

Diferencias de género en el uso de las TIC. El profesorado y las TIC

Autor: Balibrea Ríos, Marina (Graduada en Estudios Ingleses).

Público: Secundaria. **Materia:** Inglés e Informática. **Idioma:** Español.

Título: Diferencias de género en el uso de las TIC. El profesorado y las TIC.

Resumen

Dado que las TIC son extremadamente beneficiosas dentro y fuera del contexto escolar, y es escasa la información que existe sobre por qué las estudiantes tienden a estar por detrás de sus homólogos masculinos en cuanto a su uso, este artículo analiza el rol del profesorado de secundaria, quienes, en numerosas ocasiones, promueven y mantienen los estereotipos asociados a las diferencias de género, y cuyo comportamiento (consciente o inconscientemente) sitúa a las adolescentes en un segundo plano en cuanto a las TIC se refiere.

Palabras clave: TIC, Diferencias, Género, Desigualdad, Profesorado, Estrategias.

Title: Gender differences regarding ICT. Teachers' attitudes towards ICT.

Abstract

Since ICT are extremely advantageous in and out of the school context and very little is known about the reasons why female students seem to be backward if compared with their male counterparts and missing many of these technological benefits; this review analyses what the scientific literature produces regarding the role of secondary teachers who, in many occasions, act as developers and maintainers of many of these gender differences and stereotypes, and whose behavior towards students – consciously or unconsciously- places girls in a second position when it comes to ICT.

Keywords: ICT, Differences, Gender, Inequality, Teachers, Faculty, Strategies.

Recibido 2018-02-16; Aceptado 2018-02-22; Publicado 2018-03-25; Código PD: 093078

1. INTRODUCTION

The selection of this specific subject to carry out a literature review is based on the increasing presence and relevance of Information and Communication Technologies (ICT) in almost all domains of our daily lives, especially in educational contexts such as schools and high schools. The information about all the aspects related to this topic brings to light the evident gender differences related to ICT in terms of use, preferences and attitudes among others.

Therefore, considering that technology and that the role of women in this field are current topics, the main aim of this research will be, firstly, to capture what the scientific literature has produced about these two issues and, secondly, to analyse the gender differences found in the teachers' attitudes towards ICT.

2. THEORETICAL FRAMEWORK

The constant advance of the world requires schools and education to adapt to all the rapid changes in order for students to become citizens prepared to confront the different situations that take place in life. Considering that technology is completely present in all spheres of everyday life, according to Collins & Halverson, its increasing introduction in education has been inevitable since it is obvious that it may improve education if used in a responsible manner. However, although this panorama looks to be gradually progressing, there are still many schools which seem to be trapped in the 19th century, rejecting the usage of ICT in the school context (2009).

Since the first introduction of computer applications in education back in the 80s, which were merely restricted to drill-and-practice, instructional programs and programming; and due to the knowledge revolution which caused the transition from physical labor to people's minds interacting with powerful tools (Collins & Halverson, 2009), the use of technology in education has swiftly developed, and a wider range of educational programs have been introduced, such as word processors, databases and spreadsheets first (Volman & van Eck, 2001), and digital educational games (Steiner, 2009), social networks designed especially for education such as Edmodo, RedAlumnos or Educanetwork as well as other social

networks more massive like Facebook, Twitter, blogs (Barragán & Ruiz, 2013), mails, forums, photo or video sites, instant messaging, Internet and telephony (Buchmüller et al., 2011) that can be used as learning tools more recently.

Much research has been made in relation to the benefits and advantages of using ICT with educational purposes in school contexts. Research by Román and Murillo supports that nowadays Internet is directly linked to the acquisition of knowledge: “access to knowledge, its construction, appropriation, application, communication and transference are inevitably and intimately tied to digital technological resources and virtual social networks” (2012, p. 1109).

This exemplifies the current technological world we live in, where digital tools are constantly appearing in our daily life, changing the way in which people communicate and learn, and in which especially secondary students and teenagers are fully absorbed.

This generation of people, who were born when computers had already been created, and who spend lots of hours near digital devices such as computers, tablets, (smart) mobile phones and digital games; have been grouped together by many authors and researches under the name of ‘Digital Natives’, a term that was created by Prensky in 2001 (Demirbilek, 2014, p. 115).

