998; Subrahmanyam, Greenfield, Kraut, & Gross, 2001; Yelland & Lloyd, 2001). Computer games are therefore now attracting the attention of many researchers, who wish to use them as educational tools in the classrooms of this new generation of students (Prensky, 2001). However, even within the USA, direct instructional uses of computers are still uncommon (Molenda & Bichelmeyer, 2005). Grabe and Grabe (1998) even reported a recent situation in which computers were not used effectively in teaching practice, due in part to teachers' attitudes and fears regarding this relatively new technology. Thus, without a knowledge of teachers' and prospective teachers' perceptions and future plans for using computer games in education, any potential innovations in this area may lack utility.

It has been reported that computers' real educational uses are mostly associated with applications such as educational simulations/games and problem-solving (Molenda & Sullivan, 2003). However, these are currently the least used applications, compared to word-processing, e-mail, assessment, and record-keeping (Misanchuk, Pyke & Tuzun, 1999; Molenda & Bichelmeyer, 2005).

Only a limited number of scholarly articles mention educators' views about the use of computer games in education. It would therefore be unwise to suggest integrating computer games into classrooms before more fully investigating teachers' perceptions. This study attempts to fill this gap in the literature. Our particular focus on prospective teachers' perceptions is significant, because the high annual attrition rate for teachers will soon alter the teaching population. Newer teachers may become agents of change in schools. In order to estimate the possibility of change regarding the use of computers, it is therefore very important to understand the current perceptions of prospective teachers in relation to this practice.

This study specifically investigates:

- The perceptions of prospective computer teachers regarding the use of computer games with educational features in education (the participating prospective teachers are all students in the Computer Education and Instructional Technology (CEIT) departments of four different universities within Turkey); and

- These prospective teachers' future plans for using of computer games with educational features in their courses, or in learning environments which they will design.

Definitions

In this paper, the terms *computer games, educational computer games*, and *computer games with educational features* are simply defined as follows:

a) Computer games: All computer games on the market.
b) Educational computer games: Computer games developed intentionally for educational purposes.
c) Computer games with educational features: As illustrated in Figure1, the scope of computer games with educational features includes educational games, and also other market games not intentionally developed for educational purposes, but which nonetheless have a positive effect on students' learning or development.

The terms *computer games with educational features* and *computer games* are used according to these definitions consistently in the paper. However, the broader term *computer games* is used in the background section, in place of variety of other terms such as educational computer games, electronic games, and video games.

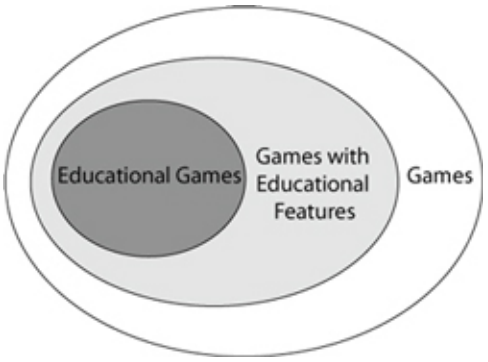

Figure1. Games, educational games, and games with educational features

Background of the Study

Some of the factors that may affect prospective teachers' perceptions regarding computer games and their utilization in courses can be identified as these: the prospective teachers' characteristics and their flexibility in regard to innovation; the current literature available on computer games and their effects on students; societal perceptions that teachers hold in regard to play and gaming; and administrative issues, such as the availability of resources and curriculum considerations.

Teachers' Flexibility in regard to Innovations

Prospective teachers' decisions to use computer games in their courses are somewhat dependent on their flexibility regarding innovation and their awareness of new students' changing interests. Currently, computers are not used as effectively as they could be in schools (Grabe & Grabe, 1998), because teachers either 1) may not know how to use computers to enhance instruction (OTA, 1995; Smaldino, Russell, Heinich, & Molenda, 2005; Whetstone & Carr-Chellman, 2001); 2) may feel anxious about potentially losing their authority (Lunenburg & Ornstein, 1996; Grabe & Grabe, 1998); 3) may not want to change the power and control balance of the current system (Lunenburg & Ornstein, 1996); or 4) may not know how to assess student progress in the new system (Prensky, 2001). In Turkey, teachers generally have positive attitudes toward the use of computers in classrooms. However, their concurrent lack of knowledge and skills for the integration of technology into instruction is a serious barrier which prevents a wide utilization of computers (Cagiltay, Cakiroglu, Cagiltay, & Cakiroglu, 2001).

Current Literature on Computer Games and Their Effects on Students

As presented in Table 1, the respective researchers and theorists have presented contradictory results and assertions concerning the effects of computer games on students. One possible reason for these contradictory studies is that the number of longitudinal studies on this topic is limited. Furthermore, due to a lack of theory and

design paradigms for educational games, the quality of the games that were the focus of these studies may have directly affected the results. However, one assertion that most of these researchers do agree upon is that all computer games should not be viewed as valuable, positive, or useful for educational purposes (Prensky, 2001; Rieber, 1996; Subrahmanyam et al., 2001).

