

Interactive Educational Multimedia, number 9 (November 2004), pp. 1-15  
<http://www.ub.es/multimedia/iem>

## *The digital gap: gender and computer games*

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### ***Introduction***

The purpose of this article is to consider a specific aspect which has become an obvious source of social inequality in the digital era: computer games from a gender perspective. To this end, the existing literature is reviewed to show that despite the positive educational aspects of play, educational use of computer games is minimal. Details are also given of various research which shows the gender bias in different aspects related to multimedia games.

The results of the research carried out by the authors (which received a subsidy from the Catalan Autonomous Government Catalan Women's Institute), dealing with the prevailing sexism in multimedia games, is also listed.

Finally, the need for safeguarding the quality of multimedia games is highlighted, without forgetting new technologies' socialising importance in today's society.

### ***Computer games, school and society***

Today's society is immersed in a process of change in social, human and workplace relationships, dominated by information and communication technologies. Schools are also experiencing the impact of the ICTs, which have led to a change in teaching/learning relationships. The uses of certain applications, related with mathematics, languages and physics, to support teachers' explanations and to work in specific areas, such as mental calculations and drawing, are common in most primary and secondary schools.

The same is not true of computer games. Despite the benefits of using computer games and of playing them in general described by the literature, many teachers are reluctant to use them in the classroom.

The two most commonly mentioned negative aspects refer to violence and sexism. As far as violence is concerned, many games display aggressive attitudes and an anti-social

world view, and many authors observe that this type of conduct may lead to an increase in aggressiveness, as a result of vicarious learning or imitation, as shown by Bandura, Ross and Ross (1961).

However, Cooper and Mackie (1986) studied spontaneous playing by boys and girls after they had played with violent video games and noted that the boys showed no increase in their aggressive conduct compared to the values prior to playing with video games. However, aggressiveness among girls did increase after having played a video game with aggressive subject matter or having seen their classmates play with one. The authors attributed this difference between the sexes to the girls' lower exposure to aggressive models.

What many studies indisputably reveal (Braun et al, 1986; Provenzo, 1991; Colwell et al, 1995) is the existence of stereotypes with regard to masculine and feminine figures in computer games. These stereotypes are detrimental to women, who appear to a lesser extent and tend to be represented in passive, dominated or secondary attitudes, while men are more represented and in active and dominant attitudes.

Nevertheless, the use of computer games does not only have negative effects, but also provides many educational opportunities. As well as a significant influence on visual motor co-ordination, which is especially important in children's cognitive development, research attributes a role to computer games in the development of certain attention and spatial concentration skills (Okagaki and Frensch, 1994), in the increase of precision and reaction capacity and even in the acquiring of problem solving and decision-making skills (Gros, 1998; F9 Group, 2000).

Ball (1978) mentions some of the educational benefits of computer games:

- They can be used to stimulate players' sense of alertness and to improve their thinking skills
- Their format may simulate a real life experience or situation
- They can increase the attention span of people showing difficulties in carrying out an individual task within a period of time
- They can help in the development of skills for the identification and assimilation of numerical concepts, word recognition, identification of objects and colours, an increase in reading rate and improvement of comprehension, among others
- These activities may be especially suitable for dealing with learning problems related to acceleration and delay
- Players can perceive their own errors and are encouraged to rectify them or select other options
- players can transfer the conduct they have learnt to real-life situations

These positive effects are increased by the motivating nature of the use of games in the classroom for very young. This playful aspect makes any learning through them more significant. Long and Long (1984) emphasised the importance of challenges, fantasy and curiosity. As positive aspects, they also mention:

- The player's active involvement
- The option to leave when the task required is beyond the player's skill level

- Short periods of intense activity
- Flexible time programmes for learning
- A controllable environment
- The possibility of command as an internal motivator
- Characters that are a motivation to improve skills and abilities
- Continuous and immediate feedback, both visible and audible, which also excites, motivates and challenges the player to make a greater effort depending on knowledge of the game's contents and understanding of the consequences of the various action strategies
- A deductive process for improving the game's results as the causes of errors are not mentioned
- Anticipation of events and development of action strategies as knowledge of the game increases

Finally, the playful nature of computer games and the importance, emphasised by authors such as Hepp (1999), of including tools belonging to the historical-technological context within which the students work in educational programs should be mentioned. As with other resources, which are not specifically designed for the classroom but with the right use may become important didactic resources, computer games may become another tool for stimulating or providing support for classroom activities. In this regard, the teachers' role is to take advantage of the richness of a resource which the student knows, is motivated by and knows how to use.