Furthermore, Prensky also invented the term ‘Digital Immigrants’ to refer to the rest of population, those people who might be able to use and learn from these technologies but whose language and way of communicating are totally different from those of the ‘Digital Natives’ (Gisbert & Esteve, 2011).

Besides, the availability of ICT in schools, especially Internet, creates an educational environment where students have an active, self-directed and constructive role when dealing with new knowledge, transferring the results obtained to everyday situations occurring outside school, something which is less likely to happen in traditional teaching/learning environments (Volman & van Eck, 2001). This self-directness leads students to take the initiative with or without external help, to realize about what they need in their learning process, to set their own objectives, to recognize and identify several learning resources, to choose from the different learning strategies the most adequate and, finally, to evaluate their learning outcomes (Choi & Ah Park, 2013).

ICT not only favours the interactive and collaborative learning, arousing students’ valuation, motivation and success during the learning process; but also it increases the applicability of their learning into real contexts and daily situations (Barragán & Ruiz, 2013) and, as Collis et al. (2001) claimed, the possibility of providing students with authentic feedback. Educational ICT include a wide range of activities that improve students’ creativity and prepare them for the global workforce (Purushothaman, 2014). As Heemskerk et al. state, the use of technologies makes a huge contribution to “educational equality” (2005, p. 1), expanding access, efficiency, quality of learning and teaching, lifelong learning and promoting preparation for the workplace through them (Yee Mar, 2004).

But for all these benefits and advantages to have a real impact on students, there are some factors which need to be present when introducing ICT in the teaching and learning process: “access to ICT and adequate infrastructure”; “intensity or frequency of use by teachers and students”; “contextualized integration in line with curricular objectives”; “teachers’ pedagogical focus or vision”; “teachers’ capacity or competency to manage and use these resources”; “the characteristics of the implied innovation of the technological resources” and “the value of usefulness of the ICT impact on learning” (Román & Murillo, 2012, pp. 1112-1113).

However, although the benefits of using ICT in schools are evident and the number of educational applications and programs are progressively appearing, their usage is in many cases still reduced to a) replace teachers’ work in distance education or b) improve and extol the role of the teachers, leaving students without any possibility to use ICT for simply learning (Yee Mar, 2004).

These differences between males and females regarding ICT, which are named ‘gender digital divide’ or ‘gender digital gap’ also refer to the inequalities of access, usage and attitudes between them. In fact, this gender gap has been recognized by the Unesco as the most meaningful disparity created by the digital revolution (Botturi et al., 2012). The digital gender gap not only refers to access and use type, but also to the scarce presence of women in virtual spaces, the absence of women in both public and professional spheres, their limitation to the domestic life, the lack of broadcasting related to women’s contribution to science, the exclusion of the feminine gender in the language use, the reproduction of gender stereotypes and roles, the non-inclusion of motivating contents for both women and men, and the scant feminine representation of role models to reach (Barragán & Ruiz, 2013). Moreover, the digital divide also includes differences

regarding knowledge and skills to use Internet, social and cultural structures that influence Internet usage attitudes, autonomy of use, utility value, background and psychological factors (Purushothaman & Zhou, 2014).

Since ICT are extremely advantageous both in and out of the school context and given the fact that very little is known about the reasons why female students seem to be backward if compared with their male counterparts, and missing many of these technological benefits; the main aim of this sample will be to explain in detail how the teachers' attitudes and the gender differences between female and male teachers contribute to the creation and maintenance of the 'gender digital gap' in secondary education. Therefore, special attention will be paid to examine the role of secondary teachers who, in many cases, act as the developers and maintainers of many of these gender differences and stereotypes, and whose behaviors with the students –consciously or unconsciously- place girls in a second position when it comes to ICT. Some strategies will be provided at the end so as to reduce the breach between girls and boys in secondary education when it comes to ICT.

