RESEARCHING GENDER & ICT IN KINDERGARTEN

Eduarda Ferreira[1] and Maria João Silva[2]

[1] Interdisciplinary Centre of Social Sciences (CICS.NOVA), Faculty of Social Sciences and Humanities (FCSH/NOVA)

[2] Escola Superior de Educação, Instituto Politécnico de Lisboa

ICT are increasingly pervasive and embedded in everyday interactions and objects, constituting a relevant aspect of social identities. Nonetheless, ICT continues to be a highly gendered area of life in all socioeconomic and educational backgrounds, and a source of significant social inequality in enduring ways. This paper reports on an ongoing research project 'Gender@ICT', which explores the interrelations of gender and technologies in an educational context in Portugal, based on group activities (games with images related to ICT and gender), focus groups and semistructured interviews. This paper presents the results of the group activities and focus groups with preschool children, analysing their representations on gendered activities and behaviours. Most children evidenced stereotyped representations on ICT and gender, reproducing the ICT gender gap. Only the few children that reported diverse gender representations at home disclosed more gender inclusive perceptions of ICT, evidencing the importance of diversity in gender representations.

Keywords: Gender, ICT, Kindergarten

RESEARCH FOCUS

'Gender@ICT' research project aims to explore the embodied relationship between gender and Information and Communication Technologies (ICT) in preschool and 9th grade, based on the understanding that both gender and technologies are social constructions (Wajcman, 2007). This research draws upon Feminist Technology Studies (FTS) theorizing the relationship between gender and technology as one of mutual shaping. Objects and artefacts are not seen as separate from society, but as part of the social fabric that holds society together; technology is understood as a sociotechnical product – a fluid network combining artefacts, people, organizations, cultural meanings and knowledge (Bijker et al. 1987; Law & Hassard 1999; MacKenzie & Wajcman 1999).

Considering that technologies are increasingly pervasive and embedded in everyday interactions and objects, constituting a relevant aspect of social identities, and that research often reports on "ICT gender gap" (Kay, 2008), our problem is centred on how do technologies affect and are affected by gendered practices.
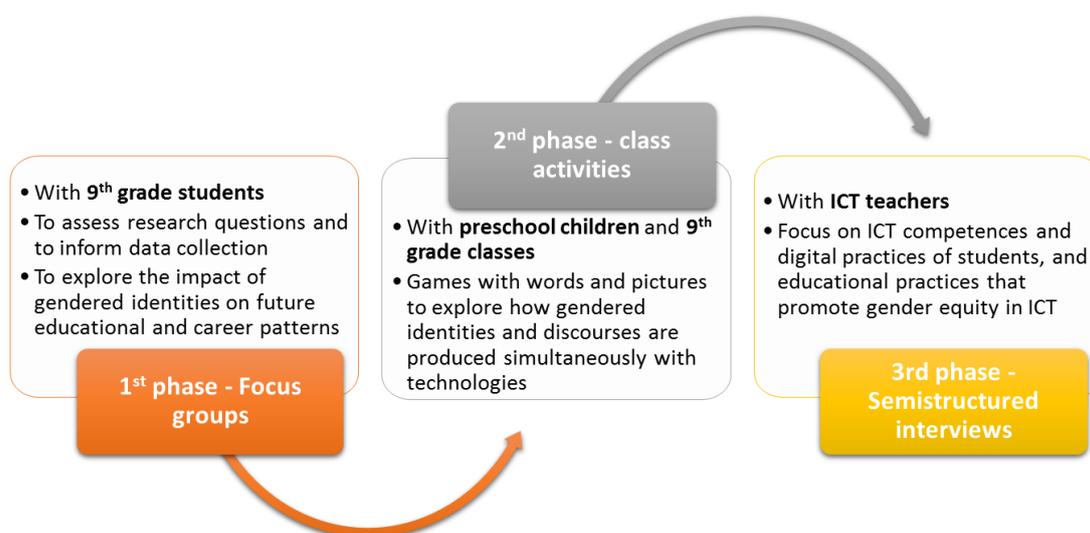
To fully participate in the economic, social and cultural life people need the competences to navigate through a complex digital landscape (OECD, 2015). Nowadays, there are still differences between girls and boys in what concerns self-reported digital competences and experience with computers, even in countries where there is gender and socioeconomic equality in access to school. These differences do not reflect material constraints, but rather the students' interests and families' and educators' notions about what is suitable for them (OECD, 2015).