### ***Computers and gender differences***

For approximately the last decade, the scientific community has started to perform important studies on gender and technology, and various research projects basically related with variables such as access, use, competence and attitude have taken place, which have always made the differences between the two sexes clear. In general (Escofet, Herrero and Rubio, 2002), boys show greater competence, a more positive attitude, a higher access level and make different use (less functional and more playful, more individual and less co-operative) of technology than girls.

At present, research replicates with these variables continue, and others are appearing, including learning styles, the relationship between gender and domestic violence, the perception of technology by men and women (from a qualitative perspective), etc. If we focus on computer games, research has traditionally been based on analysis of characters and their roles, with a clear imbalance in favour of masculine characters and the representation of stereotyped roles for both genders.

A review of current research into gender and technology shows similar data to those of a few years ago concerning the classic variables. At school, girls are less motivated than boys to carry out technology-related tasks (Ruiz Ben, 1999), feel themselves less able to use computers and to learn to use them (which affects their choices in future studies) and they attribute more utilitarian functions to them (word processors and other computer applications compared to programming and games). At home, control by the masculine members of the family of technology and of computer games in particular can be seen (Farray, Aguiar, Bonny and Calvo, 2002). In public spaces for computer games, girls are present to a considerably lesser extent, although networked games are now enabling girls to reduce their stereotyped image and as a consequence, acquire

increased competence in the skills and abilities necessary for these games, as mentioned by Bryce and Rutter (2002).

Qualitative research on gender and language is also significant in terms of technology. Girls show different attitudes with regard to language use, with a greater tendency to use non-specialised language, which is very expressive and shows some perceptions concerning the computer: surprise, insecurity, powerlessness, with exclamations such as “*We didn't touch anything!*” compared to the boys' more technical language denoting a command of computing, and an authoritative attitude, with phrases like “*click now, ... when it's loaded, you turn it off*” (Anguita and Ordax, 2000).

Learning styles have also been seen to have a relationship with the gender variable, with certain styles being more effective for the relationship with technology than others, and these styles being predominant in boys (Ames, 2003).

If we focus on the analysis of the games existing on the market, recent research (Urbina, Riera, Ortego and Gilbert, 2002) reveal an even greater presence (at least double) of masculine characters compared to feminine ones, assuming stereotyped roles - masculine dominance and action compared to feminine submission and passiveness - and even roles of beauty or a sex object in women. Nevertheless, this research does not show significant data of aggression or direct violence towards women as in the data collected by Dietz (1998), in which this type of aggressions took place in 21% of games. It seems that despite the passing of the years failing to produce substantial changes in gender sensitivity or the treatment of the female figure in computer games, there is a tendency to make slight corrections to the prevailing sexist pattern (Urbina Ramírez and others, 2002). However, in general, in all the media, there is a tendency to use a less explicit sexism, which is possibly more dangerous.

Efforts in the school context to overcome the differences between gender and technology support the research related to “high access environment” action programmes (a ratio of one computer per student), among others. The research by Bain, Hess, Jones and Berelowitz (2003) clearly showed the increase in the technological skills of the girls involved in this programme, compared to the skills shown by the boys, who did not follow the higher access program. However, other research shows that co-operation is a stimulating way to learn how to use the computer for girls (Anguita and Ordax, 2000). Indeed, their tastes in computer games favour those including co-operative tasks.

In short, research continues to show clear significant differences between boys and girls with regard to technology. In any case, from an educational perspective it is clear that it is necessary to insist on socialisation aspects and to attempt to minimise their effects from childhood.

### ***Computer games for girls***

The old gender-based myths are not dead - they have merely adapted to new technologies. An experiment by Huff and Cooper makes this bias clear: software is specifically designed to attract boys. The programs designed for “seventh-grade students” are very similar to those designed for “seventh-grade boys” while they differ significantly from those for “seventh-grade girls”. The designs “for boys” are similar to

games emphasising hand-eye co-ordination, reflex speed and action. Programs “for girls” are more like productive tools and facilitate carrying out practical or artistic tasks.