3. TEACHERS' ATTITUDES AND GENDER DIFFERENCES

Teachers should be the ones responsible for providing all the conditions needed for students to be equally 'successful through the interplay between humans and machines' (Mukama & Andersson, 2007, p. 158) by, firstly, teaching ICT, which is teaching how to use ICT effectively and then; teaching with ICT, which allows students to become active and reflective learners with ICT. That teachers play an important role in a classroom is undeniable, however, in some cases, they still contribute to the creation of differences between girls' and boys' computer usage. They are still considered to carry 'hidden messages' about boys' and girls' ability or capacity to work with technology. Teachers interact with students in ways that may give the impression that boys are, by nature, better with computers than girls are. In some cases, teachers think that boys are more interested in computers than girls and, for that reason, they enjoy teaching boys more than teaching girls. Furthermore, teachers contribute to the stereotyping by taking over more quickly at the computer for girls and assuming expertise in boys. Due to all these prejudices and stereotypes present in teachers, they ask more questions to boys in computer lessons, who also receive more feedback than girls. (Volman & van Eck, 2001).

But gender differences regarding ICT not only appear in secondary students, they are also given in secondary teachers who experience differences related to ICT usage, confidence and attitude, as well as differences in both their basic and advanced technological abilities (Almerich et al., 2005). These differences in teachers may exert a very negative impact on girls, who do not see close female role models to whom look at.

A study carried out by Mukama and Andersson, in which 18 teachers responded to some questionnaires, shows some of the most noticeable differences between women and men. They agreed that for their teaching activities they were able to use 'Microsoft Windows (women 10/12, men 5/6), word processing (women 5/10, men 6/6) and spreadsheets (women 3/12, men 6/6) in their activities of teaching and learning'. Some reported to use 'Internet (women 3/12, men 4/6) and e-mail (women 4/12, men 4/6) in their activities of teaching and learning'. Only two women recognized being 'able to use Microsoft Power Point', while nobody used Microsoft FrontPage or Microsoft Access. Curiously, female teachers went more frequently to the computer lab than males, concretely, women went an average of 2.6 days per week, while men went 2.3 days per week (Mukama & Andersson, 2007, p. 161). As it can be seen, female teachers do not integrate ICT in their classrooms as often as their male counterparts.

According to Almerich et al., who made a questionnaire to 868 male and female teachers from 20 to 65 years old, male teachers show better and superior computer knowledge than female teachers, placing the biggest difference in hardware and software installation and computer maintenance, and being the minimum difference in the usage of computer applications. Male teachers have advanced knowledge on navigating the operating system, on text editors and on Internet as a source of communication. They have basic knowledge on software and hardware installation, on computer maintenance and on Internet as a form of communication. Finally, male teachers present good knowledge on spreadsheets, databases, presentations and audiovisual medium and limited knowledge on educational software, applications and web design. However, female teachers present basic knowledge on navigating the operating system and on text editors while they have basic knowledge on Internet both as a form of communication and as a source of information with some limitations (Almerich et al., 2005).

For Wong et al. (2012) this panorama demonstrates that one of the main reasons why ICT have not completely transformed the learning process is that there are still many teachers who have not been properly trained in adequate teaching applications. In fact, teachers who do include ICT in their classes are the minority. This happens because there is

a high number of senior teachers that did not have any computer education when in school, and they need to learn how to solve technical problems, the workings of the basic teaching applications as well as different strategies to increase motivation in both girls and boys equally.

4. STRATEGIES TO PREVENT ICT GENDER INEQUALITY

Any process intended to improve gender inclusiveness and to prevent the existing gender gap or gender inequalities in secondary education should begin with a deep analysis of the state of the educational system, taking into account both the social and cultural implications of the technology which is aimed to be introduced, and contemplating the possibilities of adopting it. Then, providing with adequate quality wireless and networking facilities, and overcoming the problem of low speed which leads to declining motivation. Cooperation and innovation among government, ICT industries, educational administrators and society are essential for the gender gap to be progressively reduced. Besides, large investments from private donations, community support, membership fees and public subsidies are required in order to finance the costs. Technical support from specialists of the school or external staff would be recommendable in order to guarantee the viability of Internet and the rest of technologies in general. Moreover, different approaches should be available for girls and boys in order to foster their creativity as well as the implementation of motivational activities and tasks.

