EFFECT OF GAME PREFERENCES (DIGITAL OR TRADITIONAL) OF YOUTH PLAYERS ON THEIR PROBLEM SOLVING SKILLS

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ABSTRACT
Aim of this study is to evaluate whether game choices of players aged between 11 and 13 affect their problem solving skills taking account of gender differences. Eighty-eight females and 101 males, who were pupils and having licensed sports activities in different clubs, were enrolled to the study. “Problem-Solving Scale” was a 35-item questionnaire measuring the problem solving component of self-control behaviors, formed by 6 sub-scales, namely impatient, mindful, planned, avoidant, self-confident, evaluator approaches. The scores to obtain were the highest 192 and the lowest 32. The height of the total score from the PSS inventory indicated that an individual perceived himself as insufficient in problem solving. In order to evaluate results amongst or between groups, One-way ANOVA (Bonferroni Posthoc) and Student’s t tests were used, respectively. When considered together, there was a statistically significant difference between female and male students (p<0.05). The data obtained from female and male students preferring digital or traditional games and statistical tests did not show any difference amongst the groups in regard to impatient, mindful, planned, self-confident and evaluator approaches (p>0.05). On the other hand, as to avoidant approach, there was a significant difference between male students preferring computer games and female students preferring traditional ones (p<0.001). In addition, it was also observed between female students preferring computer games and male students preferring traditional ones (p=0.01). For avoidant approach, we found that game preferences affected problem solving capacity in the groups of female students (p<0.001). In conclusion, it is clear that preference of computer games improves the problem solving ability in students with regard to avoidant approach.

Keywords: Youth Players, Problem Solving, Digital Game, Traditional Game, Gender

INTRODUCTION
The purpose of this study was to evaluate whether game choices of youth players aged between 11 and 13 affected their problem solving skills, taking account of gender differences. A total of 189 youth players, made up of 88 female and 101 male primary school students, who were engaged in licensed sports activities in different clubs, were enrolled to the study.

Every living being capable to display different patterns of behavior has to make choice among the possibilities it might encounter during the course of life, either consciously or unconsciously, at least to survive. The more it gets complex, or in other words, the more a living being climbs up the evolutionary scale, the more complex and challenging gets the process of decision-making. It is fact that an advanced brain has a property that increases its chance of survival, namely the skill to perceive the differences in its environments with higher precision, and that an individual-sportsman having said brain skills will encounter not only a larger number of, but also more advanced options of behavior.

The most important point is that a brain that is more recent and advanced in the evolutionary sense does not only react to the environmental conditions at a given moment, but has the skill to generate models for probable conditions it might encounter in future. This means necessarily that the individual will have to make choice among a larger number of probabilities. The problem solving process of individuals is quite complex. An individual facing a problem has to be able to think about alternative solutions. The ability to choose the most adequate solution available is a very important skill. The individual should be able to anticipate the steps that will help the individual accomplish his/her goal. To that end, the individual is
supposed to envisage all steps from the very beginning till the end of a situation. He/she should be able to make out the outcome of a problem in advance (Bozkurt, 2013; Altun, 2000).

As a process, problem-solving is involving several procedures reaching from trial and error to gaining insight and figuring out cause and effect relationships. Even though it might seem to be a long lasting process, it is a reaction we must give at the shortest moment of time. When solving a problem, an individual-sportsman does not only make use of what he/she has learned before, but gains new learnings and acquisitions at the same time (Açıkgöz, 1996; Geron et al., 1986). If considered in the broad sense or beyond research problems (reaction given to problems encountered when playing sports) problem can be defined as a simple cognitive and behavioral process which sports players encounter during everyday life, requires accustomed reactions, and develop in the course of time. It is a reactive process which the player encounters at the moment of problem solving or response giving; which the player is supposed to react right at that moment. The ability to give an optimal reaction to a problem under intense internal and external pressure is a top-level skill. It is very important for trainers and sports managers to encourage their players to solve the problems they encounter themselves. One of the most important contributions that a game can make is to improve the problem solving skills of the player (Yıldızhan, 2013).