Most computer games have therefore been created for a mostly masculine audience. However, instead of a masculine audience, it would be more accurate to talk about a stereotypically masculine audience. This stereotype assumes that the characters are masculine and a heavy dose of conflict, violence and competition. Another study of twenty computer games including *SimCity 2000*, *Mortal Kombat II* and *Where is Carmen SanDiego?* based on analysis of their authors, stories and the philosophy they implicitly or explicitly transmit, showed that the authors of most programs are not identified, and when they are, they are usually men, that all of them transmit a culture in which men predominate as the main characters and the stories' subject matter is men rescuing women, revenge and "good guys against bad guys" (Matthis, 1996).

Many authors state that girls have specific criticisms of modern games' violence and are interested in games that enable them to create rather than destroy. However, girls' acceptance of boys' games is another story: not all girls refuse to play with boys' games. In his research, Jacobs (1994) found that while boys are very little inclined to play girls' games, girls do not show this attitude, and some of them even mention typically masculine games among their favourites. This is probably one of the practical reasons that have led the industry to gear its production to boys: it is more likely that a girl will accept a game aimed at boys than vice versa.

However, the fact that girls frequently play games that are either designed to entertain both genders and also play games traditionally associated with boys does not mean that discussion of the need to design games specifically for girls is without interest. Over the last decade, the computer games industry has changed direction significantly in this respect. Software designers have frequently echoed the studies which state that girls do not like the typical features of boys' games and have tried to attract girls to computer games by creating games specifically for them. Although these games all too frequently leave one stereotype behind merely to adopt the opposite one (these girls' games are very frequently stereotypically feminine, and for this reason are heavily criticised by some authors, as we will see below), they aim to provide a response to the preferences mentioned by girls with regard to computer games.

The industry's view, which is frequently shared by families and schools, of computer games as being something for boys and not for girls, led to the companies producing computer games failing to consider the preferences of the half of their potential market until 1996. Recognition of this market which had been ignored for many years led to "girls' games", or computer games for girls aged 6 and over. This movement came about as a result of an unlikely alliance between feminine activists, who wanted to close the gender gap in digital technology, and the software producing industries, who wanted to expand their market with a new segment (Cassell and Jenkins, 1998).

Since 1997, several North American companies have to aim their game production at girls. Despite their erratic success rate, in the United States, according to the IDSA (Interactive Digital Software Association), 19% of computer games produced today are aimed at girls. This does not seem proportionate to the figure of 43% of female computer game and video game users (according to the same source), but it is a sufficient number for consideration of these new products and their influence.

Today, this diversity has disappeared and it is almost impossible to find video games "for girls" on the American market. For example, one of the most typical companies in this field, *Purple Moon*, has been purchased by the well-known company *Mattel*, which has the paradigmatic doll *Barbie* as its flagship product.

Despite the research that all the companies in this sector say they have done when they declare that they have in-depth knowledge of what girls want to play, and the inclusion of these opinions in their products, these games –presented in pink or lilac boxes and with the explicit “for girls” label – frequently aim to make the computer into a friendly space for girls by exploiting the most common female stereotypes: make-up, shopping and dates. This has been strongly criticised by authors such as Rubin (1999), who says “(...) *Viewing girls as motivated primarily by social status and consumerism is just as bad as assuming that all boys will be captivated by violence*”.

Turkle, de Castell and Bryson are perhaps those who best reflect opinion against a price that is too high to be paid for bringing girls closer to technology: the use of games that perpetuate stereotypes, despite the fact that they attract girls. For Turkle (1995), “*computers don't just do things for us, they do things to us, including to our ways of thinking about ourselves and other people*”, while De Castell and Bryson (1998) wonder “*Are we producing tools for girls, or are we producing girls themselves...?*”

Another idea is also strongly criticised: the "non-competitive relationships" that these games appear to suggest, as they take girls even further away from the ambition and fighting spirit which, in the right doses, are essential for playing leading roles in the workplace (Eisenberg, 1998).

However, not all authors share this negative view: there are also those who feel that any game that is able to attract girls to using technology has its positive side, regardless of its content.

This attitude is frequently adopted by the industry involved. However, it is not only the industry that maintains this attitude. Authors including Beatto (1997) and Subrahmanyam and Greenfield (1998) also defend the role of this type of application in bringing girls closer to computers, an area in which girls have a clear comparative disadvantage. They say that boys who play computer games spend much more time in front of the machine than those who only use it to perform tasks, and this extra time gives them increased skills in using them and significant comfort in experimenting with them.