Despite several recent research studies on computer games, relatively few studies have been conducted on the implementation of computer games in education. Gredler (1994) described several purposes for using computer games in classrooms. These uses were to practice new knowledge and skills, to diagnose weaknesses in knowledge and skills, to provide review, and to build new relationships with concepts and principles. In addition, Gredler (1994) also proposed that games could be used as rewards. Furthermore, Smaldino et al. (2005) listed some additional applications for computer games. These are to help students to fulfill "cognitive objectives," to motivate them to study dull subjects, to help them to learn without teachers, to improve vocabulary, and to develop "basic skills such as sequence, sense of direction, visual perception, number concepts and following rules" (p. 328).

Table 1. Research Studies on the Effects of Computer Games on Student

Factors	Positive Effects	Negative Effects
Self-esteem	Durkin & Barber, 2002; Malone, 1980.	Negative correlation with frequency of time play for boys, Colwell & Payne, 2000.
Academic achievement	Higher for players who play a little. Durkin & Barber, 2002; Cole, 1996 as cited in Subrahmanyam et al., 2001.	Negative correlation with time spent game playing. Anderson & Dill, 2000.
Social behavior	No negative effect. Colwell &Payne, 2000. Positive effect when played together. Durkin & Barber, 2002; Media Analysis Laboratory, 1998; Prensky, 2001; Rosas et al., 2003; Strasburger& Donnerstein, 1999.	Anderson & Bushman, 2001, 2002; Anderson, 2002; Chory-Assad, 2000. No effect: Phillips, et al. 1995.
Increased aggression	No association with game playing Interactive Digital Software Association, 2001; Durkin & Barber, 2002.	Anderson & Bushman, 2001, 2002; Anderson, 2002; Bartholow & Anderson, 2002; Chory-Assad, 2000.
Addiction	Media Analysis Laboratory, 1998.	Rosas et al., 2003.
Confusion of reality-fantasy	Subrahmanyam et al., 2001; Prensky, 2001 (especially for young children)	
Gender stereotyping		Dietz, 1998; Provenzo, 1992.
Cognitive skills	(In the long term) Cole, 1996 as cited in Subrahmanyam et al., 2001.	
Visual skills	Improved "spatial representation," "iconic skills," and "visual attention" Subrahmanyam et al., 2001, p. 13; Greenfield et al., 1994; Greenfield, 1984 as cited in Prensky, 2001.	Some games require only simple skills. Gredler, 1996. Market games generally include repetitive activities and have negative effects on learning strategies. Coyne, 2003; Gredler, 1996; Price, 1990. Badly designed games have negative effect on learning. Provenzo, 1992. During speedy games, opportunity for reflection is decreased. Prensky, 2001.
Motor skills	Increased performance as time spent. Kawashima et al, 1991.	
Computer skills	Prensky, 2001; Subrahmanyam et al., 2001.	
Problem solving skills	Rieber, 1996.	
Discovery	Gorriz & Medina, 2000; Greenfield, 1984 as cited in Prensky, 2001; Price, 1990.	
Exploration	Prensky, 2001; Provenzo, 1992.	
Engagement-interactivity	Gredler, 1996; Prensky, 2001; Price, 1990; Provenzo, 1992.	
Motivation-flow	Malone, 1980; Prensky, 2001; Rieber, 1996; Rosas et al., 2003.	

Perceptions Concerning Play

Starting with the basic concept of *play*, Glickman (1984) argued that how people perceive play depends on the educational philosophies of their social milieu; these influence the policies in their educational systems (Glickman 1984 as cited in Rieber, 1996). In the literature, although some positive points have been associated with 'play' (Prensky, 2001; Rieber, 1996), certain negative perceptions have also been presented. Some of the negative perceptions include the following notions: play is not serious or respectable; it is applicable only to

young children; it is unrelated to learning; it is the opposite of work (Rieber, 1996); it is unproductive; and it requires too much time and effort (Prensky, 2001). However, some parents share beliefs with their children concerning the positive influences of computer games (Sneed & Runco, 1991), and they prefer that their children spend their time using computers rather than watching TV (Kraut, et al., 1996).

Many educators perceive recreational computer games as "time wasters." Some educators also believe that educational games are not beneficial to students (Virvou, Katsionis & Manos, 2005). However, others believe that educational games are important instructional tools (Price, 1990, p. 51; Molenda & Bichelmeyer, 2005). Becker (2001) asserted that entertaining games are generally perceived as not being useful for education, and that academicians think the game market has few educationally valuable products. Teacher interest in using computer games in courses may also decline as the grade-level increases, due to teachers' perceptions that computer games are most effective for elementary school students (Becker, 2001; Rieber, 1996).

