Gender Impact of ICT in Education

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ABSTRACT

Gender is an important issue in the context of information and communication technologies (ICT). Studies show that ICT use is subject to gender bias, e.g. in relation to ICT use and interests. This contribution describes the current situation of gender and ICT professions. Based on an empirical study, it shows particular areas in ICT education that suffer from gender inequalities in both countries. Furthermore, the chapter elaborates how gender inequalities develop from secondary to professional ICT careers based on statistics. As a consequence of recession-driven economic development, the information and communication technology sector has weakened in recent years in OECD countries. Still, an ICT growth of about 4 percent was observed in 2008. Although there was a decrease in 2009 due to the current financial crisis, a general upturn is expected in the long-term because of constant development of the ICT services, software, products for Internet use and communication, and infrastructure. The ICT skills of the work force contribute to the growth: the overall share of employees in ICT specialist occupations is 4 percent and increasing rapidly, and 20 percent of employment relates to occupations that use ICT extensively.

Even though information and communication technology (ICT) is essential for everyday life and has gained considerable attention in education and other sectors, it also carries individual differences in its use and relevant skills. This systematic review aims to examine the gender differences in ICT use and skills for learning through technology. A comprehensive search of eight journal databases and a specific selection criterion was carried out to exclude articles that match our stated exclusion criteria. We included 42 peer-reviewed empirical publications and conference proceedings published between 2006 and 2020. For a subsample of studies, we performed a small-scale meta-analysis to quantify possible gender differences in ICT use and skills. A random-effects model uncovered a small and positive, yet not significant, effect size in favor of boys ($g = 0.17$, 95% CI [-0.01, 0.36]). However, this finding needs to be further backed by large-scale meta-analyses, including more study samples and a broader set of ICT use and skills measures. We highlight several concerns that should be addressed and more thoroughly in collaboration with one another to better IT skills and inspire new policies to increase the quality of ICT use.

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INTRODUCTION

For women the world over, information and communication technologies (ICT) can be leveraged for personal security, better access to education and jobs, financial inclusion or to access basic healthcare information.[1,2] But benefits such as these rely on women having meaningful access to ICT which can be facilitated or prevented by several factors, including affordability, relevant content, skills and security. SDG 5 aims to achieve gender equality and empower all women and girls and calls for enhanced use of enabling technology – ICTs in particular – to promote the empowerment of women. To help turn

commitment into action, the International Chamber of Commerce has teamed up with UN Women – the global champion for gender equality – to host a side-event during the HLPF. The event, entitled Accelerating Women's Economic Empowerment to Achieve the 2030 Agenda will showcase the global efforts stakeholders have embarked on to bring women's economic empowerment to the forefront of all the SDG targets. Through innovation, investment and development of products and services, the private sector plays an important role in advancing gender equality and improving the lives of women. While women make up more than 50% of the world's population, they also represent 70% of the world's poor. According to research, women reinvest 80% of every dollar made back into her family, meaning that practical support for the economic empowerment of women is a crucial step towards eradicating poverty and promoting prosperity. At the event, ICC will highlight private sector initiatives that are catalysing women's economic empowerment in developed and developing countires and present just how ICT can help advance the global goals.[3,4]

The Internet is a great enabler, creating unprecedented opportunities for female entrepreneurs to enter global markets for the first time. ICT provides opportunities to boost small business growth by establishing an international, level-playing field that enables all businesses, regardless of size, location or sector, to compete on an equal footing in global markets. Programmes through partnerships can help realise the opportunities ICT can offer, [5,6] by boosting skilling, equipping women with digital devices and providing training that helps women teach their respective communities how to make the most of these tools. Today's side event will highlight the importance of multistakeholder collaboration in these efforts and showcase business initiatives that are using ICT to support women's participation in the workforce and aid financial inclusion.

ICT can give women access to basic needs such as healthcare and education. The private sector plays a pivotal role in investing in community-oriented training, deploying infrastructure and delivering a wide range of ICT services to meet these needs. A recently published ICC policy paper on ICT, Policy and Sustainable Economic Development, to be shared at the event, underscores that for countries to enhance the use of enabling technology for the goal goals they must create an enabling environment for sustainable investment.[7,8]

Women are currently less likely than men to use or own digital technologies, with gaps larger among youth and those over 45 years old. ICT improves efficiency, enhances coordination and improves the quality of information gathered and shared for development planning. For countries to leverage ICT to promote the empowerment of women, governments need to be well-informed about how the ICT ecosystem works in practice, the barriers to access and how challenges can be overcome. ICC aims to raise awareness of the impact that policies on infrastructure, applications, services and user-engagement have on the ICT ecosystem and believes greater understanding of these issues can equip policymakers with a framework to identify appropriate policy approaches.

