**A Study of the Motivations for Playing Computer Games at Secondary Education Level in Turkey: The Potential for Games-Based Learning**

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**Abstract**

Over the past decade there has been extensive investigation into the aspects and potential applications of games-based learning. Educationalists and industrialists continue to explore it as it is perceived as a potentially beneficially supplementary learning, teaching and training approach. While there has been an increase in the quality and quantity of the studies performed looking at the potential aspects of games for learning there is still a dearth of empirical evidence in particular Randomised Controlled Trials (RCTs) and longitudinal studies. This paper will provide empirical evidence by reporting the results of a survey conducted at a number of Secondary Education (SE) institutions in Turkey. The survey has been used in a number of previous studies over the past decade. This paper will report on the evidence from Turkey where 823 participants completed the survey from SE institutions where the average age of participants was 15. The top ranking motivations for playing computer games were: recognition, avoidance of other activities, control and challenge whereas the top ranking motivations for playing games in education were control, fantasy, recognition and challenge. The paper will contribute to empirical evidence in games-based learning by providing a detailed quantitative analysis of the data gathered by the survey including gender and player type comparisons. The results will also be compared to other similar studies performed at different educational levels in different countries and provide a synthesis.

**Keywords:** Motivations, computer games, games-based learning, empirical research

1. **Introduction**

Games-based Learning (GBL) has been used in a number of curriculum-based subjects including: Mathematics (Ketamo, 2009; Miller and Robertson, 2011), Science (Kuo, 2007; Wrzesien and Alcaniz Raya, 2010), Languages (Cobb and Hurst, 2007; Vos *et al*., 2011), Social Issues (Chen *et al*., 2010; Furio *et al*., 2013), Health (Hung *et al*., 2009; Banos *et al*., 2013), History (Chatterjee *et al*., 2011) and Music (Coban and Tuncer, 2008). The case is constantly being made for further empirical evidence associated with GBL in education particularly with regards to learning effectiveness (Connolly *et al*., 2012; Boyle *et al*., 2015). One key aspect of learning effectiveness is motivation in terms of the subject being taught using computer games (Tsai, Yu and Hsiao, 2012) and motivation and attitudes towards computer games (Ryan, Rigby and Przybylski, 2006). These aspects were taken into account in a detailed evaluation framework proposed by Connolly, Stansfield and Hainey (2009) and require the generation of further empirical evidence in different educational contexts. Previous studies have been performed in Higher Education, Further Education and Secondary Education in different countries.

1. **Previous Work on Motivation**

Papastergiou (2009) states that the motivational aspects of games “*combined with curricular content*” is known as Games-based Learning and a number of researchers have described games as motivational and even going so far as to say that they are addictive (Griffiths and Hunt, 1998). There have been a number of previous studies investigating motivations for playing computer games: Yee (2006) identified ten independent, nonexclusive player motivations, grouped into achievements (advancements, mechanics, competition), social (socialising, relationships, teamwork) and immersion (discovery, role-playing, customisation, escapism) based on data from 2,300 users of MMORPGs. According to the Nielsen Games report (2008) which collected data about gaming motives and habits in 15 European countries, the main motivations for playing video games are fun (80%), relax/de-stress (55%), boredom (41%) and challenge (36%). Studies have also been performed at different levels of education to ascertain the motivations for playing games in an educational context: Sobkin *et al*., (2004) performed a study involving 796 Russian school children for playing video games where the main motivations for playing video games were boredom, entertainment, emotional release and the desire to beat the opponent (the latter received significantly higher appreciations among boys). Bekebrede *et al*. (2011) carried out a survey about the use of games in HE using 1,432 students in the Netherlands where differences in attitudes between net-generation and non-net-generation participants could not be confirmed however in general the respondents preferred collaborative, technology-rich learning and deemed games a valuable teaching method. Previous studies performed using Malone and Lepper’s framework of intrinsic motivation had some of the following main findings:

* Roussiou and Hainey (2011) performed a study involving 120 SE students in Greece where cooperation was rated as the highest ranking motivation and filling leisure time was the lowest for playing games in an SE context. Males believed that challenge was significantly more important for playing computer games in SE than females. They also believed that competition was more important and filling leisure time was significantly more important. Interestingly females believed control and recognition to be significantly more important. No significant differences were detected in: cooperation, fantasy, curiosity, pleasure and relaxation with regards to gender.
* Hainey, Connolly, Stansfield and Boyle (2011) performed a study looking at the differences in motivations of online game players and offline game players. The study was a combined analysis of three studies at Higher Education (HE) level and involved 2226 participants from 2005, 2007 and 2009. Challenge was the top ranking motivation for playing games in HE while fantasy and recognition were the lowest ranking motivations for playing games in HE. Multiplayer gamers and online gamers ranked competition, cooperation and recognition significantly more important for playing computer games in HE than single players and offline participants.
* Hainey *et al*., (2013) performed a study in HE comparing students attitudes and motivations for playing computer games in Scotland and the Netherlands where participants from regular education in the Netherlands rated the following four motivations significantly more important for using computer games to learn in an HE context: cooperation, fantasy, pleasure and relaxation. No significant differences were detected in terms of the following motivations: challenge, competition, recognition, control and curiosity. The results suggest that participants from the Netherlands put more emphasis on playing computer games in an HE context as a contribution to making education more relaxed and social than participants from Scotland.
* Hainey, Connolly, Boyle, and Stansfield (2011) performed a study involving 131 HE computing students and 111 FE computing students. The top motivations for playing computer games for learning in a FE context were challenge and cooperation and the lowest ranking motivations were recognition and fantasy. There were no significant differences between FE and HE student motivations for playing games in an educational context with the exception of curiosity. HE students rated curiosity significantly more important for playing games in an educational context than FE students.

1. **Methods used to collect data in the study**

**3.1 Participants**

823 participants completed the motivations for playing computer games questionnaire from the Turkish secondary education institutions. 362 participants (43.9%) were male and 461 (46.1%) were female. The mean age of participants’ was 14.89 (SD = 0.72) with a range of 12 to 17 years of age. A Mann-Whitney *U* test indicated that there was no significant difference in the ages or participants in relation to whether they were male or female (Z = -1.577, p < 0.115).

**3.2 Materials**

Malone and Lepper’s (1987) framework was used to examine the reasons for playing computer games (challenge, fantasy, curiosity, control, cooperation, competition, and recognition). Other motivational aspects such as pleasure, relaxation and avoidance of other activities as well as attitudinal statements were also added in following discussions with Psychologists. The questionnaire was translated into Turkish.

**3.3 Procedure**

The questionnaire was made available through an online questionnaire package to a number of Turkish institutions for a two week period in May of 2015. The results were analysed using SPSS version 20.

1. **Results**

**4.1 Game playing habits**

The majority of participants (603, 73.2%) indicated that they played computer games and 220 participants (26.8%) indicated that they did not play computer games. A higher percentage of males played computer games with 91% of males (331 participants) stating that they played computer games and 59% of females (272 participants) stating that they played computer games. Participants played computer games for an average of 2.38 hours per week (SD = 2.21) with a range of 1 to 20.5 hours per week. Participants were asked to rate how often they played a genre from 1 to 10. The results are displayed in *Table 1*.