As far as teachers are concerned, a paramount strategy consists of training teachers to introduce technology in their classes and use it in an appropriate manner (Purushothaman & Zhou, 2014) since, in many occasions, they act as conscious and subconscious creators and maintainers of these gender inequalities among students.

All these steps and measures would be directed not only to improve females' role regarding ICT, but also they would be addressed at recovering and improving the education process. It seems undeniable that only through the improvement of education –including ICT integration- can women achieve gender equity.

5. CONCLUSION

Although the benefits and advantages of using Information and Communication Technologies (ICT) in the educational context –especially with adolescents in secondary education- are more and more noticeable, and even though secondary schools are increasingly adapting to the rapid advance of the world in terms of technology, there are still many factors contributing to the 'gender digital gap'. These factors create several inequalities between females and males related to access, usage and attitudes; and very frequently these agents act as barriers for girls, who feel reluctant to use educational ICT. In that sense, in many occasions teachers reinforce the gender differences regarding ICT in female and male students of secondary education, since the 'gender digital gap' is also present among female and male teachers.

Research proves that, apart from the socioeconomic factors and the students' preferences and attitudes, teachers' attitudes and experience affect differently to female and males, being women the most harmed, and therefore, having a negative influence in female students.

The role of teachers is paramount in the creation and maintenance of these gender and stereotypical differences regarding ICT use in schools and high schools. In many cases, they still interact with students in ways that favor boys, such as asking more questions to them and giving them more feedback (Volman & van Eck, 2001). Apart from teachers' different behavior towards the students, they also exhibit gender differences in terms of ICT use, attitude and technological abilities (Almerich et al., 2005). Moreover, female teachers do not tend to integrate technology in their classes as frequently as male teachers (Mukama & Andersson, 2007). All these facts have a negative impact on girls who, in addition, do not find female role models to whom look at or with whom feel identified.

Taking into account that the persistent gender differences regarding ICT usage still contribute to the 'gender digital divide' and, in turn, create gender inequalities; the educational system should be improved, since only through education can females achieve equality. This improvement also involves technology, which should be provided and used differently from the way in which is nowadays. To begin with, an analysis of the implications of the technology aimed to be introduced needs to be done, considering the possibilities of adopting it. Furthermore, schools should be equipped with adequate technological facilities which do not dispel students from using ICT. Apart from cooperation among government, industries and social and educational administrators; different learning approaches should be provided for girls and boys in order to increase their motivation and their creativity (Purushothaman & Zhou, 2014).

The design of educational games should be adapted to the preferences and interests of both genders because if not one of them –girls or boys- would be at a disadvantage (Steiner et al., 2009). With regards to the material content, attention must be paid to the language used, avoiding gender stereotypes and respecting gender paradigms, metaphors and examples (Schinzel, 2008). For course materials to be gender inclusive, males and females should be equally involved in the design of educational games, since it may contribute to girls' engagement and successful performance (Steiner et al., 2009).

A recommendable strategy would be training teachers to integrate ICT in their classes properly, helping both genders equally (Purushothaman & Zhou, 2014). Finally, Barragán and Ruiz (2013) note more advisable measures with the aim of increasing gender equity, such as reproducing the message in both genders, or using an impersonal mode.

Throughout this review, we have become aware of the importance and benefits of using ICT in secondary education, since technology acts –if used in a responsible and egalitarian manner- as a fundamental tool to use with the aim of preparing citizens to adapt and participate in this constant developing world. As technology is more and more essential in our daily lives it seems unfair that males and females cannot enjoy its benefits equally due to the 'gender digital divide', which still creates barriers for females to have a positive attitude towards educational technologies, especially Internet, and to access ICT. Most of the authors used for this review agree on the powerful effect that secondary education has in order for gender differences to finally be broken and that ICT should be used to eradicate them.

Although current teachers seem to be quite traditional on their practices and exerting a negative influence especially on females, it is obvious that this situation is starting to shift, improving the students' learning process. New generations of teachers who grew up in this technological era, taking part on it as 'digital natives' are expected to use their experience with ICT in their classes and integrate them by taking into account part of the scientific production used for this review, since it may become rather valuable information to keep in mind when implementing technology in our future classes.