Subrahmanyam and Greenfield () analyse the reason for the success of *Barbie Fashion Designer*. As these authors state, a game that attracts girls is more than a game with a feminine central character and they conclude that the success of Barbie lies in the fact that it is a game which has no end in itself, but which makes the computer into a tool (which is girls' most frequent description of computer) making it easier for girls to carry out tasks that they would normally do manually, such as dressing up girls. They, as designers, and not Barbie, are the active central characters in this game. This, together with the lack of characteristics that girls reject - such as aggressive content - is the main reason why this game attracts girls, despite it being full of stereotypes. Among the stereotypes of violence and aggression that characterise most games available on the

market, the feminine stereotype presented in *Barbie Fashion Designer* is, for these authors, pro-social.

### ***The research: computer games and gender***

The general objective of the research was to analyse educational computer games aimed at students in the first years of primary education from a gender point of view, taking into consideration their objective design features, content, activity and interaction and the preferences and needs mentioned by their users.

#### **Methodology**

The methodology was basically descriptive-quantitative.

#### **Sample**

For *games software*, after a review of the most common products on the market, aimed at 6-10 years old age range, three games were selected. The parameters for review were: a) the objectives of the game and the plot; b) the characters (main and secondary); c) the type of atmosphere; d) the activities; e) the design (colours, drawings, sounds and voices); f) the target audience; and g) the technical requirements.

Of all the games reviewed, the following were finally selected:

- *Barbie SuperSports*, by Mattel
- *Action Man*, by Hasbro
- *The Wizard of Oz*, by Z Multimedia

The *participants in the research* were selected from 12 schools in Barcelona from various districts, from which a total sample of 160 participants was obtained - 78 boys and 82 girls.

#### **Data gathering tools**

To analyse software use and preferences among girls and boys, the systematic observation strategy using a numeric estimation scale was used, which was applied during the time in which the boys and girls interacted with the three types of games (one for girls, one for boys and one neutral), as well as a structured interview with each of the participants observed, which took place after the interaction.

The items on the estimation scale included aspects enabling the boys' and girls' ability with or command of the software to be described, and their attitudes.

The interview provides data on the aspects that most appealed to each gender.

Both instruments were reviewed by three external assessors, who were experts in gender and new technologies, to ensure their validity.

#### **• The estimation scale**

The participants' attitude towards the game was observed in each type of game as follows:

- Concentrates
- Expresses happiness
- Explores all the menu options
- Shows excitement
- Listens to and/or read the instructions
- Listens to the stories

In terms of ability to use the games, it was noted whether:

- Progress was made
- Knows what to do him/herself (does not ask anybody)
- Finishes the screens in a reasonable time

The reliability of the test was established by means of a pilot test with a sample of 12 girls and boys, with similar characteristics to those in the real study. The objective was twofold: firstly, to check whether the items on the scale were measured equally by two observers, and secondly to check whether the level of difficulty of the games chosen was accessible for the group.

•The interview

This had three different parts:

a) For details of preferences of the games, the following questions were asked for each game:

- Had you played the game before? (as control for a possible variable influencing preference)
- How much did you like the game? (direct evaluation of the game)
- Would you play this game again? (control of the above)
- What did the game consist of? (it was considered important to control whether understanding of the game had an influence on preference)

b) For evaluation of the game, various questions were asked on all the main aspects of a multimedia game

- Colours
- Drawings
- Sounds, voices or music
- Main character
- The main character's costume
- Actions carried out by the main character
- The game's scenario
- The history of the game
- The game's activities
- The feedback provided by the game

c) For the game's perceived simplicity (as a control measure of understanding) the following questions were asked:

- Did the game's activities seem to you: easy, difficult or so-so?
- Did you know what you had to do - always, sometimes or hardly ever?
- What game did you like the most and why?

d) To ascertain boys' and girls' playing habits as possible intervening variables, the following questions were asked:

- What do you normally play?
- Who with?
- Do you have a computer at home?
- If yes, do you use it to play?
- How often ?



- Which computer games do you normally play?