**Table 1:** Popularity of types of computer games played (genre)

|  |  |  |  |
| --- | --- | --- | --- |
| ***Game Genre*** | **Rank** | **Mean** | **SD** |
| **Adventure** | 1st | 6.69 | 3.68 |
| **Sports** | 2nd | 6.96 | 3.62 |
| **Strategy** | 3rd | 7.37 | 3.74 |
| **Racing** | 4th | 7.47 | 3.56 |
| **Others** | 5th | 8.19 | 3.36 |
| **Simulation** | 6th | 8.25 | 3.08 |
| **Fighting** | 7th | 8.40 | 2.89 |
| **Shooting** | 8th | 8.52 | 2.86 |
| **RPG** | 8th | 8.52 | 2.89 |
| **Platform** | 9th | 8.64 | 2.69 |

The most popular computer game genres selected by participants were adventure, sports and strategy and the least popular genres were shooting, RPG and platform games. Table 2 shows the popularity of the types of computer games played split by gender.

**Table 2:** The popularity of computer games genres split by gender

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Gender*** | **Male** | | | **Female** | | |
| ***Genre*** | **Rank** | **SD** | **Mean** | **Rank** | **Mean** | **SD** |
| **Sport** | 1st | 5.60 | 3.65 | 1st | 7.23 | 3.64 |
| **Adventure** | 2nd | 6.00 | 3.63 | 2nd | 7.69 | 3.35 |
| **Strategy** | 2nd | 6.00 | 3.93 | 3rd | 7.88 | 3.24 |
| **Racing** | 3rd | 6.05 | 3.75 | 4th | 8.03 | 3.22 |
| **Fighting** | 4th | 6.61 | 3.47 | 5th | 8.42 | 2.82 |
| **Others** | 5th | 7.30 | 3.67 | 6th | 8.44 | 3.20 |
| **Shooting** | 6th | 7.71 | 3.34 | 7th | 8.59 | 2.95 |
| **Simulation** | 7th | 8.71 | 2.81 | 8th | 8.89 | 2.92 |
| **Platform** | 8th | 8.92 | 2.49 | 9th | 9.15 | 2.23 |
| **RPG** | 9th | 9.57 | 1.67 | 10th | 9.81 | 0.98 |

Mann-Whitney *U* tests indicated that males played the following genres of computer games significantly more than females: platform (Z = -2.671, p < 0.008), RPG (Z = -9.637, p < 0.000) and simulation (Z = -4.632, p < 0.000). Mann-Whitney *U* tests also indicated that females played the following genres of computer games significantly more than males: strategy (Z = -9.262, p < 0.000), fighting (Z = -16.765, p < 0.000), racing (Z = -12.048, p < 0.000), shooting (Z = -8.177, p < 0.000), adventure (Z = -4.699, p < 0.000), sports (Z = -11.113, p < 0.000) and others (Z = -7.602, p < 0.000).

**4.2 Motivations for playing computer games**

Participants were asked whether they preferred single player games or multi-player games. 610 participants answered the question where 479 (78.5%) preferred single player games and 131 participants (21.5%) stated that they preferred multi-player games. On average participants had been playing computer games for 2.82 years (SD = 2.67) with a range of 0 to 12. A Mann-Whitney *U* test indicated that males had been playing computer games for a significantly longer period of time than females (Z = -14.328, p < 0.000). Males had been playing computer games for an average of 4.02 years (SD = 2.22) with a range of 0 to 11 and females had been playing computer games for an average of 1.84 years (2.60) with a range of 0 to 12. Participants were also asked whether the participated in online gaming. 623 participants (75.7%) stated that they did not participate in online gaming and 200 participants (24.3%) stated that they did participate in online gaming. The majority of participants (135, 67.5%) who played online games were male and 37.5% (65) were female. Participants were asked to rate the importance of the reasons and motivations for playing computer games in general. Table 3 shows the ranking of the motivations for playing computer games in general.

