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A descriptive study of Turkish high school students' game-playing characteristics and their considerations concerning the effects of games

Turkan Karakus*, Yavuz Inal, Kursat Cagiltay

Computer Education and Instructional Technology, Faculty of Education, Middle East Technical University, Ankara, Turkey

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ABSTRACT

The purpose of this study is to examine high school students' preferences, playing habits, expectations, and thoughts concerning computer games. One-thousand two hundred and twenty-four (1224) vocational high school students, studying at eight different schools in six cities within four different regions in Turkey, participated in the study. The results reveal that female students expect games to have instructive elements, while males desire elements that are entertaining, competitive, and multi-player. Females complained about negative aspects of computer games, such as causation of laziness and motivation for aggressive behavior, more than males. The students suggested that computer games might be used in education for Mathematics or History courses, and that they can be used to improve mental skills. Females also stated a preference to play in "convenient" places, such as their homes or schools, rather than in Internet cafés or other outside places, which were more strongly favored by males.

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1. Introduction

Technological developments have been increasingly influencing the perceptions and conceptualizations of both educators and learners. In recent years, several attempts have been made to enhance students' learning experiences by increasing their motivation, by attempting to focus their attention, and by helping them to construct more meaningful and permanent records of their learning. In these attempts, educational computer games have won widespread popularity and acceptance within

* Corresponding author. Tel.: +90 312 210 4183; fax: +90 312 210 7986.
E-mail address: karakus@metu.edu.tr (T. Karakus).

educational environments. The 21st century has already been called a “game era” by some researchers (e.g., Leonard, 2003). There is therefore good reason to suppose that computer games may soon be widely integrated in schools.

People play computer games because of their enjoyable and entertaining attributes (Kiili, 2005). Young people especially prefer playing computer games as a leisure time activity, for reasons such as avoiding or coping with stress, passing time in non-pressuring way, escaping real life difficulties, and simply to enjoy the attractive characteristics of the games. But beyond entertainment, computer games are also becoming a vital component in many fields, such as the military, healthcare, and business. The flexible and scalable attributes of computer games make this possible.

Computer games can be effective educational tools (Alessi & Trollip, 2001; Dempsey, Rasmussen, & Lucassen, 1996), and they can provide rich interactive environments for learning (Reiber, 1996). They have the potential to positively influence students’ learning outcomes, if they are used appropriately. Turvey (2006) stated that computer games can potentially help players to think critically when they are required to construct connections between virtual and real life. Game-like learning environments also provide students opportunities to develop intrinsic motivation and collaboration skills, and can help them to learn new concepts and synthesize new information (Colella, 2000).

Educational games allow students to engage in education while they are enjoying themselves (Maushak, Ghen, & Lai, 2001). The goal is to encourage students to take learning seriously while engaging in difficult tasks which are made more enjoyable because of the method of the instruction (Roussou, 2004). Computer games may be successfully used for instruction because they can easily motivate students with their enjoyable attributes. Like conventional educational games (e.g., LOGO, Reader Rabbit Series), commercial games can also be used for educational purposes (see, Squire’s and Jenkin’s study on Civilization III in Squire & Jenkins, 2003). Commercial games can provide intrinsic motivation to become engaged by means of their visualizations, sound, addictive qualities, and fantastic elements (Amory, Naicker, Vincent, & Adams, 1999).

Creating conventional educational games for a course might be difficult because it requires a considerable time and effort. Alternatively, available commercial games as educational tools can be used for their several educational features (Amory et al., 1999). Amory et al. have shown that adventure and strategy games are more suitable for educational aims due to their incorporation of logical thinking, visualization, mathematics, reflexes, and problem solving. Another study has shown that adventure, arcade, board, simulation, word, and also puzzle games can be used for educational purposes (Dempsey, Haynes, Lucassen, & Casey, 1996).

Analyzing students’ demographic characteristics, and their perceptions and thoughts in relation to playing both educational and commercial games is important. In the literature, similar studies have been conducted to explore the educational potentials of games from students’ points of view. Gender difference is a significant variable in many of these studies; for example, some researchers have concluded that males and females have different expectations of computer games (e.g., Quaiser-Pohl, Geiser, & Lehmann, 2006). Gender differences might be observed in relation to game preferences, too. It is obvious that males and females prefer playing different types of computer games (Chou & Tsai, 2007; Fromme, 2003). They also tend to emphasize the importance of different parts or aspects of games (Denner, Bean, & Werner, 2005). While females prefer to emphasize the importance of narratives and storytelling parts of games, males prefer the challenge and complexity of games and emphasize the importance of competition (Inal & Cagiltay, 2007).