The common aim of training programs trying to improve the players’ personal and technical skills and abilities which the player might require to solve every day problems, to create products beneficial to the country and society, make a positive influence on surrounding people, and realize himself/herself is to, thereby, maintain social order and make the country develop. It can be said that digitalized training can be carried out in 5 different ways, namely exercise and practice, private lessons, simulation, games, and problem solving (Çeliköz, 1995; Gelen and Özer, 2010). In sports sciences, the level of problem solving skills is an issue that needs to be emphasized in particular for elite players. The fact that in sports success depends on split seconds, on very short slices of time, and that the smallest differences determine who is going to be successful in the end prove how important this issue is. What kind of reactions should players give to problems when they are under stress in the face of internal and external stimuli? It is fact that individuals engaged in sports face a larger number of problems than those that are not engaged in sports (Savaşır and Şahin, 1997). When making a training program to prepare their players for competitions and matches, trainers have to take account of all factors that might improve the players’ performance development. Various studies carried out since the 1960’s to analyze the relationship between personal and sports performance have shown that sports players have different character traits from those people that are not engaged in sports (Fox, 1998). It is also assumed that individuals engaged in sports have distinguished character traits such as more independent, more objective, and less worried compared to individuals not engaged in sports (Tiryaki, 2000; Barut and Yılmaz, 2000).

When facing a problem, sports players make use of their past knowledge and experiences to solve the problem. To explain this, Schmidt asserts that there are general schemes in memory which serve as guidance for human performance, that there are also schemes which belong to certain groups of movement, that the individual-sportsman stores his/her past movement experiences in his/her motor memory, and that a situation will take place if there is a pre-planned situation in the individual’s/sportsman’s mind and if there is no feedback about that situation (Schmidt, 1991; Magill, 1989).

Gallahue advises to provide individuals-sports players with a set of questions which will give them the chance to make research on a large variety of movements and the basic elements thereof, i.e. to give them the chance to solve problems. All rational solutions are considered as right. In this method, success is employed as a means to make the child improve within its own limitations of skill (Gallahue, 1982). This is very important to show trainers that, when making a training schedule or program, how important it is to take account of the skills which they want to improve in the players they train. However, past experience is not always helpful, but can also cause obstacles (Peale, 1997). This shows how important training schedules and programs, which trainers are making according to their own knowledge and skills, can be.
In everyday life, we have to deal with many tasks and various problems that cross our way as a must which we need to solve and give response. Some of our responses are “right”, and some are “wrong”. Some of them are “right” only for you, while some are “wrong” again only for you. Some are rational, some not. But researchers point out that, this way or the other, even those thoughts and decisions that seem to be the most rational and most distant from emotional influence can only be created by means of emotional input, influenced by mental and cognitive tradition from very ancient times. It is fact that we could make hardly any decision, no matter how simple or complex it might be, without such input. Emotions are not contradictory to the process of rational decision making, but provide functionality which contributes to both the speed and efficiency of this process. The acts and behaviors of sports players have to be questioned and trained with an eye to emotional decisions. An important way to achieve that is to make them play games. Nowadays, games have shifted from social environments to media and industries of technology and education. Learnist educators put forth that games could be beneficial in the development of a leaning framework for the new generation. Game makers are developing games that illustrate their own culture, language, political system, and economy in virtual environment (Annetta et al., 2009; Squire, 2005).

According to Huizinga, play is a second, poetic world alongside the world of nature, in giving expression to life. “In play there is something “at play” which transcends the immediate needs of life and imparts meaning to the action”. All plays have a meaning. In his well-known book Homo Ludens (Man the Player), Johan Huizinga approaches the issue of play not as a biological or psychological, but cultural phenomenon. “Summing up the formal characteristic of play, we might call it a free activity standing quite consciously outside ‘ordinary’ life as being ‘not serious’ but at the same time absorbing the player intensely and utterly. It is an activity connected with no material interest, and no profit can be gained by it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner. It promotes the formation of social groupings that tend to surround themselves with secrecy and to stress the difference from the common world by disguise or other means”. No matter whether among children or adults, play can only be played with full “earnestness”. Among all actions taken serious by children in their own world, play is what they take serious most. Play might seem to be an action with simple rules, but if we look at it from the children’s world, it can be seen that it is an earnest action that has its own hierarchy and systematic (Huizinga, 1976). Necati Demir defines play as “a preparatory school for real life, a moderate form of the problems we encounter in real life” (Demir, 2010) which shows how important play is for real life.