**Table 3:** The rankings of motivations for playing computer games

|  |  |  |  |
| --- | --- | --- | --- |
| *Motivations* | Rank | Mean | SD |
| **Recognition** | 1st | 4.33 | 1.55 |
| **Avoidance of other activities** | 2nd | 4.22 | 1.60 |
| **Control** | 3rd | 4.12 | 1.63 |
| **Challenge** | 4th | 4.05 | 1.72 |
| **Emotional Stimulation** | 5th | 3.69 | 1.84 |
| **Cooperation** | 6th | 3.68 | 1.88 |
| **Competition** | 7th | 3.67 | 1.75 |
| **Fantasy** | 8th | 3.66 | 1.82 |
| **Feeling good** | 9th | 3.28 | 1.84 |
| **Curiosity** | 10th | 3.18 | 1.89 |
| **Escape stresses** | 11th | 3.17 | 1.82 |
| **Release tension** | 11th | 3.17 | 1.84 |
| **Excitement** | 12th | 3.14 | 1.85 |
| **Leisure time** | 13th | 3.13 | 1.86 |
| **Boredom prevention** | 14th | 3.09 | 1.95 |
| **Relaxation** | 15th | 2.83 | 1.92 |
| **Pleasure** | 16th | 2.62 | 1.81 |

Table 4 shows the motivations and reasons for playing computer games split by gender.

**Table 4:** Motivations for playing computer games split by gender

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Gender*** | **Male** | | | **Female** | | |
| ***Reason*** | **Rank** | **Mean** | **SD** | **Rank** | **Mean** | **SD** |
| **Avoidance of other activities** | 1st | 4.01 | 1.66 | 6th | 4.38 | 1.53 |
| **Recognition** | 2nd | 3.99 | 1.75 | 2nd | 4.59 | 1.31 |
| **Fantasy** | 3rd | 3.97 | 1.63 | 11th | 3.41 | 1.93 |
| **Emotional stimulation** | 4th | 3.86 | 1.65 | 7th | 3.56 | 1.97 |
| **Control** | 5th | 3.67 | 1.84 | 5th | 4.48 | 1.36 |
| **Curiosity** | 6th | 3.17 | 1.71 | 16th | 3.19 | 2.02 |
| **Challenge** | 7th | 3.13 | 1.92 | 1st | 4.78 | 1.09 |
| **Feel good** | 8th | 3.02 | 1.65 | 8th | 3.48 | 1.96 |
| **Boredom prevention** | 9th | 2.92 | 1.78 | 15th | 3.23 | 2.07 |
| **Leisure** | 10th | 2.91 | 1.57 | 14th | 3.30 | 2.04 |
| **Escape stress** | 11th | 2.90 | 1.62 | 12th | 3.39 | 1.94 |
| **Release tension** | 12th | 2.86 | 1.62 | 9th | 3.42 | 1.96 |
| **Excitement** | 13th | 2.83 | 1.62 | 13th | 3.38 | 1.99 |
| **Competition** | 14th | 2.62 | 1.74 | 4th | 4.50 | 1.23 |
| **Cooperation** | 15th | 2.55 | 1.85 | 3rd | 4.57 | 1.36 |
| **Relaxation** | 16th | 2.07 | 1.46 | 10th | 3.42 | 2.02 |
| **Pleasure** | 17th | 1.95 | 1.20 | 17th | 3.15 | 2.03 |

Mann Whitney *U* tests indicated that there were no significant differences between male and female in relation to the following reasons and motivations for playing computer games: boredom prevention (Z = -1.378, p < 0.168), emotional stimulation (Z = -1.870, p < 0.06) and curiosity (Z = -0.599, p < 0.549). Mann-Whitney *U* tests also indicated that females rated the following motivations as significantly higher than males: challenge (Z = -12.101, p < 0.000), competition (Z = -14.463, p < 0.000), cooperation (Z = -14.390, p < 0.000), recognition (Z = -4.240, p < 0.000), control (Z = -6.019, p < 0.000), leisure (Z = -1.942, p < 0.052), pleasure (Z = -7.228, p < 0.000), relaxation (Z = -9.306, p < 0.000), avoidance of activities (Z = -3.061, p < 0.002), feeling good (Z = -3.393, p < 0.0001), escaping stress (Z = -3.383, p < 0.001), releasing tension (Z = -3.816, p < 0.000) and excitement (Z = -3.623, p < 0.000). The only motivation that males in the study rated significantly higher than females was fantasy (Z = -4.040, p< 0.000).