Children might not be aware of the educational value or potential of games. They can only see games as a leisure time activity which is fun. For the aforementioned reasons, investigating children’s perspectives on games and learning can provide data which can help designers to develop effective strategies for incorporating learning features in computer games. The purpose of the present study is to analyze students’ demographic characteristics with regard to their computer game preferences and game playing habits, and also their expectations, perceptions, and thoughts on games. This data will hopefully assist instructors in their selection and utilization of computer games for educational aims.

This study investigates the following research questions:

- What are the most favored computer game genres among girls and boys?

- What aspects of these games do they like the most?
- What are the opinions of children concerning the effects of these games on players' behaviors?
- What do students think about the educational value of computer games?

2. Significance of the study

Computer game skills have been increasingly applied in almost all areas of human activity within modern societies (Gee, 2004). As a popular and powerful media, computer games are being considered for use in educational settings to motivate students, to focus their attention, and to help them to construct meaningful and permanent records of their learning. However, before any computer games are adopted for use in an educational environment, learner analysis should be employed to inform instructors of the target audience's expectations, conceptions, and thoughts, so that selected computer game features may be most effectively integrated and implemented into the desired course of instruction.

3. Methodology

3.1. Instrument

The data collection instrument used for this study includes seven demographics, eleven multiple-choice, two open-ended, and ten Likert-type questions. Each question includes an open-ended "other" choice. The questions investigate whether students play games, what their favorite games are, why they select particular games, what effects they obtain from the games, whether they think games can be used in education, and the reasons for their opinions on their education utility. A pilot study was conducted with thirty-seven high school students, and the questions were modified for the main study in accordance with these pretest-participants' responses and comments.

3.2. Data collection procedure

A total of 1550 questionnaires were distributed to ten different high schools, in six cities within four different regions in Turkey. A total of 1224 questionnaires from eight different high schools, in six cities within four different regions in Turkey, were returned. The questionnaires were administered by computer education teachers in these schools, and were completed by the student responders in computer labs during the space of one course hour. The teachers were provided a guide to implement the questionnaires properly. They were especially requested not to give clues regarding the open-ended questions and not to interfere in any way with the students' provision of answers.

3.3. Data analysis

The data collected from the questionnaires were analyzed by calculating frequencies of responses for the demographics and multiple-choice questions. The open-ended questions were subjected to content analysis. Each answer in the open-ended questions was analyzed and assigned a code from a bank of codes that was created at the beginning of the analysis process. Then, the answers marked with each individual code were counted to reveal the frequencies for each code. There are some missing data especially for open-ended questions, so for each question, the number of responses will be given at first.

4. Results

In this study, 167 of the participants were 9th grade students, 773 were in the 10th grade, 232 were in the 11th grade, and 52 were 12th grade students. Rates of computer and Internet use seemed high among the students: 662 students (404 males and 258 females) reported having a computer in their home, but 560 had no computer. A total of 312 students (190 males and 112 females) reported having

an Internet connection at home; 835 of them (428 males and 406 females) used the Internet outside of their home; 438 students frequented Internet cafés to use the Internet; 280 accessed the Internet from school; 74 accessed the Internet on friends' computers; and 43 accessed it from other places, such as the homes of relatives, at their work place, or in the library. Only seventy-four reported that they did not use the Internet (12 males and 62 females). Males were in the majority for using Internet cafés (266 males as opposed to 171 females). Females were in the majority for using school labs to access the Internet (164 females as opposed to 116 males).

As stated in the previous paragraph, 99% of students use the internet. Regarding the students' Internet use, 58.8% of respondents (345 males and 375 females) reported usage for 1–5 h per week; 18.3% of students (136 males and 88 females) spent 6–10 h per week on the Internet; and 17.3% of (140 males and 72 females) reported a usage of more than 10 h per week. It was observed that when Internet use-duration increases, the ratio of females using the Internet for longer periods decreases (see below for computer game playing time durations specifically). Regarding reasons for using the Internet, 72.1% of students (481 males and 402 females) reported using the Internet to access information; 70.6% of students (434 males and 431 females) used it to do homework; and 49.3% of students (381 males and 223 females) reported using the Internet to chat. Additionally, 39.7% of students (303 males and 183 females) played online games, and 32.6% of students (260 males and 140 females) used the Internet to communicate via e-mail. Most of the students reported that they play games ($N = 878$); of these, 523 players were males, and 354 were females.