Recommendations have been suggested that include encouraging females and males to participate in ICT equally. Parents and guardians are urged to ensure that girls and boys both use computers and ICT facilities equally without discrimination so that girls can equally pick up interest in the technology right from home. Teacher training should equip teachers with knowledge and skills around gender issues in the use of ICT and how to plan activities which encourage girls and boys to develop ICT skills equally.[9,10]

Nowadays, information and communication technology is major backbone of Indian education system. To support E-learning in Universities, information and communication technology (ICT) plays a momentous job. Several experts discussed about ICT awareness among students, teachers, and research scholars to take it into their learning and teaching methodology. Many of Universities either government or private are supporting the utilization of various ICT tools in teaching and learning practice. There is wide need to determine educator's behaviour towards ICT adoption to promote and enhance their learning skills. Students and faculty must confess that ICT awareness is key rod to access the technological services. This paper focuses on ICT awareness among students and faculty residing in Indian Universities. The concerned paper is describing the attitude of students and faculty towards ICT awareness in relation to their gender using statistical tools. More than nine hundred samples have been gathered from six Indian universities. Indian Universities administration should get aware about current scenario of ICT involvement in education system therein.[11]

Discussion
ICTs have been promoted by international organisations such as United Nations Educational, Scientific and Cultural Organization , the World Bank and the FAO as a poverty reduction strategy with the additional benefit of empowering women in

developing countries. A study by the International Development Research Centre of Canada (IDRC) on ICT for poverty reduction strategies states that trends show that ICT have been applied to systemic improvements important to poverty reduction such as education, health and social services delivery, broader Government transparency and accountability, helping empower citizens and build social organization voice. However, existing persistent gender discrimination in labour markets, in education and training opportunities, and allocation of financial resources for entrepreneurship and business development, negatively impact women's potential to fully utilize ICT for economic, social and political empowerment.[12,13]

Research and studies have highlighted the many benefits of ICT for women's empowerment, through increasing their access to information on health, nutrition, and education. Projects founded by NGOs and international organisations include providing WAP phones to women in Senegal to help them check the price of food items and communicate with other women in the network, thereby breaking down the digital divide.

Women's access to ICTs is restricted in some countries. Low levels of Literacy, limited technological access, technical expertise and the often inadequate infrastructure and high cost of connectivity in developing nations, prevent many women from taking full advantage of the opportunities offered by ICTs. [14,15]

In many societies, women's and men's access and use of technology are rooted in behavioral, cultural, and religious traditions:

➢ Cultural and social attitudes are often unfavorable to women's participation in the fields of Women in Science and technology, which limits their opportunities in the area of ICT.

➢ Women are often financially dependent on men or do not have control over economic resources, which makes accessing ICT services more difficult. For example, mobile phones are often seen as being too expensive for poor women, who depend on their husbands to pay the bills.

➢ Allocation of resources for education and training often favors boys and men.

➢ In some societies, women's seclusion from the public arena makes access to community telecenters difficult.

The overall picture of the situation relating to gender and Information and Communication Technology (ICT) has so far been that men have been dominating

the field and have left the women behind. This has also been the point of departure for policymakers. But, as will be shown in this paper, this male domination of the entire ICT field is not the case anymore. On the contrary, the situation is far more complex. For example, when looking at younger generations, the picture appears to be nuanced; both boys and girls seem to be involved and interested in using different ICT tools, both at school and elsewhere . Moreover, along with the new generation, there is the emergence of the new social media, in which girls seem to be highly involved. The present paper explores the ways in which the gender issue appears in youngsters' use of and attitudes towards ICT and how they perform and interact as producers and consumers of digital content.[16,17]

The overall picture of the situation relating to gender and Information and Communication Technology (ICT) has so far been that men have been dominant and have left the women behind. This has also been the point of departure for policymakers in their efforts to make plans and activities in the field. But, this male domination of the entire ICT field is not the case anymore. On the contrary, the situation is far more complex. When looking at younger generations, the picture appears to be more nuanced; both boys and girls seem to be involved and interested in using ICT different tools, both at school and elsewhere

Moreover, along with the new generation, there is the emergence of the new social media, in which girls seem to be highly involved. Based on this, we have to explore the ways in which the gender issue appears in youngsters' use of and attitudes towards ICT and how they perform and interact as producers and consumers of digital content.[18,19]

This new insight into a complex picture needs to be taken into consideration by policymakers, schools/educational institutions and in research. The paper will present an overview of the existing evidence relating to gender and ICT, and elaborate and discuss possible new approaches on how to nuance the ICT, gender and education picture.