What seems undeniable is that gender equality is essential in all spheres of life and it seems obvious that only through the improvement of education –including ICT integration and equal use- can females achieve gender equity in terms of technology and in every area of life.

Bibliografía

- Almerich, G., Suárez, J., Orellana, N., Belloch, C., Bo, R., & Gastaldo, I. (2005). Diferencias en los conocimientos de los recursos tecnológicos en profesores a partir del género, edad y tipo de centro. *RELIEVE – Revista Electrónica de Investigación y Evaluación Educativa*, 11(2), 127-143.
- Barragán, R., & Ruiz, E. (2013). Gender divide and digital inclusion. The potential of social networks in education. *Profesorado: Revista de Currículum y Formación del Profesorado*, 17(1), 309-323.
- Botturi, L., Bramani, C., & Mccusker, S. (2012). Boys are like girls: Insights in the gender digital divide in higher education in Switzerland and Europe. *Journal of Universal Computer Science*, 18(3), 353-376.
- Buchmüller, S., Joost, G., Bessing, N., & Stein, S. (2011). Bridging the gender and generation gap by ICT applying a participatory design process. *Personal and Ubiquitous Computing*, 15(7), 743-758.
- Choi, J., & Park, E. A. (2013). Epistemological beliefs and self-directedness in learning of South Korean middle school students. *Asia-Pacific Education Researcher*, 22(4), 541-548.
- Collins, A., & Halverson, R. (2009). The technology enthusiasts' argument. In *Rethinking Education in the Age of Technology: The Digital Revolution and Schooling in America* (pp. 9-29). New York, NY: Teachers college press.
- Collis, B., De-Boer, W., & Slotman, K. (2001). Feedback for web-based assignments. *Journal of Computer Assisted Learning*, 17, 306-313.
- Demirbilek, M. (2014). The 'digital natives' debate: An investigation of the digital propensities of university students. *Eurasia Journal of Mathematics, Science and Technology Education*, 10(2), 115-123.
- Gisbert, M., & Esteve, F. (2011). Digital Learners: la competencia digital de los estudiantes universitarios. *La Cuestión Universitaria*, 7, 48-59.
- Heemskerk, I., Brink, A., Volman, M., & Dam G. (2005). Inclusiveness and ICT in education: a focus on gender, ethnicity and social class. *Journal of Computer Assisted Learning*, 21(1), 1-16.
- Mar, N. Y. (2004). Utilizing information and communication technologies to achieve lifelong education for all: A case study of Myanmar. *Educational Research for Policy and Practice*, 3(2), 141-166.
- Mukama, E. & Andersson, S.B. (2007). Coping with change in ICT-based learning environments: Newly qualified Rwandan teachers' reflections. *Journal of Computer Assisted Learning*, 24(2), 156-166.
- Purushothaman, A., & Zhou, C. (2014). Change toward a creative society in developing contexts – women's barriers to learning by information and communication technology. *Gender, Technology and Development*, 18(3), 363-386.
- Román, M., & Murillo, F. J. (2012). Learning environments with technological resources: a look at their contribution to student performance in Latin American elementary schools. *Educational Technology Research and Development*, 60(6), 1107-1128.
- Schinzel, B. (2008). E-learning, gender sensitive. *Asian Women*, 24(4) 43-59
- Steiner, C., Kickmejer-Rust, M., & Albert, D. (2009). Little big difference: Gender aspects and gender-based adaptation in educational games. Proceedings of the 4th International Conference on E-Learning and Games (EDUTAINMENT 2009), August 9-11, 2009, Banff, Canada. Lecture Notes in *Computer Science* (Vol. 5670 pp. 150-161). Berlin: Springer.
- Volman, M., & Van Eck, E. (2001). Gender and equity and information technology in education: The second decade. *Review of Educational Research*, 71(4), 613-634.
- Wong, A., Bakar, A., Hamzah, R., & Wong, S. (2012). ICT integration in Malaysian smart schools: Do teachers' gender, computer ownership, Internet access, subject area and ICT training matter? In *Proceedings of the 20th International Conference on Computers in Education*. (pp. 90-97).