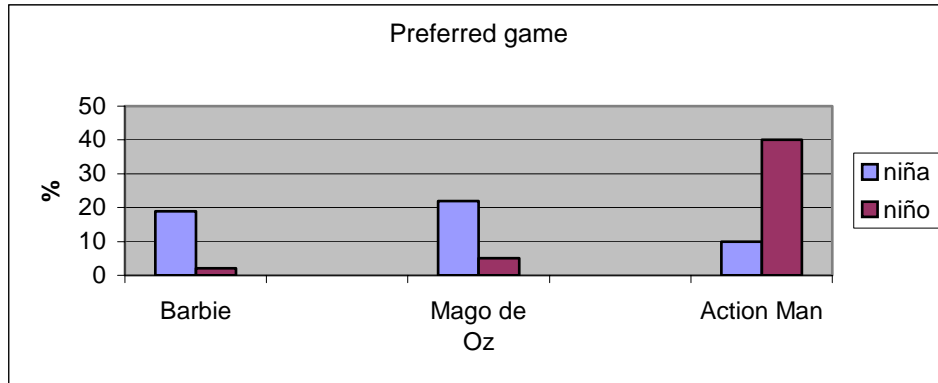
**Most outstanding results**

- Game preference

The most frequently selected game was *Action Man*.

There are significant differences by sex (according to the Chi Test 2): boys mostly choose *Action Man* and girls *Wizard of Oz* and *Barbie* (Graph 1).

Except for a very few boys and girls, the vast majority had never played any of the three games, meaning that it is a variable which has had no influence on their choice.



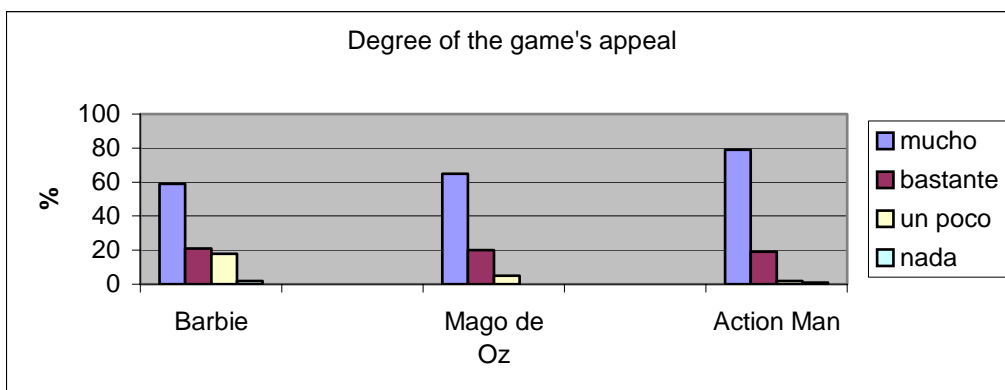
**GRAPH 1: Differences between boys and girls with regard to their preferred game**  
Text: “Barbie, Wizard of Oz, Action Man boy girl”

The reasons for choosing a game given by boys and girls are:

- In the case of *Action Man*, the emotion of the action itself (war and killing "baddies"), the adventure or the character.
- In the *Barbie* game, girls highlight the attraction of fashion, the character, or the game's activity. The few boys who choose it as their preferred game do so because of the game's activity.
- *Wizard of Oz* is chosen because of the characters, the background story, the variety of activities and the type of drawings.

- Game rating

When asked to evaluate each game, the results are that *Wizard of Oz* and *Action Man* receive almost the evaluation (Graph 2), from both boys and girls. This means that despite stereotyped and significant preferences (according to Chi Test 2) the game *Wizard of Oz* is equally liked by both boys and girls and as much as the *Action Man* game.



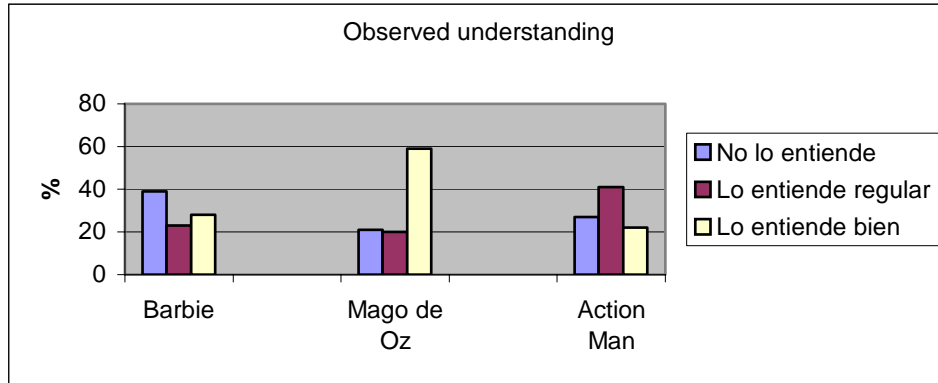
**GRAPH 2: General evaluation of each game**

Text: “Barbie, Wizard of Oz, Action Man / a lot, quite a lot, a bit, not at all”

- Understanding of the games

Understanding observed

In general, the game most understood by both sexes is *Wizard of Oz* (Graph 3), with no significant differences between girls and boys (according to Chi Test 2).