Currently, insufficient information is available concerning the perceptions of Turkish society about computer 'play.' However, a recent research study on the use of information technologies, conducted by the State Institute of Statistics in Turkey, reported that 63 % of the respondents use the Internet in order to play or download games or music (TSIS, 2004).

Games and Organizational Issues

New approaches in the education system have been proposed, but change is slow. There is little agreement even about how people learn, which means that significant changes typically require much debate and argument, as well as time (Prensky, 2001). One organizational problem is the teachers' general resistance to change, which is due to their lack of time to learn and apply new technologies (Lunenburg & Ornstein, 1996; OTA, 1995; Molenda & Bichelmeyer, 2005). Another problem is the unavailability of quality resources, such as computers and games (Grabe & Grabe, 1998; Lunenburg & Ornstein, 1996). Though the studies cited above were not conducted in Turkey, here too, the situation is similar in that, a significant barrier which limits the use of computers in courses is the lack of available resources and inappropriate instructional programs (Cagiltay et al., 2001).

Summary

Research studies published on the topic of teachers' flexibility concerning innovation have shown that computers are not used as effectively as they could be, due to the teachers' lack of skills or confidence to integrate this technology into their courses. Controversial results within the current literature concerning computer games and their effects on students might also lead teachers to question the effectiveness of these games for educational purposes. Broader social perceptions may additionally affect teachers' ideas about game-playing activities. Finally, teachers might question the argued need to integrate computer games when they consider the schools' curriculum, the availability of resources, and other organizational issues.

All of these considerations could potentially affect the perceptions of teachers, as well as their future plans to use computer games in their classrooms. These issues should therefore be considered in order to facilitate the successful integration of this technology into school courses. Currently, despite the existence of research studies in these four areas, a critical gap remains in the literature, specifically concerning prospective teachers' perceptions relating to computer games and their uses in education. As it would not be wise to suggest the integration of computer games with educational features into classrooms without first knowing teachers' current perceptions, this study was designed to specifically investigate prospective teachers' perceptions. This will enable us to look ahead, in order to predict the wants and needs of the teaching population in the near future.

Methods

Design

This project was designed as a survey research study. Its main purpose is to investigate and portray the perceptions of prospective teachers concerning the use of computer games with educational features in education. Both qualitative and quantitative data were collected through two survey instruments, a questionnaire and an interview schedule.

Participants

One-hundred sixteen students, from four different Computer Education and Instructional Technology (CEIT) departments in Turkish universities, participated in this study. The aim of these departments is to offer students experience not only with computer literacy but also with instructional technology. Graduates are expected to be able to integrate a variety of technology into their courses.

A two-phase, non-random sampling method was used to select participants. In the first phase, using a convenience sampling method, four public universities in Ankara were identified by both their prestige and their close proximity to the researchers. Secondly, a purposive sampling method was used to select fourth-year CEIT students at these universities. One-hundred sixteen students were recruited to complete the questionnaire. Among these 116 students, four volunteer students from each university (for a total of 16) were selected again to be interviewed.

As presented in Table 2, 32% of the participants were from Middle East Technical University, 30% from Hacettepe University, 19% from Ankara University, and 19% from Gazi University. While in three universities the data were collected from fourth-year students, in METU the data were collected from third-year students. Sixty-two percent of the participants were male, and 38% were female. Students' ages ranged from 20 to 25, with the mean age at 22.1 (SD: 0.91).

Table 2. Participants' Characteristic

		GENDER					
UNIVERSITIES	YEAR	F#	F%	M#	M%	TOTAL#	TOTAL%
Middle East Technical University	3rd year	7	6.03	28	24.14	35	30.17
	4th year	1	0.86	1	0.86	2	1.72
	Sub-Total	8	6.90	29	25	37	31.90
Hacettepe University	4th year	15	12.93	20	17.24	35	30.17
Ankara University	4th year	10	8.62	12	10.34	22	18.97
Gazi University	4th year	11	9.48	11	9.48	22	18.97
TOTAL		44	37.93	72	62.07	116	100

Instruments

Two survey instruments were used to collect data: a questionnaire and an interview schedule. They were both reviewed and revised by experts for their content validity.

The questionnaire is composed of two parts, with a total of 58 total questions. First part can be further divided into two sections, which deal with demographic and computer game-playing characteristics of the participants and their general perceptions toward playing computer games. The second part investigates the participants' perceptions regarding the use of computer games with educational features in education. Aside from some multiple choice, short answer, and open-ended questions, most of the questions are in the form of a four-point Likert scale (Strongly Disagree, Disagree, Agree, and Strongly Agree). A four-point scale was preferred over a five-point scale because of the high number of Neutral responses in the pilot study.