'Gender@ICT' adopts a critical discourse perspective in which gender differences in ICT use are understood as a result of gender-technology and power-knowledge relations (Faulkner & Lie, 2007), aiming to disclose the tension between agency and structure that is worked out by individuals in particular contexts. One must consider that gender is not universal, it is the culturally local behavioural expressions of an internalized individual identity that includes understandings of masculine and feminine, tailored to the specific culture in which a child develops (Trautner et al., 2005). Gender identity is a pattern in time, it is shaped by the preceding dynamics of physical, social, and emotional experience and becomes the basis of future identity transformations (Fausto-Sterling, 2000).

Considering the stages of gender identity development, the research on ICT and gender in early education is of central importance, and there is still a need for such research (Kay, 2008). In this context the research question of this study is: "How does gender makes a difference in the construction of individuals' relations to ICT?". The research developed in two kindergartens is presented in this paper.

METHODOLOGY

The 'Gender@ICT' research project has three phases (Figure 1) which include focus groups, class activities (games with words and pictures related to ICT and gender) and semistructured interviews, developed in a school context. The focus groups with 9th grade students inform the structure and content of the class activities, and the semistructured interviews with ICT teachers contribute to further explore the gendered representations associated with ICT and to identify educational practices that promote gender equity. The class activities with preschool children and 9th grade students engage mixed-sex groups in games with words and pictures to explore how gendered identities and discourses are produced simultaneously with technologies. Researching with preschool children (around 4/6 years old) and 9th grade students (around 14/15 years old) give us the opportunity to analyse gender stereotypes in different stages of development. This paper reports on the results of the group activities and focus groups with preschool children.

2nd phase - class activities

- With **9th grade students**
- To assess research questions and to inform data collection
- To explore the impact of gendered identities on future educational and career patterns

1st phase - Focus groups

- With **preschool children** and **9th grade classes**
- Games with words and pictures to explore how gendered identities and discourses are produced simultaneously with technologies

- With **ICT teachers**
- Focus on ICT competences and digital practices of students, and educational practices that promote gender equity in ICT

**3rd phase - Semistructured interviews**

Figure 1 – Gender@ICT research phases

This research took place in two kindergartens of a school cluster in Setúbal, Portugal. The school cluster Sebastião da Gama, where the research takes place, has seven schools: two preschools and 1st cycle, three 1st cycle, one 2nd and 3rd cycle, and one 3rd cycle and secondary, with a total of 135 classes and about 3.000 students. Students' age ranges from 4 years old to 18/20 years old. The educational system in Portugal is divided into preschool (for those under age 6), basic education (9 years, in three cycles) and secondary education (3 years).

The researcher who conducted the activities and groups is an educational psychologist in that school cluster. As such, the researcher was not an outsider, and the research data were collected within a familiar context for the participating children. Researching with preschool children requires that: focus groups should be similar to "natural groups" (i.e., pre-existing social groups, such as friends, classmates, etc.), conducted in informal peer group settings such as classroom situations, and the location of the research should be familiar to the child (Irwin & Johnson, 2005). The group activities and focus groups with preschool children, aged from 4 to 6 years old (14 girls and 18 boys), were conducted during November and December 2016 in children's kindergarten and explored their representations on gendered activities and behaviours. Focus groups were organized with mixed-sex groups with 4/5 children while engaging in games with images to explore how gender relations are materialized in technology and how gendered identities, discourses, and technologies are produced simultaneously.