Social, economic, and technologic developments have turned games into a most efficient means to get through to young sports players. Indeed, educatory games are accepted as integral part of education in all schools of the United States. Nowadays, computer games are part of education in a large variety of different disciplines (Jenkins et al., 2003). There are many positive and negative findings about the usefulness of digital games. This being said, it is evident that computer games do not only give joy while increasing the player’s motivation and addiction, but also improve the player’s social and cognitive skills. Interactive virtual game environments are a gripping experience for the player. It is fast and reactive; the player is supposed to figure out immediate solution for the problems encounters and give actual response. If this process succeeds, the player will be able to create a positive atmosphere. In his description of the power of positive thinking, Peale asserts that self-confidence and cognitive capacity are individual properties that are of huge importance in problem solving. Experts agree that differences in self-confidence and cognitive capacity are very important to sports players in gaining the upper hand over their competitors. The more children play games, the more their problem solving skills develop, which in the end improves their motor skills and physical development. Scientists point out that the so-called “free play” creates positive impact on cognitive aspects of children such as socialization, problem solving skills, and stress coping skills (Demirel and Ün, 1987; Mitchell et al., 2004).

The goal is to point out that and raise awareness of self-evaluation, which improves the problem solving skills and determined the problem solving skill level of players in the face of more complex problems that are more difficult to react, as emphasized in this study.
Aim of this study was to evaluate whether game choices (digital or traditional) of youth players aged between 11 and 13 affect their problem solving skills taking account of gender differences, and whether this impact differs among girls and boys. This study was the first to be carried out in Turkey.

MATERIALS AND METHODS

Research Group and Protocol

A total of 189 youth players, made up of 88 female and 101 male primary school students studying at diverse primary school in the province of Van as of 2007 and engaged in licensed sports activities in different clubs, were enrolled to the study.

Data used for the purpose of this study was collected by means of the “Problem Solving Inventory, Form-A (PSI-A)”, a scale developed by P.P Heppner and C. H. Petersen (1982) to determine the self-perception levels of problem solving skills. The inventory was adapted to Turkey in 1993 by Nail Şahin, Nesrin H. Şahin, and Paul Heppner. The Cronbach Alpha internal consistency coefficient of the scale consisting of 35 items was found to be .88, whereas the reliability coefficient determined by split-half method was found to be .81. In the validity check, the correlation coefficient between the scale’s total score and the Beck Depression Inventory was found to be .33, whereas the correlation coefficient between the STAI-T total score was found to be .45. Factor analysis of the scale revealed that the scale consisted of six sub-factors, namely “impatient approach”, “mindful approach”, “avoidant approach”, “evaluator approach”, “self-confident approach”, and “planned approach”. The height of the total score from the Problem Solving Inventory indicates that an individual perceives himself as insufficient in problem solving. The score range of the scale was determined to range between 32 and 192.

Means of Data Collection

Data collection was carried out by means of the “Problem Solving Inventory, Form-A (PSI-A)”, a scale consisting of six sub-scales, developed by P.P Heppner and C. H. Petersen in 1982. The “Problem Solving Inventory” consists of 35 items and 6 sub-dimensions, namely “impatient approach”, “mindful approach”, “avoidant approach”, “evaluator approach”, “self-confident approach”, and “planned approach”, to determine the problem-solving skill level of an individual.

The problem solving levels of individuals were evaluated over a 6-point grading scale, according to which the answers were scored as follows: “I always act like that” (1), “I mostly act like that” (2), “I often act like that” (3), “I occasionally act like that” (4), “I rarely act like that” (5), and “I never act like that” (6).

Means of Processing

Problem Solving Inventory (PSI)

Criterion: Self-perception of the individual with regard to problem solving.

Applicable to: Adolescent and Adults

Scope: 1-6 point graded Likert type scale consisting of 35 items.

Material: Questionnaire (answers ticked on questionnaire)

Directive: Questionnaire begins with information on how to answer the questions.