This questionnaire was developed by Gulfidan Can, the first author of this article, but some of the questions were inspired by an existing questionnaire developed for MIT's Games-to-Teach project (Squire & the Games-to-Teach Research Team, 2003). Since the content of this study is new to experts and also new to the participants, pilot studies were conducted to support the content validity of the questionnaire. Sixty-seven different participants in METU participated in that pilot study.

The internal consistency estimates of the reliability analysis for the questionnaire were calculated separately for the different parts of the questionnaire, because the questionnaire is not uni-dimensional and there are different types of questions in it. While the coefficient alpha value for the overall questionnaire is 0.87, for three sections they are 0.79, 0.64, and 0.85, respectively.

In addition to the survey, semi-structured interviews were also conducted with the 16 participants (see Participants, above). Pilot interviews were initially conducted with 17 other individuals from different backgrounds to ensure that the questions were meaningful, understandable, unambiguous, and not leading.

Data Collection Procedure

The data were collected from 116 students in a three-day period, during the students' regular course hours, at the beginning of a class. The questionnaire was used with the permission of the course instructors. The response rates were 100%. On average, the students completed the questionnaires in 10 minutes.

The purpose of the research and the directions for the questionnaires were conveyed verbally by the researcher before the participants were given the questionnaires. The directions for the interviews were also conveyed verbally before starting the interview sessions. Throughout the administration of the questionnaire, one researcher was present in the classroom to answer any problems or questions.

Four students from each university were selected to be interviewed after they completed the questionnaire. Semi-structured interview sessions were recorded with the permission of the interviewees.

Data Analysis Procedure

The data analysis procedure included two main phases: the descriptive statistical data analysis and the qualitative data analysis. Regarding the descriptive data, SPSS software was used for data storage, and for calculation of frequencies and percentages. For the qualitative data, the content analysis method was used, as explained by Yildirim and Simsek (2000). The data were coded, themes were found, and the data were organized and defined according to the codes and themes. Then, interpretations were made. This process was described by Miles and Huberman (1994) as "data reduction," "data display," and "conclusion drawing and verification" (p. 10).

Limitations

The present study has certain limitations that need to be taken into account. Briefly, these are:

- The validity and the reliability of the study are limited by the honesty of the participants' responses to the instruments used in this study.
- Since the participants' perceptions may change in accordance with alterations in their environments and experiences, repeatability may not be possible.
- In one university, the data was collected from third year students rather than fourth year students (since fourth year students were included in the pilot study).
- Even though the same researcher collected the data and tried to standardize the procedure of data collection, there may have been some differences in the experimenter's treatment of the participants during the administration of the questionnaire and during the interviews.
- The participants' conceptions of *computer games with educational features* may be different. It is possible that some of the participants considered only *educational games* when they responded to the questions.

Results

The Participants' General Perceptions regarding Computer Game-Playing

As illustrated in Figure 2, the negative statements selected most often in the questionnaire were that playing computer games requires too much engagement time (85%), it leads to addiction (77%), and it is not an important leisure time activity (63%). Only half of the participants agreed that playing computer games is a waste of time (49%).

The positive statements selected most often were that playing computer games is suitable for every age group (80%), playing computer games is not merely for children (86%), and they help with the development of some useful knowledge and skills (79%). Seventy-two percent of the participants rated this activity as an element that stimulates curiosity in learning. In regard to social behavior, 68% agreed that when computer games are played with a group of people, they help with the development of social skills.

In the interview and short-answer questions, some participants supported the idea that games could be useful for learning skills and knowledge. However, others expressed negative statements, such as: games have more disadvantages than advantages; they are not productive enough; they should only be used for enjoyment rather than for educational purposes; not all market games are useful; and there are no quality games on the market.