As to how often they play computer games per week, 843 students responded. As seen in Table 1, most of the students played games for about 1–5 h per week; however, the percentage of females who reported playing games for 1–5 h is higher than that of the males. About 88.5% of the females played for 1–5 h, while 61.2% of the males played games for 1–5 h. The percentage of males playing games for more than 5 h is higher than that of the females. Twenty-four percent of the males reported playing for 6–10 h, and 14.4% of them played for more than 10 h. Only 9% of the females played for 6–10 h, and a mere 1.5% of them played for more than 10 h.

Regarding where they play computer games, 848 students replied. They were given the opportunity to select more than one place where they played. Most of the students (54.7%) played games in their homes; but 25.3% played in Internet cafés. Students playing games in Internet cafés were mostly males (80.7%). Females mostly played games at home (42.5%) and in school (39.0%); only 14.9% of the females reported playing games in an Internet café. Males mostly played games in Internet cafés (76.7%) and at home (62.6%); only 3.9% of males played games in schools.

The students were asked to state three games which they most like to play. Seven-hundred forty-five of them listed their favorite games. Table 2 shows the genres and percentages of preferences. As seen in this table, the males favored "Car Race" (53.9%), "Sports Games" (46.9%), and "First Person Shooter" (43.1%). Females preferred "Action Adventure" (mostly Super Mario) (34.7%), "Puzzle Games" (27.4%), "Car Race" (24.5%), "Card Games" (23.4%), and "Board Games" (21.5%).

The students were also asked what aspects of games they like, and 640 students responded to this question (226 females and 413 males). As shown in Table 3, the highest response category among the students was that they like games because of their entertaining nature (25.1%). Competition was preferred by 19.7% of the students, and the instructive nature of computer games was preferred by 19%. Broken down by gender, the males (29.5%) considered their enjoyment of games to be a more important aspect overall than females did (only 9.2% of the females claimed the same factor as important).

Table 1
Weekly game playing durations

| Hours | N | Percentage of all students | Percentage of responding students |
|----------------|-----|----------------------------|-----------------------------------|
| Less than 1 h | 5 | .4 | .6 |
| 1–5 h | 604 | 49.3 | 71.6 |
| 6–10 h | 154 | 12.6 | 18.3 |
| More than 10 h | 80 | 6.5 | 9.5 |
| Total | 843 | 100 | 100 |

Table 2
Preferred game genres

| Genre | Males (%) | Females (%) | Total percentage (%) |
|----------------------|-----------|-------------|----------------------|
| Car Race | 53.9 | 24.5 | 43.1 |
| First Person Shooter | 43.1 | 9.9 | 30.9 |
| Sports | 46.9 | 4.4 | 31.3 |
| Action Adventure | 2.8 | 34.7 | 14.5 |
| Board games | 5.3 | 21.5 | 11.3 |
| Puzzle Games | 1.7 | 27.4 | 11.1 |
| Quiz | 1.7 | 23 | 9.5 |
| Card games | 1.3 | 23.4 | 9.4 |
| Strategy | 8.1 | 2.2 | 5.9 |
| Fighting | 7 | 1.1 | 4.8 |
| Simulation | 0.4 | 4.7 | 2 |
| Role playing | 1.1 | 2.6 | 1.6 |
| Atari games | 0.8 | 1.8 | 1.2 |

Table 3
Most preferred attributes of games

| Features of games which they like | Percentage (%) |
|-----------------------------------|----------------|
| Entertainment | 25.1 |
| Specific Characteristics | 22 |
| Competition | 19.7 |
| Instructive | 19 |
| Realistic Visual effects | 10.2 |
| Multi-player | 2.3 |

The females preferred instructive features of games more than the males (24.7% of the females reported this, as opposed to 16.4% of the males).

When the students were asked about the reasons why they play games, they were given five items from which to select: Entertainment, relaxation, improvement of thinking skills, to spend leisure time, and for the social environment. Eight-hundred seventy students responded to this question (347 females and 522 males). As seen in Table 4, most of the students stated that they play games for entertainment (58.6%); the next highest category is relaxation (30.6%). Very few students reported playing games for the sake of the social environment. A comparison of males' and females' aims in game playing reveals some differences. For example, males play games more than females for entertainment: 61.5% of the males played games for entertainment, while only 35.7% of females did so. Roughly a quarter of the females (25.3%) reported that they play games for relaxation, while a greater percentage (34.0%) of the males cited this reason. To improving thinking skills, 18.7% of the females and 12.0% of the males played games.