Answering: For each item, the individual is asked how frequent they act in the manner that is described in the scale’s items. Possible options are “I always act like that”, “I mostly act like that”, “I often act like that”, “I occasionally act like that”, “I rarely act like that”, and “I never act like that”.

Point scoring: The answers are scored between 1 and 6 points. Items 9, 22, and 29 are excluded from point scoring. Items 1, 2, 3, 4, 11, 13, 14, 15, 17, 21, 25, 26, 30, and 34 scored reverse. It is assumed that these items represent adequate problem solving skills. Point range is 32-192.

Interpretation: The height of the total score from the Problem Solving Inventory indicates that an individual perceives himself as insufficient in problem solving.

The form adapted into the Turkish language by Şahin, N. et al (1993) was applied by the researcher to primary school students in the province of Van, during class.
Data Analysis
The subjects were divided into 4 groups with the aim to evaluate whether game choices (digital or traditional) of youth players affect their problem solving skills taking account of gender differences, and whether this impact differs among girls and boys:
Group 1: Male digital
Group 2: Male traditional
Group 3: Female digital
Group 4: Female traditional

The statistical testing of data obtained from PSI was carried out by means of SPSS 21.0 for Windows, intergroup one-way ANOVA (Bonferroni Correction) was applied to test group and gender differences, and Students’ T Test was applied for comparisons between two groups. After the homogeneous distribution of the groups’ data was ascertained by Levene test, parametric tests were preferred.

RESULTS AND DISCUSSION

Results

Table 1: Difference between female players playing both traditional and digital games

<table>
<thead>
<tr>
<th>Groups/Approach</th>
<th>Impatient</th>
<th>Mindful</th>
<th>Avoidant</th>
<th>Evaluator</th>
<th>Self-confident</th>
<th>Planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Computer (n=51)</td>
<td>3.94±0.55</td>
<td>3.31±0.89</td>
<td>3.49±0.97</td>
<td>3.84±1.25</td>
<td>3.21±0.61</td>
<td>2.58±0.78</td>
</tr>
<tr>
<td>Male Traditional (n=50)</td>
<td>3.93±0.59</td>
<td>3.05±0.97</td>
<td>3.93±0.73</td>
<td>3.48±1.12</td>
<td>3.20±0.61</td>
<td>2.68±0.89</td>
</tr>
<tr>
<td>Female Computer (n=38)</td>
<td>3.91±0.52</td>
<td>3.34±0.74</td>
<td>3.31±0.96</td>
<td>3.90±1.09</td>
<td>3.32±0.63</td>
<td>2.42±0.65</td>
</tr>
<tr>
<td>Female Traditional (n=50)</td>
<td>4.19±0.56</td>
<td>3.02±0.71</td>
<td>4.48±0.97</td>
<td>3.56±1.14</td>
<td>3.19±0.64</td>
<td>2.51±1.04</td>
</tr>
<tr>
<td>Total Computer (n=89)</td>
<td>3.92±0.54</td>
<td>3.32±0.83</td>
<td>3.41±0.97</td>
<td>3.89±1.17</td>
<td>3.25±0.62</td>
<td>2.51±0.73</td>
</tr>
<tr>
<td>Total Traditional (n=100)</td>
<td>4.06±0.58</td>
<td>3.05±0.97</td>
<td>4.19±0.89</td>
<td>3.50±1.13</td>
<td>3.20±0.62</td>
<td>2.59±0.96</td>
</tr>
</tbody>
</table>

Considering the students as a whole, the difference between male and female players was found significant (p<0.05). Data obtained from female and male players preferring digital or traditional games differed among groups in the “impatient approach”, “evaluator approach”, “self-confident approach”, “planned approach”, and “mindful approach” (p>0.05). A very significant difference (p<0.001) was observed between computer playing males and traditional playing females in the “avoidant approach”. This shows that female students playing traditional games perceive decrease in their problem solving skills. Difference (p<0.01) could be observed between the traditional playing male group and the computer playing female group in the avoidant approach (p<0.01). This data provided a very important finding, namely that female students preferring computer games had better problem solving skills than male students preferring traditional games. Difference could also observed between female players playing both traditional and digital games at the same time, in the avoidant approach (p<0.001). These data confirmed that computer games (strategy games) improved the subjects’ problem solving skills.