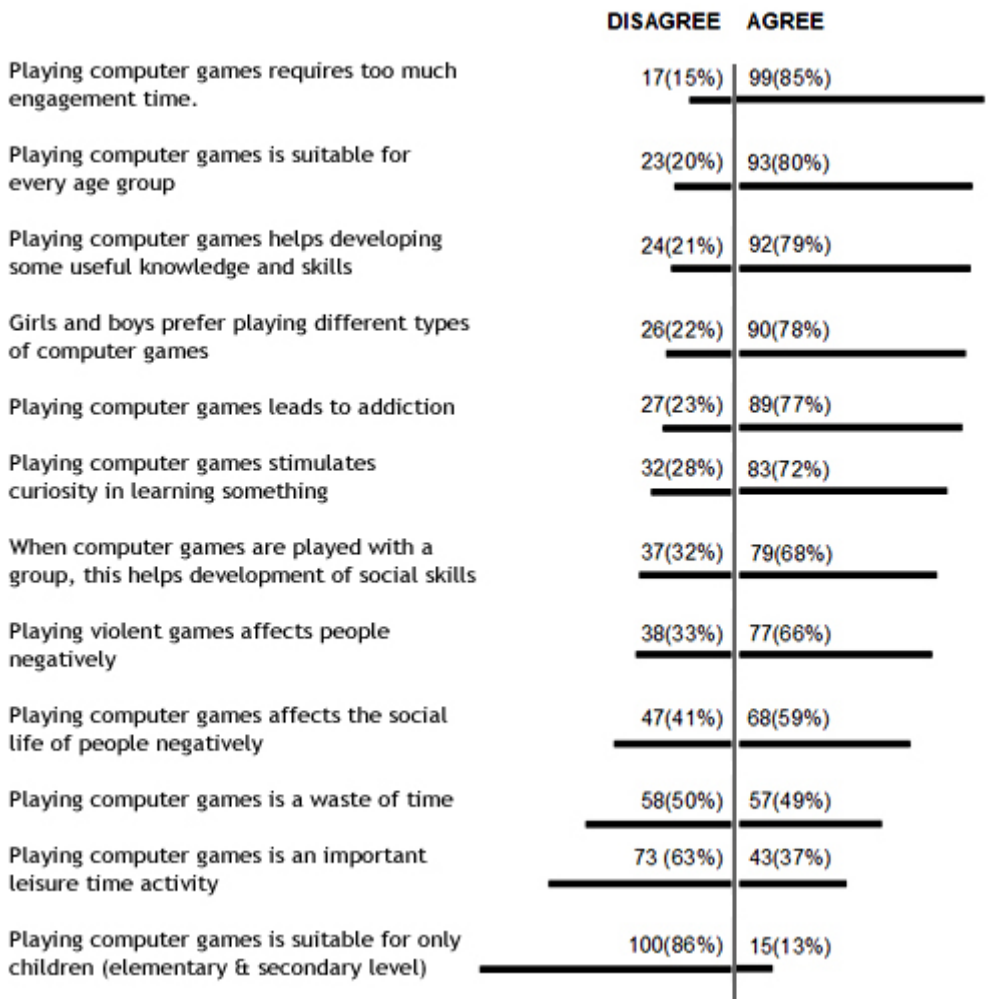

Figure 2. General perceptions concerning computer game-playing

The Participants' Perceptions concerning the Use of Computer Games with Educational Features in Education

While most of the response ratings are positive (see Figure 3), the key disagreements concern the applicability of computer games with educational features for all grade levels (21% disagreed), and that they were suitable for all subject matters (23% disagreed).

The percentages of responses to the questionnaire items revealed that most of the participants supported the idea that computer games with educational features could be suitably used without causing any problems with curriculum plans. About 10%, however, responded that there could be some problems during the use of these games. Ninety-six percent agreed with the statement that computer games have the capability to help students fulfill cognitive goals. Eighty-nine percent of the participants agreed that this kind of computer games could help to develop psychomotor goals. Eighty-seven percent agreed that the games could help students to meet affective goals.

Quotes from the participants' responses to interview and short answer questions are listed below. Among similar expressions, the most representative and comprehensive statements are presented. The more unique statements have been added to the list directly.

Some of the positive perceptions that emerged from our analysis of the interviews and responses to the short-answer questions are as follows:

- Students can learn more useful things using games with educational features than through traditional methods. Moreover, this learning will be more permanent.

- Students are engaged in activities during the game play; they apply their knowledge; they investigate and discover; and they learn by doing.
- The students' critical thinking processes will be enhanced, as a result of their dealing with the logical processes of the games.
- This activity will help them develop their creativity, imagination, and visualization skills.
- The course content will be more understandable when using games, and previous knowledge will be reinforced by means of the games.
- Games will also help with the development of eye-hand coordination, interest in computers, and computer-related skills and knowledge.