Children were asked to describe 4 images: the woman with the laptop, the man with the laptop, the woman with children, and the man with children (Figure 2). The laptop with the screwdriver was meant to direct the conversation to broken laptops, so that the conversation was not only about using computers but also about how to fix them.
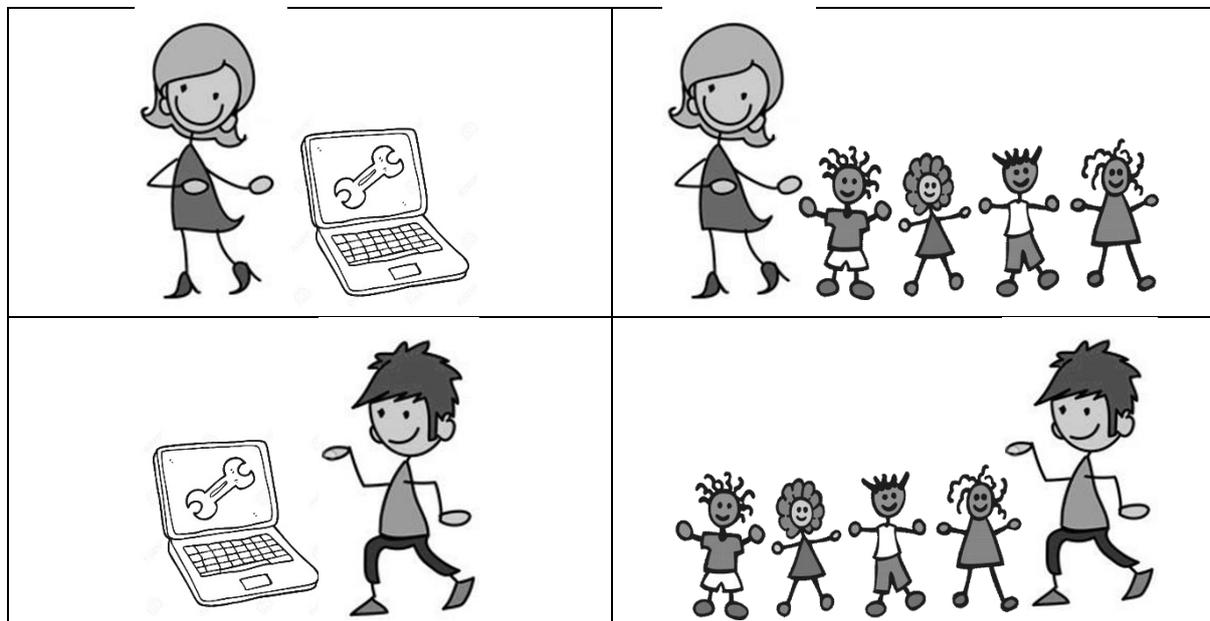

Figure 2 – Images used in the activities: woman with the laptop, man with the laptop, woman with children, and man with children

From a set of images (Table 1) children had to decide which toys would girls and boys more probably receive at Christmas. They had to argue and discuss until they decided. The images were all randomly spread over the table.

Table 1 - Images of toys
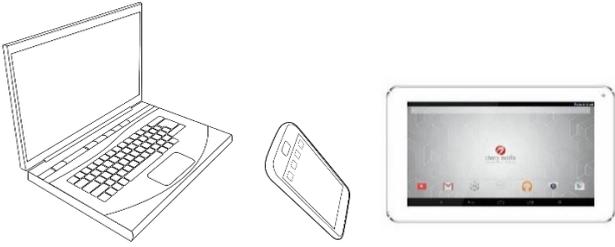
ICT related	
"Boys' toys"	
"Girls' toys"	