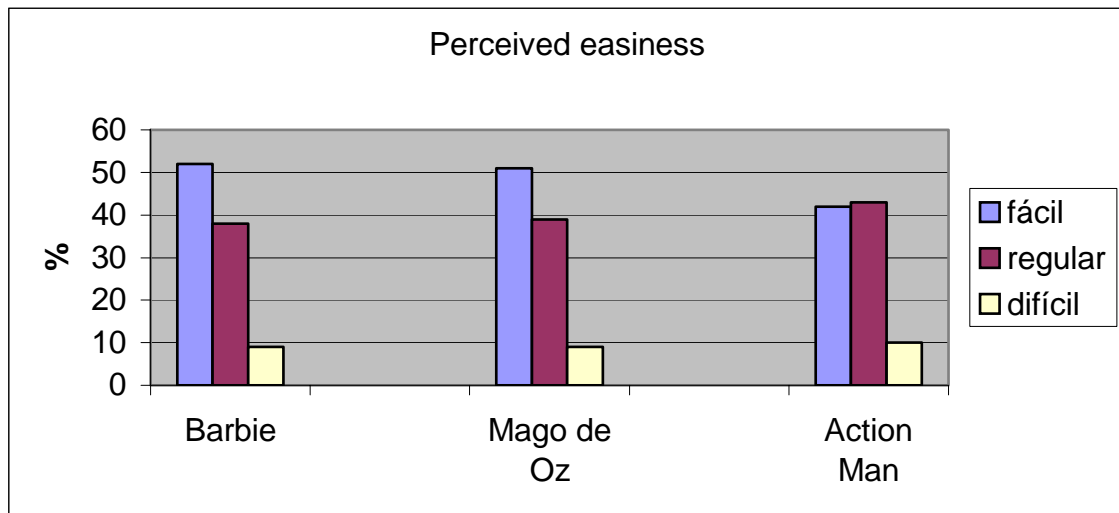


**GRAPH 3: Understanding of each game observed**

Text: “Barbie, Wizard of Oz, Action Man - Not understood / Some understanding / Understood well”

-Perceived simplicity

When asked whether they found the game easy, difficult or so-so, very few subjects found any of the games difficult, most boys and girls tend to say that they found it easy or so-so (Graph 4) except for *Action Man*, where answers of "so-so" and "easy" are equally prevalent. Neither are there any significant differences by sex (according to Chi Test 2).



**GRAPH 4: Perceived simplicity of each game**

Text: “Barbie, Wizard of Oz, Action Man - easy / so-so / difficult”

For the question "did you always know what you had to do", in most cases they say that they only knew what they had to do sometimes, although they say that they found the game easy, except for the *Barbie* game, in which the answer “I always knew what I had to do” is very common for both sexes, despite being the least understood game. We can

see that there is no relationship between the level of understanding of the game and its perceived easiness or clarity. A tendency to have a more optimistic rather than real perception can be seen.

- Understanding observed and educational level

There are significant differences according to educational level in the *Barbie* and *Action Man* games, which are mostly more understandable for third and fourth grade boys and girls. *Wizard of Oz*, however, is equally understood by all the ages analysed.

- Ease of use and attitude towards games

The results show average attitudes and skills in general, with the following significant aspects:

*Wizard of Oz* is the game in which participants display less happiness and excitement, in which it takes longer to move from one screen to another and in which they listen to the stories and/or instructions the most.

*Action Man* is the game in which the menu options are explored least, although in general, the menu options are not much explored in any of the three games.

*Barbie* is the game in which most progress is made.

In the stereotyped games - *Action Man* and *Barbie* - there are significant differences by sex with regard to competence displayed (according to Chi Test 2). Boys finish each screen first and know what they have to do with no need to ask. However, in *Wizard of Oz*, no significant differences between the sexes are observed.

- Evaluation of the games

The results show a high general evaluation for all the games, with a slightly higher evaluation for *Wizard of Oz* (in which the sounds, voices, music and feedback are particularly highly valued), followed by *Action Man* and finally by *Barbie*.