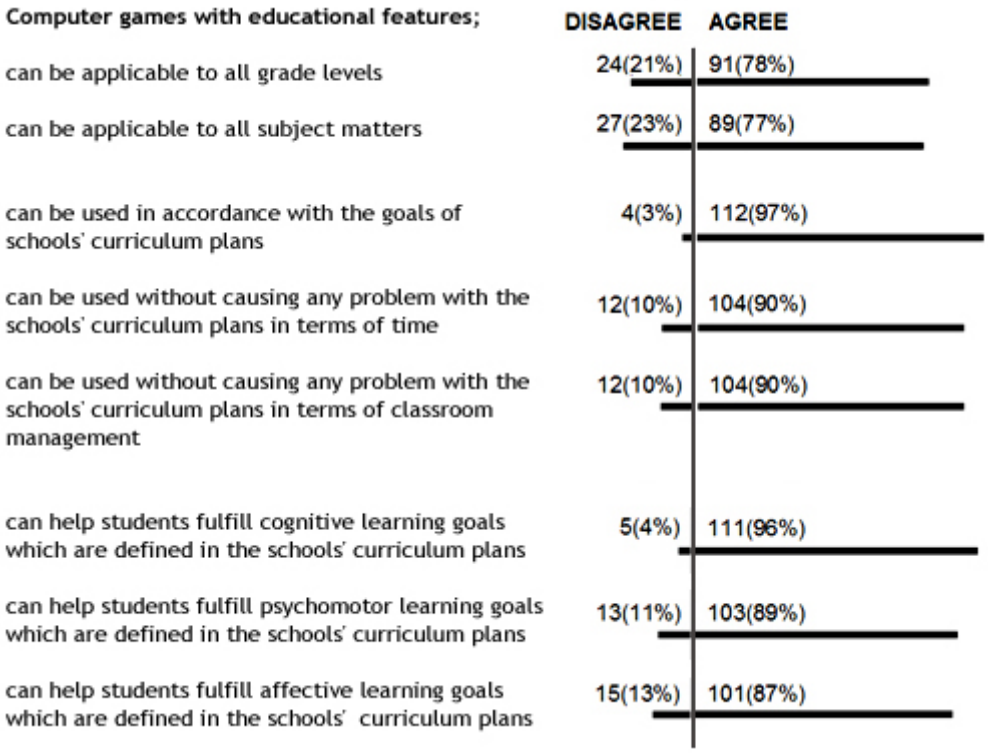

Figure 3. Perceptions regarding the use of computer games with educational features

The negative perceptions were as follows:

- Students may not understand or learn anything from the games, and these games may prevent students from learning course content if they are played too much.
- Rather than using games, more productive course activities could be planned, which will be more useful for the students.
- Some games may restrict creativity.

Classroom Management

Two general patterns were identified in relation to classroom management and the use of games. The comments below explain how using games in the classroom could benefit classroom management.

- School administration will allow the use of games in the courses, if the outcomes correlate with the intended curriculum standards.
- Time spent with these games will not be a serious problem, since curriculum plans are not so dense.
- In the courses, students' motivation, attention, and enthusiasm about learning the course content will increase when playing computer games with educational features. Moreover, the feeling of accomplishment during the game-play will contribute to this motivation.
- Students will have positive feelings about the teacher, and the teacher will be pleased, since the instructional process will be easier.
- Teachers do not need to talk much and do not have to give traditional instruction. The students will be silent during the course, and the classroom management will be easier.

- Teachers can give more feedback to the students when games are used in the courses. Social interaction among students will increase.

On the other hand, the teachers' perceptions also included some negative visions in terms of classroom management:

- Lack of possibilities and administrative issues may limit the use of these games.
- Time spent with computer games will be a problem, because they will restrict teaching other course content.
- Students may not like the selected game and become bored. They may prefer traditional instruction, surfing on the Internet, or doing something else rather than game-playing.
- Students may develop negative feelings toward the teacher because of some of the reasons explained in this section.
- It will be hard for teachers to integrate the game and lead the course according to the goals when the games are used and when the goals of the games are not related to the goals of the course.
- Students may not be aware of the aim/goals of this activity when they play the game and might begin to wonder how they will be assessed.
- In every course, students may want to play games rather than listen to the presentation. It may be hard for teachers to redirect students from games to normal instruction.
- Noise may increase during game play, and observing and managing the students will be harder; thus, teachers will be more tired.
- Using games in the courses may have a negative effect on students' perceptions toward the importance of the course, which will lower the students' respect for the course.

Other presented doubts are about process effectiveness, suitability of the games for the students' levels, comprehensiveness of the game to cover the content or outcomes, and whether or not students can benefit from these activities.