| **More gender-neutral** | |
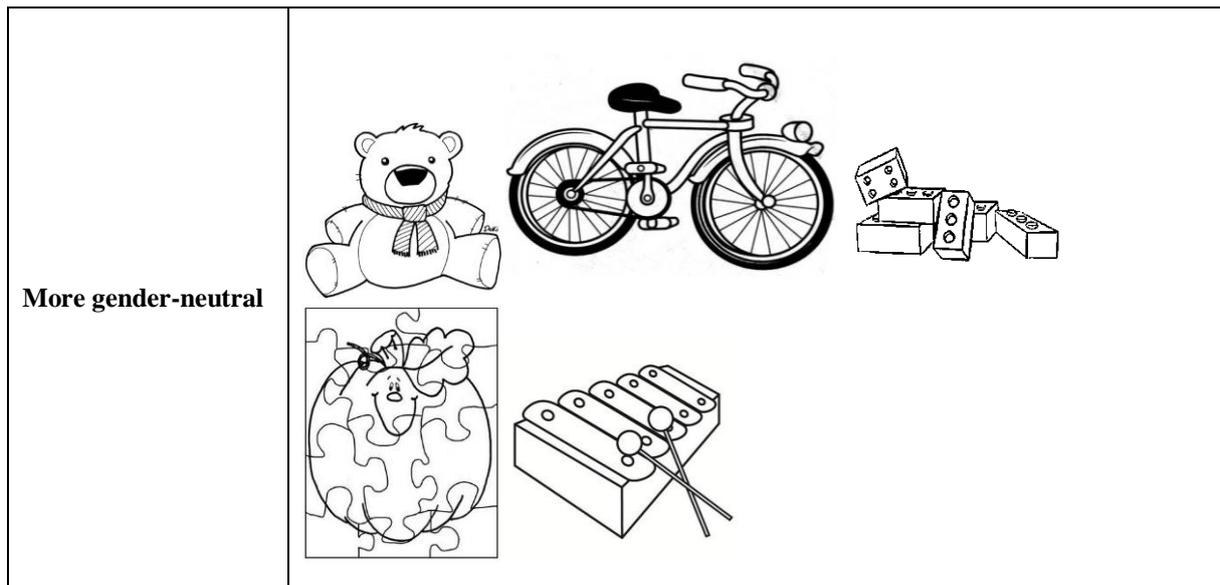
The discussions during the group activities were audio-recorded, transcribed and analysed.

RESULTS

It was possible to observe some specificities of researching with preschool children in kindergarten. For example, occasionally a child stands up and says, "I have to poo", and before children engage with the tasks they thoroughly touch and explore all the images.

In the images showing children and adults (Figure 2), the participants almost always identified the woman as a teacher and the man as a relative (father, brother) or physical education teacher. These ideas are clearly related to their experience, there are almost no kindergarten teachers in Portugal (only 0,2% of Portuguese kindergarten teachers are male) and it is common that the men who work in the Portuguese kindergartens relate to physical education. When asked about what the woman and the man would do if the laptop was broken, only 4 (3 boys and 1 girl) out of 32 children mentioned the possibility of the woman repairing it, although many also said that the man would go to a repair shop. In the discussion, it was clear that for all the children only men work in computer repair shops. Dialogue about repairing computers:

If the computer is not working she cannot do anything, she will go to a repair shop. Participant 3, Boy, 4 years old

She cannot fix the computer because she is a woman; she is not a man. Participant 6, Boy, 4 years old

She can ask a man to fix the computer. Participant 1, Girl, 5 years old

The ones who fixes the computers are the men. Participant 10, Boy, 5 years old

There are only men working in computer repair shops. Participant 9, Girl, 4 years old

The 4 children who interpreted an image as a woman repairing a computer, have direct experience with women who use it every day.

The social cultural context strongly socializes children, according to gender stereotypes; in particular toys' marketing is highly gendered (Trautner et al., 2005). As such, in the game with

toys' images, unsurprisingly toys were mostly attributed according to gender stereotypes. Children showed difficulties in deciding about the more gender-neutral toys, and the decisions varied from group to group.

The reasons children present to decide on which toys they attribute to either a girl or a boy are closely related to their experiences at home.

One of the girls said that the ironing board could also be for a boy because her father also uses it. The other children reacted immediately saying that this was not true because their fathers did not use the ironing board. It is almost always about their own personal experience. Dialogue about pots and pan:

Pots and pans are for the girl, boys don't cook. Participant 12, Boy, 4 years old

No, it can be for both, they both can cook, my mother cooks and so does my dad. Participant 14, Girl, 5 years old

No, no, only for girls, my mother cooks, but my father never cooks. Participant 2, Girl, 4 years old

The importance of social representations and changes in the gender social roles also have an impact. As an example, when they talk about weapons:

The weapon can also be for the girls. Participant 7, Girl, 5 years old

Yes, it can be because women can be cops, they can go to the army. Participant 17, Boy, 5 years old

Although they had this conversation they ended up deciding to attribute the weapon to the boy.