The question on whether students play single or multi-player games was answered by 873 respondents (346 females and 526 males). The single-player and multi-player ratios seem similar; however, most of the respondents who preferred multi-player games are males (73.5%). When we compare this preference among the female respondents, 67.5% of the females preferred playing single-player games,

Table 4
Reasons for playing games

| Reason | Percentage within females | Percentage within males | Percentage (%) |
|---------------------------|---------------------------|-------------------------|----------------|
| Entertainment | 31.9 | 51 | 58.6 |
| Relaxation | 14.9 | 28.1 | 30.6 |
| Improving thinking skills | 11 | 10 | 14.7 |
| Spending leisure time | 7.8 | 10.2 | 12.6 |
| Social environment | 1.7 | 2.2 | 2.8 |

while 32.5% of them preferred multi-player games. For the males, 41.1% preferred single-player games, and 58.9% preferred playing multi-player games.

The 422 students (48.3% of the respondents from the previous question) who preferred playing multi-player games were asked whether they mostly play multi-player games with their friends or with others on the Internet. Most reported that they prefer playing with their friends (71.8%).

Parental control over games might influence students' playing durations and their attitude toward the advantages or disadvantages of games. Thus, in the questionnaire, there was a question about parental control over the students' game playing. Nearly half of the students stated that their families do not give permission when the parents think that their children are playing too much (48.2%); however, 39.6% stated that their parents always give their permission. Only 1.5% of the students stated their parents do not ever give them permission to play computer games (See Table 5).

The students were also asked whether computer games are harmful or not, and the reasons for their opinions. The open-ended answers were analyzed, and four concerns were identified: that computer games are "harmful to the perception system (mainly for the eyes)," "they cause addiction," they are a "waste of time," and they "lead to aggressive behaviors." Computer games were seen as harmful for various reasons by 372 of the students. Of these, 215 were females and 157 were males. As shown in Table 6, 30.3% of these students reported that games are harmful because games may hurt the eyes and brain. According to 26.6% of the students, computer games might cause addiction for game players. They stated that playing computer games too much may keep them away from real life activities. A smaller group (16.2%) of these students emphasized concerns about wasting time. The smallest group (12.4%) of the students stated that games are harmful, especially if they include violence, because this might lead to aggressive behaviors.

Approximately half of the students ($n = 689$, 376 males and 313 females) stated that computer games might be beneficial for educational purposes. Another 389 students (201 males and 188 females) stated that computer games are not educational. The majority of those students who stated that computer games are beneficial for education (32.2%) emphasized the mental benefits of games. They stated that computer games might be used to develop or increase intelligence in a learner. Also, 25.3% of the students stated that computer games can be useful for courses in schools. They stated that computer games can be supplementary and complementary materials for courses such as Mathematics and History. A few students (2.7%) emphasized that computer games might be helpful for learning a foreign language such as English.

Whereas some of the students reported that computer games might be harmful (30.4%), others stated that playing computer games might be beneficial or useful (35.1%). On the other hand students at both sides have also positive and negative views about computer games at the same time. On the negative side, 36.4% of the students stated that playing computer games might cause aggressive behaviors. Also, 76.0% of the students stated that computer games might be harmful in terms of reducing

Table 5
Parental controls on students' game playing

| Parental control | Percentage (%) |
|------------------------------------|----------------|
| They object if I play too much | 48.2 |
| They permit me to play | 39.6 |
| They do not know that I play games | 8.9 |
| They never permit me to play games | 1.5 |

Table 6
Students' opinions about the harmful effects of computer games

| Computer games harmful because | Percentage (%) |
|--------------------------------|----------------|
| They harm the brain, eyes | 30.3 |
| Causes addiction | 26.6 |
| Time consuming | 16.2 |
| Cause aggressive behavior | 12.4 |

homework time. Nearly half of the students (59.4%) stated that playing games causes a waste of money. Moreover, 62.2% of the students stated that playing games make people lazy. And finally, 58.1% of the students stated that computer games cause less socialization. On the other side some students indicated that computer games might be beneficial for them. For instance, computer games can improve spatial abilities according to 75.7% of the students. Playing games can also lead users to be more creative (70.4%), help one to learn new things (52.1%), and help one to develop personal relationships (46.2%). In addition, 60.5% of the students stated that computer games might improve eye-hand reflexes. When comparisons were made between male and female opinions, females tended to report that games cause aggressive behaviors (44.5%), while 29.6% of the males agreed. Also, more females agree that games reduce homework time, make students lazy, and cause low socialization (see Table 7).