Results

The production and use of knowledge by using advanced ICT is increasingly important as the basis for what is often coined as " the new knowledge economy", which can be framed as a response to increasing global competition between countries and regions drawing on knowledge as the main asset. To ensure that society and individuals are included in this development, the notion of "digital inclusion" has been suggested in order to enhance the social, political and economic inclusion of all social marginalized groups in which gender has been

embedded. One possible approach for measuring gender digital inclusion would be to analyze the existing evidence in four broad categories, namely:

1. Access and use of the Internet
2. Skills and attitudes towards ICT
3. Higher education graduates in computing
4. The ICT workforce

The following paragraphs summarize how existing evidence appears in this respect.[20,21]

Education systems are increasingly trying to ensure equitable, inclusive and high-quality digital skills education and training. Though digital skills open pathways to further learning and skills development, women and girls are still being left behind in digital skills education. Globally, digital skills gender gaps are growing, despite at least a decade of national and international efforts to close them. Women are less likely to know how to operate a smartphone, navigate the internet, use social media and understand how to safeguard information in digital mediums (abilities that underlie life and work tasks and are relevant to people of all ages) worldwide. There is a gap from the lowest skill proficiency levels, such as using apps on a mobile phone, to the most advanced skills like coding computer software to support the analysis of large data sets.

Women may not have the financial independence needed to purchase digital technology or pay for internet connectivity. Digital access, even when available, may be controlled and monitored by men or limited to 'walled gardens' containing a limited selection of content, known as 'pink content' focused on women's appearances, dating, or their roles as wives or mothers [22,23]

The stereotype of technology as a male domain is common in many contexts and affect girls' confidence in their digital skills from a young age. In OECD countries, 0.5% of girls aspire towards ICT-related careers at age 15, versus 5% of boys. This was not always the case. At the beginning of electronic computing following the Second World War, software programming in industrialized countries was considered 'women's work'. Managers of early technology firms allowed women well-suited for programming because of stereotypes characterizing them as meticulous and good at following step-by-step directions. Women, including many women of colour, flocked to jobs in the computer industry because it was seen as more meritocratic than other fields

In many societies, gender equality does not translate into gender equality in digital realms and digital professions. The persistence of growing digital skills gender gaps, even in countries that rank at the top of the World Economic Forum's global gender gap index (reflecting strong gender equality), demonstrates a need for interventions that cultivate the digital skills of women and girls [24,25]

Helping women and girls develop digital skills means stronger women, stronger families, stronger communities, stronger economies and better technology.[1] Digital skills is recognized to be essential life skills required for full participation in society. The main benefits for acquiring digital skills are they:

➢ Facilitate entry into the labour market;

➢ Assist women's safety both online and offline;

➢ Enhance women's community and political engagement;

➢ Bring economic benefits to women and society;

➢ Empower women to help steer the future of technology and gender equality;

➢ Accelerate progress towards international goals.

Digitalization can potentially pave the way for improving the efficiency and functioning of food systems, which in turn can have positive impacts on the livelihoods of women and men farmers and agripreneurs, for example, through the creation of digital job opportunities for young women and men in rural areas.

Conclusions

The digital divide cuts across age groups, therefore solutions need to assume a lifelong learning orientation. The technological changes adds impetus to the 'across life' perspective, as skills learned today will not necessarily be relevant in 5 or 10 years. Digital skills require regular updating, to prevent women and girls fall further behind [26]

Women and girls digital skills development are strengthened by:

1. Adopting sustained, varied and life-wide approaches;

2. Establishing incentives, targets and quotas;

3. Embedding ICT in formal education;

4. Supporting engaging experiences;

5. Emphasising meaningful use and tangible benefits;

6. Encouraging collaborative and peer learning;

7. Creating safe spaces and meet women where they are;

8. Examining exclusionary practices and language;

9. Recruiting and training gender-sensitive teachers;

10. Promoting role models and mentors;

11. Bringing parents on board;

12. Leveraging community connections and recruiting allies;

13. Supporting technology autonomy and women's digital rights

Boosting the number of women in ICT is a major opportunity all over. The sector needs highly skilled employees, and women make up the majority of graduates from tertiary education. Redressing the gender imbalance in the ICT sector would also be a good opportunity for women to enter jobs that are more highly paid than those in traditionally female sectors. This would help reduce the persistent gender-based pay gap across countries, which is a product of longstanding gender segregation throughout the labour market.[27]

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