Discussion and Conclusion
The most important difficulty which the individual has to face when solving a problem is to understand what the problem will give rise to when solved. When facing a problem, the individual will in the first place recall the schemes and concepts stored in its memory, and after that take cognitive action. If an individual is experienced, it will make use of recalled information to understand and identify the problem. This is associated with the analysis of memory resident information. Newell and Simon advise the analysis of meanings and outcomes to ease the solving of a problem. Accordingly, to reach the...
outcome/target requiring the solving of a problem, it will be necessary to analyze the target and subsequently to define each step to be taken as a goal. In problem solving, mistakes can be reduced if the occurrence is approached from different points of view, while another problem solving strategy suggests dividing the problem into sub-problems (Newell and Simon, 1972). After consecutive tries, the individual-player will reach a status where the difference between perceptual track and the feedback received is at minimum. Since perceptual tracks get stronger with “knowledge of outcomes” gained through action put into practice, fewer mistakes will occur. Adam asserted that the “knowledge of outcomes” provides information in the solving of motor problems (Schmidt, 1988).

The individual gains new information every time it makes use of information already available to him to solve problems which it encounters in life. In other words, it teaches itself through its own skills. Before deciding upon the problem solving method, it would be in place to answer the question: “What is the problem?” If there is an obstacle between the situations an individual wants to be in and the situation it is actually in, and if this creates tension in the individual, it means that there is a problematic situation/problem for the individual (Açıkgoz, 1996; Geron et al., 1986). Problem solving can be defined as the searching and finding of ways to cope with obstacles that hinder the individual from accomplishing its target. Individuals learn whenever they accomplish a target, i.e. solve a problem. Problem solving, as a term, can be analyzed with an eye to both behavioral and cognitive types of approach.

Play is experience. It does not only require effort, but is an occupation that comes from inside. The play of a child is a symbolic reflection of the child’s inner world. Along with being an entertaining activity for children, play does also bring along several benefits such as supporting the cognitive and motor development of the child and contributing to the settlement of emotional conflicts. Play is essential for a healthy development of children. It can be said that there are 5 difference ways of play, namely computer, exercise and practice private lesson, game, and problem solving (Çeliköz, 1995). The more a child plays, the more its problems solving skills improve; resulting in positive impact on its motor skills and physical development. Play teaches problem solving skills. Players are provided with a set of rules which they are supposed to follow, and asked to adopt the best strategy to accomplish the targets set for a particular play. If a play involves multiple players, problem solving is carried out in a social context which teaches communication and collaboration among humans. Scientists point out that the so-called “free play” creates positive impact on cognitive aspects of children such as socialization, problem solving skills, and stress coping skills.

Factors such as urbanization, increased academic expectations from children, computer-video games, internet, concerns of the parents etc. push the children to spend more time at home. Along with being an entertaining activity for children, play does also bring along several benefits such as supporting the cognitive and motor development of the child and contributing to the settlement of emotional conflicts, while computer games do not only give joy while increasing the player’s motivation and addiction, but also improve the player’s social and cognitive skills.

It was ascertained that computer games are influential on the physical fitness, motor skills development, physical activity motivation, and weight loss, capability to understand physical movement principles, sports-specific training efficiency, and team spirit development in children. It was observed that real-life experiences reflect on computer games (Matthew & Katherine, 2012). Interactive virtual game environments are a gripping experience for the player. It is fast and reactive. It is noted that computer games include 36 teaching principles of education.