Several statistical tests were conducted to reveal whether gender, parental controls, or game playing durations influence perspectives about games. In these tests, the answer “I do not agree” was coded as 1; “I have no idea” was coded as 2; and “I agree” was coded as 3. For negative issues, codes of “causes aggressive behaviors”, “reduces homework time”, “waste of money”, “makes us lazy”, “causes less socialization” scales were summed up. For positive view codes of “improves spatial abilities”, “increases creativity”, “helps one to learn new things”, “helps one to develop personal relationships”, “improves eye-hand reflexes” scales were summed up. An ANOVA statistical test was conducted to reveal whether gender played a role in the reporting of negative or positive views of computer games. According to the results, males ($M = 11.26$ $SD = 2.76$) have more positive views than females ($M = 10.83$ $SD = 2.57$) with $F(1, 1115) = 7.15$, $p = .000$, $\eta^2 = .006$. In contrast, females have more negative views with $F(1, 1111) = 34.31$, $p = .000$, $\eta^2 = .03$.

Game playing habits were also tested to reveal whether playing influences point of view. According to the ANOVA results, students who play computer games ($M = 10.16$, $SD = 2.8$) have more positive views about them than those do not play games ($M = 11.95$, $SD = 2.74$) with $F(1, 1115) = 54.73$, $p = .000$, eta square is 0.47%. Game playing duration also has a significant effect on the views of students concerning the effects of computer games. According to correlation coefficients, as game playing duration increases, positive view scores also increase with $r = .24$, $p = .000$, and negative view scores decrease significantly with $r = -.31$, $p = .000$. Even brief game playing influences students' views concerning games; and when they play, they tend to have positive feelings.

Do parental controls also influence perspectives positively or negatively? In an ANOVA test on this factor, one of the items under parental control (“they [i.e., the parents] never give permission”) was excluded because only thirteen students selected this item; also, another item (“they do not know that I play games”) was excluded because it does not involve any parental control. According to the results, parental controls have no effect on positive or negative views concerning games with $F(1, 681) = .015$, $p = .9$. This result may be attributed to the students' freedom while playing games. If students whose parents never permit them to play and students who are free to play were represented more evenly in terms of their numbers, this result might change.

Table 7

Effects of computer games on students' points of views

| Playing computer games.... | I agree | | | |
|---|---------------------|------------------|--------------------|-----------|
| | N (response number) | Within males (%) | Within females (%) | Total (%) |
| Reduces homework time | 1036 | 67.8 | 84.3 | 76.0 |
| Improves spatial abilities | 896 | 75.3 | 76.2 | 75.7 |
| Increases creativity | 850 | 72.1 | 68.2 | 70.4 |
| Helps one to learn new things | 912 | 67.9 | 64.8 | 66.4 |
| Makes us lazy | 908 | 55.3 | 69.2 | 62.2 |
| Improves eye-hand reflexes | 866 | 63.7 | 56.9 | 60.5 |
| Waste of money | 999 | 57.0 | 61.9 | 59.4 |
| Causes less socialization | 857 | 52.1 | 64.6 | 58.1 |
| Helps one to develop personal relationships | 825 | 50.6 | 41.8 | 46.2 |
| Causes aggressive behaviors | 907 | 29.6 | 44.5 | 36.4 |

5. Conclusion and discussion

The purpose of this study is to examine students' characteristics in regard to computer game preferences and game playing habits, and their perceptions and thoughts on these games in terms of their educational uses and potential to assist with personal development. The results reveal that a majority of the surveyed students played computer games, and males played more than females. This might be due in part to the places that are most commonly available to males and females for playing games. While males readily have opportunities to play outside of their schools (i.e., in Internet cafés) and in their homes, females may not share these same opportunities. Because females (as reported here) play games mostly in schools, the duration of their playing time is limited, and they may face certain restrictions. Game preferences also have influences on game frequencies of both males and females. Males spend much time on games that they prefer, however females prefer playing games which don't take too much time to play. For instance, while males tend to prefer playing multi-player games more than females, females prefer playing single-player, and puzzle or card-type games.