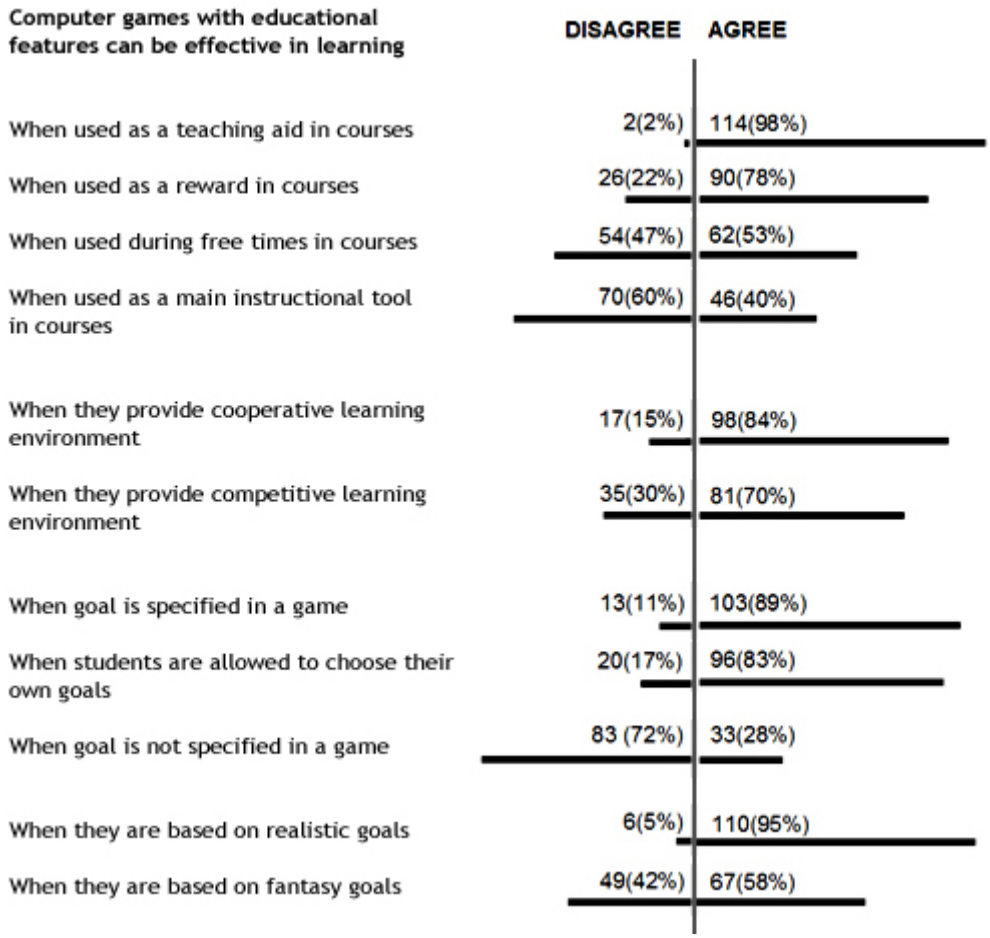

Figure 4. Perceptions about how computer games with educational features should be used

Perceptions about how Computer Games can be used in Education to Enhance Student Learning

The results of the questionnaire show that the participants favored the use of computer games with educational features as a teaching aid in courses (98%) and as a reward (78%) rather than as a main instructional tool (60% disagreed) (See Figure 4). They responded that games with educational features can be effective for learning when they provide cooperative (85%) learning environments. Similarly, 70% of the participants agreed with the effectiveness of using games when they provide competitive learning environments.

The responses to the questions on goal specification and goal nature reveal that the participants support the idea that these games can be effective for learning when goals are specified in a game (89%), when students are allowed to choose their own goals (83%), and when these goals are realistic goals (95%).

The interview and short-answer question responses reveal additional ways of using games with educational features in education to make them more effective for student learning. According to these results, the computer games with educational features can be effective for learning:

- -Time: When used at the end of the lesson, seldom, or as homework.
- -Grade-level and Subject matter: When used to support other courses (not computer literacy courses); and when used in computer literacy courses, and in low grades (elementary school).
- -Game Characteristics: When the games selected are short-duration games or games with various levels, simulation games, games in educational software, and games that require mental activities.
- -Accordance with Goals and Content: When these games are used in accordance with the goals and the content of the lesson.
- Teacher Responsibilities: When extra effort is invested to help and guide students to benefit more from the game, when the course is well-planned (considering the game activities), when the teacher is skillful in applying games in the lessons, and when the teacher informs the students about the purposes of playing games.

Future Plans of the Participants

A majority of the participants (96 participants, 83%) held the opinion that they are planning to use computer games with educational features in their courses in the future. Only 13 participants (11%) expressed that they will not use such games in their courses.

Discussion and Conclusion

One-hundred sixteen prospective computer teachers studying in Computer Education and Instructional Technology Departments in four universities in Turkey took part in this research study. They were highly experienced with computers, and took many courses related to computer literacy and instructional technology. Several of the courses that they took were also related to the integration of technology into courses. Therefore, it is logical to posit that these participants should have more positive attitudes and perceptions regarding the use of new technologies than older teachers or subject matter teachers. The participating, prospective teachers' doubts and fears about computer game use for education may therefore be expected to be found at far higher percentages among other teaching population. For this reason, these doubts must be focused upon more carefully than the positive statements. Commonly occurring themes that were found in this study are presented below:

The Effectiveness of Games, Game Quality, and their Suitability to Goals-Content-Student Level

It is contradictory that half of the participants responded that game-playing is a waste of time, while nearly 80% agreed that computer games have potential for helping students to develop useful skills and knowledge. This situation can be explained by considering the quality level of the computer games that participants referred to when they were answering these two questions.