**4.3 Motivations for playing computer games in education**

Participants were asked to rate the main reasons and motivations for playing games in an educational context. The three highest ranking motivations were control, fantasy and recognition and the lowest three ranking motivations were pleasure, relaxation and leisure. The results are displayed in Table 5.

**Table 5:** Ranking of motivations for playing games in an educational context

|  |  |  |  |
| --- | --- | --- | --- |
| ***Motivations*** | **Rank** | **Mean** | **SD** |
| **Control** | 1st | 3.79 | 1.72 |
| **Fantasy** | 2nd | 3.75 | 1.56 |
| **Recognition** | 3rd | 3.73 | 1.77 |
| **Challenge** | 4th | 3.73 | 1.82 |
| **Competition** | 5th | 3.51 | 1.92 |
| **Cooperation** | 6th | 3.22 | 1.74 |
| **Curiosity** | 7th | 2.65 | 1.92 |
| **Pleasure** | 8th | 2.62 | 1.88 |
| **Relaxation** | 9th | 2.61 | 1.83 |
| **Leisure** | 10th | 2.58 | 1.84 |

Table 6 shows the motivations and reasons for playing computer games in an educational context split by gender.

**Table 6:** Motivations for playing games in an educational context split by gender

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Gender*** | **Male** | | | **Female** | | |
| ***Reason*** | **Rank** | **Mean** | **SD** | **Rank** | **Mean** | **SD** |
| **Fantasy** | 1st | 3.09 | 1.70 | 4th | 4.26 | 1.21 |
| **Control** | 2nd | 2.86 | 1.70 | 2nd | 4.52 | 1.34 |
| **Recognition** | 3rd | 2.75 | 1.71 | 3rd | 4.50 | 1.40 |
| **Challenge** | 4th | 2.48 | 1.81 | 1st | 4.70 | 1.09 |
| **Curiosity** | 5th | 2.45 | 1.71 | 9th | 2.81 | 2.05 |
| **Competition** | 6th | 2.25 | 1.70 | 3rd | 4.50 | 1.43 |
| **Pleasure** | 7th | 2.23 | 1.57 | 8th | 2.92 | 2.04 |
| **Relaxation** | 8th | 2.19 | 1.49 | 7th | 2.94 | 2.00 |
| **Cooperation** | 9th | 2.13 | 1.55 | 5th | 4.07 | 1.38 |
| **Leisure** | 10th | 2.10 | 1.44 | 6th | 2.96 | 2.02 |

Females rated the following motivations and reasons for playing computer games in an educational context as significantly higher than males: challenge (Z = -16.307, p < 0.000), competition (Z = -15.598, p < 0.000), cooperation (Z = -15.671, p < 0.000), recognition (Z = -14.132, p < 0.000), control (Z = -13.566, p < 0.000), fantasy (Z = -9.960, p < 0.000), leisure (Z = -4.991, p < 0.000), pleasure (Z = -3.739, p < 0.000) and relaxation (Z = -4.630, p < 0.000). There was no significant difference in relation to gender with regards to curiosity (Z = -1.430, p < 0.000).

**4.4 Skill from playing computer games**

Participants were asked what particular skills they could develop from playing computer games in an educational context. Table 6 shows the ranking of the skills participants believed they could obtain from playing computer games.