An example of that is the development of students’ decidability when they face various situations. Some studies mention two different standpoints in terms of game and game type preferences of students. The first standpoint explains different fame preferences on the basis of social impacts on the development process of children. This standpoint emphasizes that in children different game preferences develop according to a society’s perception of children and the desires and expectations a society has from children. An example of that is the fact that violent computer games are considered fit for boys, but not for girls. The second standpoint asserts that digital game preferences differ according to individual characteristics. Furthermore, it is also noted that primary school students prefer different types of games.
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according to their class level (Can, 2003; İnal and Çağiltay, 2005). Game preferences are not constant, but get influenced by economic, social, and cultural aspects. Besides, game type preferences also depend on whether a game has been played before as well as on previous knowledge about the game (Carr, 2005). Teachers argue that digital games are a good way against gradual decrease in enthusiasm and motivation. For example, it can be seen that those playing the game “Civilization III” get more interested in history. This system brings also freedom to students so that they can research information (Mitchell et al., 2004; Squire, 2005; Papastergiou, 2009). It is noted that computer games are strong means of learning mathematics, and have strong motivational impact on learning. It is set forth that computer games with quite high number of empirical data have a positive impact that improve simple arithmetic and problem solving skills. These findings show that new and innovative technologies such as educational games improve the commitment and motivation of students, while giving the opportunity to make research as they replace traditional teaching materials. The results of previous studies have revealed that well-planned, student-oriented teaching techniques which address to all student intelligence types according to the multiple intelligence theory and make combined use of scientific methods such as simulation, play, and role play might be influential (Lee and Chen, 2009; Annetar et al., 2008; Keleş et al., 2006). It is noted that information about computer memory concepts are more influential in students playing games than those who play not. Although boys are more interested in computer games, no significant result could be observed between genders in terms of increased computer memory knowledge. Play is for both girls and boys a means to motivate their learning. It is asserted that computer-supported teaching could by a more efficient means of teaching, along with a motivation improving effect, while creating positive impact on learning motivation with the computer being introduced into classrooms (Papastergiou et al., 2008; Rosas et al., 2003).

The research conducted by (Coller and Scott, 2009) revealed that students spent in average two times more time out of class. In contrast, they reached the conclusion that they had deeper knowledge than those in traditional education (Coller and Scott, 2009). Yet there are also some researchers who approach the issue with more caution. They assert that only time will reveal how and to what extent digital game based education will change the education of students, with an emphasis on uncertainty. There are also pessimistic researchers. According to them, individual and social sensitivity are the only way to solve the problem of computer usage habits posing threat and alternative to the reading habits of children. They assert that, unless necessary measures are taken, the development of unhealthy characters and tendencies will be inevitable in children who start to live with visual culture without having gained written culture. New comparative researches to be carried out among children, adolescents, and adults will help to get deeper insight to the issue (Van-Eck, 2006; Aksaçlıoğlu and Yılmaz, 2007). Hooper and Rieber suggest that teachers should be familiar to and integrated with the use of technology. Hence, measures should be taken to make sure that technologic developments are followed by teachers. If the teacher is integrated with technology, there will be also difference in the teacher’s role in class. Accordingly, the student and the teacher will conduct the process of learning/teaching in cognitive collaboration and solidarity in a large variety of fields (Hooper and Rieber, 1995). According to Çeliköz, computer-supported teaching has different types of application which will increase the efficiency of teaching/learning processes, and make the teacher and student play a more active role in this process (Çeliköz, 1995). Previous studies have shown that those engaged in sports have a higher level of problem solving skills compared to those that are not engaged in sports (Sözen et al., 2012; Canan and Ataoğlu, 2010; Efe et al., 2008). Moreover, a research on the relationship between computer games and sports competitions was carried out with the aim to evaluate computer basketball games from the player’s point of view. The research revealed that the basketball game could contribute to efforts of encouraging young generations to play basketball by making the basketball game played by more players. It is considered that the design and development of learning environments making use of gripping and exciting visual elements close to real life for male students, and, in contrast, gripping and exciting but at the same time mentally challenging elements for girls might be an important means to secure permanent learning (Razbonyalı and Akgün, 2014; Pala and Erdem, 2011).
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In conclusion, statistical analyses have shown gender differences among the groups (p<0.05). If evaluated between those playing computer games and those playing free games, it can be seen that, in the “avoidant approach”, girls preferring computer games are influenced more positively resulting in improved problem solving skills than female and male students preferring traditional games. Similarly, male students preferring computer games are influenced more positively than male students preferring traditional games. According to these data, it has been ascertained that computer games (strategy games) result in improved problem solving skills. No difference could be observed in the other types of approach.

Suggestions; Gamification can be used as an efficient means to improve problem solving skills. Gamification can contribute to the creation of entertaining and educatory environments during training.

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