The gender-based differences show that for *Wizard of Oz*, there are no important differences between boys and girls, and when compared to other games, boys significantly reject the character of *Barbie* and her wardrobe to a greater extent, and girls do so with the character of *Action Man* (and they do not like the drawings, scenario, story or what the character does).

- Playing with computers

Girls and boys normally play with computers, without differences due to sex (according to Chi Test 2).

- Computer games they normally play

Boys play a wider variety of games. Furthermore, they particularly play games with sports themes, strategy games, graphic adventures and wargames. However, girls mainly play with educational/curricular games, drawing tools and games with well-known characters.

## ***Conclusions of the research***

The following conclusions can be drawn from the results of the study:

- There are different preferences for games depending on gender. Boys and girls prefer games that represent the characters and roles traditionally attributed to

their gender and reject those of the other, with this difference much more obvious in boys than in girls.

- Girls have less prejudices against playing with boys' games. They may even like these games, as numerous research projects reviewed point out.
- Girls like non-stereotyped games as much as the games representing their stereotypes. In the former, they mainly like having stories, a background story, a fantasy scenario or specific and varied activities.
- Despite the fact that non-stereotyped games are not boys' preferred choice, they also like them for the same reasons that girls do.

However, it is yet to be confirmed whether both genders like them because they are not stereotyped, or because of the type of game, with a theme, setting and activities which are different from the others mentioned in the study.

In any case, this general liking for software of a neutral nature and with specific characteristics as regards design and content should be taken into consideration by both the software production industry and by schools when making selections. A twofold objective would thereby be achieved: a wide-ranging audience would be reached and gender stereotyping would also be prevented.

- The games that are easier to understand, for both girls and boys, are those where there is a narration, a voice explaining the game's objectives, giving frequent instructions and providing appropriate feedback; this is especially true at first and second primary education levels. The games that are most difficult are the ones where the user has to discover for him/herself what he/she has to do and has to explore various options.
- Boys are more independent in terms of confronting the game and more competent than girls, especially in games which are more difficult for them or "arcade" type games, as shown by other researchers. However, we observed a similar attitude towards playing computer games. It would perhaps be advisable for schools to allocate time - as other researchers have pointed out, and some schools have already done - on the computer exclusively for girls, in order that they do not have to compete with boys and find themselves at a disadvantage.
- Boys and girls seem to have equal access to computers in the family context, both in terms of use and frequency of use, which contradicts the research which states that boys have more access. However, these data yet to be compared with others reported by the schools.
- There are differences in the computer games normally played by boys and girls. The findings of other research are thereby confirmed - girls prefer to make a more functional use of the computer and prefer games publicised in the media or with well-known characters. In this case, it is necessary that the industry, advertising, families and schools do their utmost to prevent stereotyped messages and to stimulate equality in games.

### ***Finally: good practices***

The impact and social importance assumed by video games in recent years is high. Consideration of them has followed a similar path. Among various examples are the founding at the famous *MIT* of the scientific magazine *Game Studies* and the publication of a book on the educational value of video games (Gee, 2003), among others.

In most cases, consoles and video games become children's first opportunity to gain access to the multimedia era. Computer games are a basic part of popular culture for our society's boys and girls (Provenzo, 1991). Indeed, many authors make convincing arguments for the importance of the inclusion of children's popular culture in their educational spaces. Leggo (1993) states that television, video games and computer games, among other electronic media, deserve our attention in classrooms because ignoring popular culture means constructing a high wall of exclusion around our schools.

However, it is not enough to encourage the introduction of computer games in schools. Educators must be very aware that these games, as part of popular culture, reproduce many of this culture's prejudices, and those that are gender-based in particular.

At a time when parents are demanding technological training and when the government is particularly concerned with including new technologies in schools, it is very clear that it is necessary to reflect - from the prospect of gender - on the implications of using new technologies in the classroom.

If we do not wish to perpetuate the circle of inequality and exclusion, we must try and provide boys and girls with experiences with computers which reflect the many uses of the tool, including games. Girls must receive the attention and support that have so far been lacking in the multimedia industry in order to come closer to computer games.

It is possible to find multimedia games which because of their characteristics, attract boys and girls, regardless of gender, as the research presented here shows. These "good" games share several characteristics, including interesting stories, character appeal, clarity of rules and objectives, a variety of activities and strategies which make the player become involved. These characteristics, among others, make a computer game motivating and make boys and girls want to continue using them in order to improve and become better players.

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