**Table 6:** Ranking of skills obtained through playing computer games

|  |  |  |  |
| --- | --- | --- | --- |
| ***Skills*** | **Rank** | **Number** | **Percentage** |
| Creativity | 1st | 637 | 77% |
| Leading/Motivating | 2nd | 507 | 62% |
| Analysing/Classifying | 3rd | 486 | 59% |
| Critical Thinking | 4th | 397 | 48% |
| Reflection | 5th | 366 | 44% |
| Collaboration/Teamwork | 6th | 282 | 34% |
| Problem Solving | 7th | 271 | 33% |
| Recollection | 8th | 205 | 25% |
| Management | 9th | 181 | 22% |

Table 7 shows the skills that participants believed they could obtain from playing computer games in an educational setting split by gender. Males rated creativity, collaboration/team work and problem solving as the three top ranking skills and analysing/classifying, recollection and management as the three lowest skills that could be obtained through playing computer games. Females rated creativity, leading/motivating and analysing and classifying as the three highest ranking skills and management, collaboration/team work and recollection as the lowest ranking skills. One of the largest differences in the rankings of skills in relation to gender was collaboration/team work. Males rated this very highly, however females did not indicating that males perhaps perceived playing computer games as more of a collaborative activity and females perceive it as a solitary activity.

**Table 7:** Ratings of skills split by gender

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Gender*** | **Male** | | | **Female** | | |
| ***Skill*** | **Rank** | **Number** | **Percentage** | **Rank** | **Number** | **Percentage** |
| Creativity | 1st | 280 | 44% | 1st | 357 | 56% |
| Collaboration/Team work | 2nd | 228 | 81% | 8th | 54 | 19% |
| Problem Solving | 3rd | 197 | 73% | 6th | 74 | 27% |
| Reflection | 4th | 172 | 47% | 5th | 194 | 53% |
| Leading/Motivating | 5th | 170 | 33.50% | 2nd | 337 | 66.50% |
| Critical thinking | 6th | 170 | 43% | 4th | 227 | 57% |
| Analysing/Classifying | 6th | 169 | 35% | 3rd | 317 | 65% |
| Recollection | 7th | 139 | 68% | 7th | 66 | 32% |
| Management | 8th | 133 | 73% | 9th | 48 | 27% |

**4.5 Attitudes to playing computer games**

Participants were asked to rate their attitudes to playing computer games. Table 8 shows the ratings of the attitudes split by gender.

**Table 8:** Ratings of attitudes split by gender

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Gender*** | **Male** | | **Female** | |
| ***Attitude*** | **Mean** | **SD** | **Mean** | **SD** |
| Playing games is a sociable activity | 2.48 | 1.38 | 3.06 | 1.86 |
| Playing games is a waste of time | 3.06 | 1.52 | 2.96 | 1.85 |
| Playing games helps to develop new skills | 2.15 | 1.07 | 2.35 | 1.46 |
| Playing games is time consuming | 3.08 | 1.47 | 2.95 | 1.85 |
| Playing games is interesting | 2.38 | 1.45 | 2.66 | 1.49 |
| Playing games is a worthwhile activity | 2.39 | 1.27 | 1.90 | 1.43 |
| Playing games is enjoyable | 1.52 | 0.67 | 1.39 | 0.79 |
| Playing games is a lonely activity | 4.04 | 1.06 | 2.51 | 2.78 |
| Playing games is a valuable activity | 2.87 | 1.47 | 3.02 | 1.85 |
| Playing games is exciting | 1.69 | 1.02 | 1.51 | 1.03 |

Mann-Whitney *U* tests indicated that females rated playing computer games as more of a sociable activity (Z = -4.493, p < 0.000) and more of an interesting activity in comparison with males (Z = -2.207, p < 0.027). Males rated games as more of a worthwhile activity (Z = -7.338, p < 0.000), more of an enjoyable activity (Z = -4.957, p < 0.000), more of a lonely activity and more of an exciting activity (Z = -4.498, p < 0.000). There were no significant differences between male and female with regards to the following attitudes: playing games being a waste of time (Z = -0.841, p < 0.400), playing games helps to develop new skills (Z = -0.089, p < 0.929), playing games is time consuming (Z = -0.547, p < 0.584) and playing games is a valuable activity (Z = -1.112, p < 0.266).