In line with the literature regarding ICT related toys (Trautner et al., 2005), all the boys and most of the girls attributed the laptop to boys, and the tablet and the smartphone were more equally attributed to both (Figure 3).
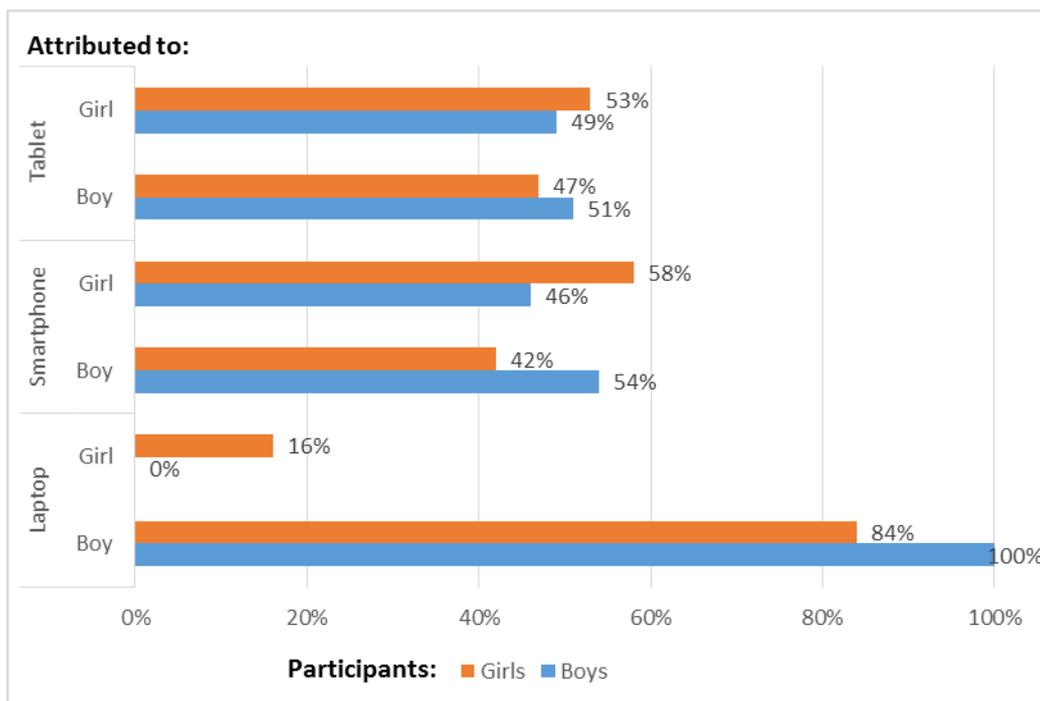

Figure 3 – Results of the game with ICT related toys' images

It is interesting that there is a significant difference between laptops and mobile devices. The use of mobile devices by girls, such as smartphones and tablets, is on clear rise, according to recent research (Ponte et al., 2017). One may question if the rise of girls using mobile technologies will have consequences on the interrelations between ICT and gender. At the present time the representations of ICT are still gender marked.

Most preschool children evidenced stereotyped representations on ICT and gender, reproducing the ICT gender gap. Only the few children that reported diverse gender representations at home disclosed more gender inclusive perceptions of ICT, evidencing the importance of diversity on gender representations.

CONCLUSIONS

The results of the first phase of research with the 9th grade students (Ferreira, 2017) revealed that gender stereotypes are deep-rooted amongst young people, in a time of their lives when they have to make academic choices that lead to professional careers. The way students identified gender practices and justified gender technological preferences illustrated how gender stereotypes are materialized in technology. In the discourse of the participants in focus groups, gender markers correlate to technology usage. Gender stereotypes can influence and determine the future educational and professional choices of young people, contributing to maintain the stereotypes, in a cyclical process. Schools have an important role to disrupt this cyclical process, supporting the diversity of students' interest and encouraging both girls and boys to further develop their technological competencies.