According to Molenda and Bichelmeyer (2005), the overall sales of educational PC software have actually been dropping in recent years, mainly because of the lack of instructional quality. Regarding this issue, Kirriemuir and McFarlane (2004) reported that irrelevant content or functionality in games can cause obstacles in the use of mainstream games in education. As some of the participants contended, there are virtually no good quality games with educational features on the Turkish market. Correspondingly, the selection of suitable and comprehensive games that meet the goals of curriculum plans, match the contents of courses, and match the

students' levels was emphasized as an issue of critical importance in the interview question responses and the short-answer questions.

An enticement toward active involvement in the games, and their effects on motivation and engagement are some of the appreciated features of computer games with educational features. The potential of educational games is well established. However, if the games are not suitable and lack quality in terms of educational benefits, some participants stated that it is better to plan other activities rather than using computer games.

Classroom Management

Although the participants expressed several concerns about classroom management, one common concern was related to the time spent using games in the classrooms. Most participants agreed that computer games with educational features can be used without causing any problems in a schools' curriculum plan in terms of time. However, some of the interviewees who agreed with this statement in the questionnaire expressed doubts about timing during the interviews. Therefore, it is reasonable to assume that the proportion of participants who had concerns about time spent with games was much higher than the reported percentage.

Also, regarding classroom management issues in general, the participants expressed a variety of doubts and fears about using these games in their classrooms. These concerns may lead them to be less confident about integrating games into their courses, especially at the beginning of their teaching careers. Compared to these participants, who have strong technical background, other teachers may not feel very comfortable with technology. Both in Turkey and in the USA, the greatest, current professional development need identified by teachers relates to the integration of technology into instruction (Molenda & Bichelmeyer, 2005). Teachers definitely need strong technical and instructional support to integrate computer games into their courses.

The Teachers' Responsibilities

One perceived drawback of using these games in education is the potentially increased responsibilities of teachers, who must select suitable games and manage the new classroom environment. Some participants thought that they would need to spend more effort and energy on a class when they use games, compared to regular instruction. Considering that some of these participants have neutral perceptions about the benefits of these games, they might think that using the games is not worth the effort required.

Some participants explained that using these games in the classroom requires skillful teachers. In the literature, some scholars have argued that a lack of knowledge about teaching methods for using games in the classroom is one of the most frequently encountered obstacles (Kirriemuir & McFarlane, 2004). Thus, it is reasonable to expect this problem among the prospective teachers.

Implications for Research and Practice

To fill a gap in the literature concerning the perceptions of prospective teachers' about the use of computer games with educational features, this survey research study documents descriptive information that will hopefully incite further research studies in this area. The present study is designed to serve as a representative example, which may also be compared with similar studies.

Though the ratio of students to computers has been improving in Turkey every year, instructional uses of computers are still very limited. The academic literature shows that computer use in schools is mainly centered on administrative tasks and computer literacy applications. However, computers can be powerful instructional tools. Realizing this in effective practice is a challenging task.

Computer games with educational features have great potential to overcome this challenge. Therefore, subsequent studies focusing on the investigation of specific games and game structures relative to educational objectives will help researchers to deeply understand what factors affect their use by current teachers, and their planned use by prospective teachers.

Most of the current teachers in Turkey began their teaching careers prior to the computer era. Newer teachers are therefore more likely to have a higher comfort level with this technology. *Prospective teachers* have the potential power to change future classroom environments, starting with their own. However, they may already possess set

ideas regarding games and traditional teaching methods. If they are not shown alternative contemporary approaches, they will most likely teach as they were taught. An introduction of educational computer games in their teaching methods classes should be provided to help these prospective teachers to develop a revised conception of their teaching approaches, and to help them to understand the nature and purpose of computer games in different classes. This introduction should not be limited to merely the tools; it should also require changes in social arrangements constituting teacher preparation (Blanton, Simmons & Warner, 2001). Such arrangements will open new doors in research which promotes different learning interactions, the mediation of social arrangements, and critical analysis and reflection.

An extensive research study should be conducted to reveal the best methods to successfully use these games within the current education system. Questions for this projected study should include the suitability of the games for particular schools' curriculum plans, and how to identify and implement games which are less likely to cause classroom management problems. The results would help prospective teachers who are enthusiastic about integrating computer games into their courses, but have doubts and a lack of confidence, as is indicated in this research study.

Moreover, a longitudinal study would be useful to examine changes in the perceptions of prospective teachers regarding the use of computer games after they have begun their careers and have become involved in real school-life issues. This sort of prospective study would offer important information about how their perceptions could change in the face of encountered difficulties, and what these difficulties might be. Furthermore, the teachers' changing confidence and competence in using these games, as well as their methods for using them, could also be examined.

The curriculum planners should carefully consider the prospective teachers' opinions reported in this research study (and in future, replicable studies) before engaging in any decision-making processes concerning the integration of games with educational features into school courses.

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