1. **Discussion and Future Research Directions**

823 participants completed the questionnaire from Turkish SE institutions with a balance of males and females. The mean age of participants’ was 14.89 years of age with no significant difference in the ages or participants in relation to gender.

73.2% participants indicated that they played computer games with a higher percentage of males playing computer games. 91% of males played computer games and 59% of females played computer games. Participants played computer games for an average of 2.38 hours per week.

The general consensus from this study and others is that males play computer games for longer which has been a consistent finding in the literature (Ogletree *et al*., 2007; Hainey *et al*., 2013; Roussiou and Hainey, 2011, Hainey, Connolly, Stansfield and Boyle, 2011).

The most popular genres were adventure, sports and strategy and the least popular genres were shooting, RPG and platform games. Males played the following genres or computer games significantly more than females: platform, RPG and simulation. Females played the following genres significantly more than males: strategy, fighting, racing, shooting, adventure, sports and others.

78.5% of participants preferred single player games. On average participants had been playing computer games for 2.82 years. Males had been playing computer games for a significantly longer (4.02 years) period of time than females (1.84 years). 75.7% stated that they did not participate in online gaming. 67.5% who played online games were male and 37.5% were female.

The mean age of participants’ was 14.89 in this study where the mean age of participants was 13.52 in the study in SE in Greece resulting in participants in Greece playing computer games for an average of 4.68 years as opposed to 2.82 years. This is consistent with the slight age difference meaning that participants in both Turkey and Greece begin playing computer games from approximately the same time in life. In the Higher education studies people had been playing computer games for significantly longer.

The top ranking motivations for playing computer games in an SE context were control, fantasy, recognition and challenge and the lowest ranking motivations were pleasure, relaxation and leisure. The highest ranking motivations in the SE study in Greece were cooperation, pleasure and competition possibly indicating that both SE sets of participants perceive computer games (even in an educational capacity) to be a pleasurable pass time. In HE in the Netherlands participants rated: cooperation, fantasy, pleasure and relaxation as the highest ranking motivations where the top ranking motivations at HE in Scotland were: challenge, curiosity, cooperation and competition. In FE in Scotland the following motivations were considered important for playing games in an FE context: challenge, relaxation and prevention of boredom. Taking all of these pieces of information into account it seems clear that across all levels of education, computer games are perceived as quite leisurely and are able to promote cooperation. Nevertheless there is a different of how they are perceived in relation to educational level and country.

Females rated the following motivations and reasons for playing computer games in an educational context as significantly higher than males: challenge, competition, cooperation, recognition, control, fantasy, leisure, pleasure and relaxation.

The highest ranking skills that participants believed could be obtained from playing computer games were creativity, leading/motivating and analysing/classifying where the lowest ranking skills were problem solving, recollection and management. One of the largest differences in the rankings of skills in relation to gender was collaboration/team work. Males rated collaboration/teamwork as very highly, however females did not indicating that males perceived playing computer games as more of a collaborative activity. Consistently in the three Scottish studies in Scotland problem solving and critical thinking were the two highest rated skills. In the Netherlands problem solving and creativity were the two highest ranking skills and in Greece in SE collaboration and teamwork and problem solving were rated as the two top skills. The previous studies seem to suggest that problem solving is a highly important skill however in this study it is revealed to be not as important. This again indicates that educational level and cultural differences may influence perceived skill development. In terms of attitudes, females rated playing computer games as more of a sociable activity and more of an interesting activity. Males rated games as more of a worthwhile activity, more of an enjoyable activity, more lonely and exciting.

This paper has presented some empirical evidence associated with the use of computer games at SE level in Turkey and provided a brief comparison a number of studies at different educational levels and in different countries. Further study involves further investigation of these factors to attempt to narrow down where games should be used and how they can be used to their optimum level in different subjects and different educational levels.

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