ICT is highly related to gender stereotypes, which affect boys and girls' representations and practices, including their educational and career choices (Faulkner & Lie, 2007). Considering the stages of psychological development and gender identity, the cross analysis of the 'Gender&ICT' results of the research with preschool children with teenagers of the 9th grade, contributes to further explore how do ICT affect and are affected by gendered practices.

The research with preschool children evidenced that gender stereotypes are present from early ages, and in particular ICT related activities are perceived as highly gendered by young boys and girls. By analysing the choices and the discussions of the participant children, it is possible to say that ICT representations function as gender markers. These results indicate that intervention must start as early as possible, and kindergarten is of crucial importance to implement educational activities that promote a diversity of gender representations, namely those related to ICT activities. One cannot expect that educational initiatives to question and disrupt gender stereotypes with teenagers have significant impact, considering that it is much earlier ages that gender stereotypes are established.

Although girls are using digital mobile devices as much as boys, the laptop is still highly gendered. The laptop is related to ICT professions as it was disclosed by the activities with the images of the 'woman with the laptop' and 'man with the laptop'. The representations of laptops and ICT related professions are as gendered as the industry of children's toys. Based on these results we argue that ICT, namely laptop and ICT related professions, function as gender markers. One may ask if the usage of digital mobile devices by girls will have an impact

in ICT representations, namely in ICT related professions? Considering that digital mobile devices are more related to communication and interpersonal relations, stereotyped female activities, than with professions or work activities, it is likely that it won't have a significant impact.

The next phase of 'Gender@ICT' research will explore the ideas and experiences of ICT teachers with both girls and boys using technology. ICT teachers have a privileged insight on young people digital practices, their views will be complementary to the results of the focus groups and class activities with children and young people. The semistructured interviews with ICT teachers will also contribute to identify educational practices that promote gender equity in ICT.

The school has a major role in promoting gender equality by providing diverse gender representations to children from all sociocultural contexts. In particular, school can make the difference to children who do not have access to a diversity of gender representations at home. It is urgent that gender equity becomes central to education. By gender equity we are not referring to equal numbers of men and women using technology, but as expressed by OECD (2015), to greater levels of self-determination for all genders, a much greater range of opportunities for being gendered and more equal distribution of power.

REFERENCES

Bijker, W., Hughes, T. & Pinch, T. (Eds) (1987). *The Social Construction of Technological Systems*. Cambridge: MIT Press.

Faulkner, W. & Lie, M. (2007). Gender in the Information Society: Strategies of Inclusion. *Gender, in Technology and Development*, 11 (2), 157-177.

Fausto-Sterling, A. (2000). *Sexing the body: Gender politics and the construction of sexuality*. Basic Books.

Ferreira, E. (2017). The co-production of gender and ICT: Gender stereotypes in schools. *First Monday*, 22(10).

Irwin, L. G. & Johnson, J. (2005). Interviewing young children: Explicating our practices and dilemmas. *Qualitative Health Research*, 15(7), 821–831.

Kay, R. H. (2008). Exploring gender differences in computer-related behaviour: Past, present, and future. In T .T. Kidd & I. Chen, *Social Information Technology: Connecting Society and Cultural Issues* (pp. 12-30). Hershey, PA: Information Science Reference.

Law, J. & Hassard, J. (Eds) (1999). *Actor-Network Theory and After*. Oxford: Blackwell.

MacKenzie, D. & Wajcman, J. (1999). *The Social Shaping of Technology*, Second edition. Milton Keynes: Open University Press.

OECD (2015). *Students, Computers and Learning: Making the Connection*. Paris: OECD Publishing.

Ponte, C., Simões, J. A., Batista, S., Jorge, A., Castro, T. S. (2017). *Crescendo entre ecrãs. Usos de meios eletrónicos por crianças (3-8 anos)*. Lisboa: ERC – Entidade Reguladora para a Comunicação Social.

Trautner H.M., Ruble D.N., Cyphers L., Kirsten B., Behrendt R., Hartmann P. (2005). Rigidity and flexibility of gender stereotypes in children: Developmental or differential? *Infant and Child Developme*nt, 14, 365–380.

Wajcman, J. (2007). From Women and Technology to Gendered Technoscience. Information. *Communication & Society*, 10 (3), 287–298.