The results of this study reveal (as noted above) that Internet cafés are more popular locations for playing computer games among males rather than females. In Turkey, most visitors use Internet cafés to play computer games, to chat, and to surf the Internet; and males prefer going to such places much more than females (Guro! & Sevindik, 2007). Although more than half of the males surveyed reported that they own a computer at home, they preferred playing games in Internet cafés. This may be due to their preferences for collaboration while playing games and for playing multi-player games rather than single-player ones. Students who prefer multi-player games also prefer to play them with their friends; therefore, they prefer such places which allow them to collaborate face-to-face while playing on a computer.

Female students reported their preference for playing games mostly in school, although approximately half of them have a computer at home. Females tend to play games available on school computers. They do not prefer to spend extra time playing games in their daily lives, and so they may not need to go to any other places to play games (or to collaborate with others about their games). They can find plenty of opportunities to play the games that they prefer, such as puzzle games or card games, on school computers.

The stated general game preferences of the participants in this study are consistent with previous studies in the literature (e.g., Chou & Tsai, 2007; Fromme, 2003; Quaiser-Pohl et al., 2006). However, we found that there are game preference differences between males and females. While males prefer playing sports games and car race games, females prefer adventure games (mostly Super Mario), puzzles, or card games. These gender-different game preferences also influence the male and female students' preferred game attributes. Because males prefer mostly sports or car race games, they want to play games including multi-player, competition, and entertaining 3D attributes. However, females seek instructive attributes in games (e.g., Mind Games) than do males, because they prefer playing puzzle games or card games. This difference might indicate the need for careful consideration when selecting educational games for combined classes of males and females. In addition, this might influence males' reactions to educational games, which tend not to have the multi-player, competition, or entertainment attributes that males prefer (e.g., Counter Strike, Need for Speed). They therefore might not enjoy playing such educational games, which in turn could result in unsuccessful applications of educational computer games.

The students had some doubts concerning the possible harmful effects of computer games, although most of them had played games. They especially reported that computer games might harm their brain and eyes, cause addiction, lead to too much time consumption, and/or cause aggressive behavior. These kinds of doubts also might cause parental restrictions on students' game playing. Therefore, parental control over the participants was also investigated in the study. The results reveal that some of the parents regulated their children's game playing. However, it seems that parental control over their children's game playing is not always very strict. Some of them impose restrictions, but the majority of them allow their children to play if the children do not exceed a time limit that is set for their play. However, parental control might be important, because as Von Feilitzen and Bucht (2001) claimed, computer games including violent elements might be detrimental to children's cogni-

tive and behavioral developments. Because parents and children have different perceptions and expectations concerning the appropriateness of computer game content (Nikken & Jansz, 2003), parents' awareness of the games' specific attributes and content should be increased.

In this study, in order to employ learner analysis to facilitate the implementation of computer games within game-like learning environments, students' opinions on the effects of computer games were investigated. For instance, female participants were more likely to agree with negative statements, such as computer games cause aggressive behavior, cause laziness, and lead to distancing oneself from real life, while males reported the opposite (i.e., that these games increase creativeness, help them to develop personal relationships, and strengthen eye-hand reflexes).

Regarding the educational uses of computer games in schools, half of the students agreed that games can be useful for educational aims. There is no gender gap between males and females on this issue. They stated that games can develop their mental abilities, such as critical thinking. They also stated that games might be more appropriate for Mathematics and History classes, and some of them stated that foreign language learning might be an appropriate use of computer games. So, when using educational games, educators may first introduce games from those disciplines and then move to other disciplines.

In order to successfully integrate educational computer games, the advantages and limitations of these games should first be investigated, so that selected designs will be more educationally beneficial for all of the target students (Virvou, Katsionis, & Manos, 2005). The personal characteristics of those target students should be taken into account not only when selecting games for use within schools, but also when designing and developing educational games. Moreover, to reach a wider target audience beneficially, some misconceptions and some prejudices related to gender preferences should be eliminated. As De Jean, Upitis, Koch, and Young (2001) claimed, in order to help girls to engage in games which are mostly considered male's toys, their preferences should first be taken into account. Their interest, participation, and enjoyment may thereby be greatly enhanced.

Before integrating computer games into education, many dynamics need to be considered in order to obtain the maximum benefits from the games. In future studies, further research should be conducted to investigate several dynamics in game-like learning environments. These include the areas of parental control, appropriate game content, appropriate game genres, and academic courses which are best suited to computer game applications.

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