

# A Study on Strategies for Bridging the Digital Gender Divide through Digital Literacy Education

Xinyu Zhang

Faculty of Education, Guangxi Normal University, Guilin 541006, China.

---

**Abstract:** Digital literacy refers to the collection of skills and abilities that individuals in the digital society should possess for learning, working, and daily life. These skills include digital awareness, computational thinking, digital learning and innovation, and digital social responsibility. Enhancing the digital literacy of citizens is a crucial step in improving individuals' social adaptability and competitiveness, thereby contributing to the sustainable development of our society. However, the emergence of social inequality has given rise to a significant challenge known as the digital gender divide, hindering women's full and effective participation in the digital domain and their comprehensive development. The digital gender divide, which is no longer an invisible issue in today's society, encompasses issues such as unequal access to digital resources, distorted gender identity constructions, and the sense of insecurity that women often experience in digital spaces. These issues require focused attentions and solutions. This study uses real-life cases to explore the development of gender-inclusive perspectives in digital literacy education. The findings of the study hold the potential to foster gender equality in education by promoting inclusivity, increasing women's participation, and fortifying digital security. By doing so, this approach will empower women for exceptional growth in the digital era, marking a substantial step towards a more equitable and secure digital society.

**Keywords:** Digital Literacy Education; Digital Gender Divide; Gender Equality

---

## 1. Introduction

With the widespread application of technologies such as cloud computing, big data, and artificial intelligence, digital literacy has become an indispensable survival skill for modern individuals. The "Action Plan for Enhancing National Digital Literacy and Skills" (2023) clearly emphasizes the importance of improving the digital literacy and skills of the entire population, considering it a strategic task for enhancing the quality of the nation and promoting the comprehensive development of individuals. However, it is essential to recognize that inequalities exist in accessing digital technologies, using digital tools sensibly, and applying digital skills. The digital gender divide is a specific manifestation of the digital divide among different gender groups. The OECD's report "Bridging the Digital Gender Divide: Include, Upskill, Innovate"(2019) analyzes the technological and socio-cultural reasons behind the formation of the digital gender divide and provides practical guidance for G20 countries based on successful cases in bridging the digital gender divide. Subsequently, the report "The Role of Education and Skills in Bridging the Digital Gender Divide" (2020) was released. It highlights that education and training are aimed at eliminating gender differences in attitudes and abilities, changing cultural norms, and dispelling stereotypes. In an information and communication technology environment, these efforts are the most cost-effective and have a lasting impact.

## 2. From Media Literacy to Digital Literacy

The United Nations Educational, Scientific and Cultural Organization (UNESCO) defines media literacy as a set of abilities empowering citizens to approach, access, understand, evaluate, utilize, and create information in a critical, ethical, and effective manner, regardless of the form of media. In the 1920s and 1930s, the widespread popularity of film and television, coupled with the prevalence of popular culture, had a profound impact on traditional societal norms, making the media environment more complex and dynamic. To alleviate social anxieties and prevent young people from losing their direction in the face of media influences, the British scholar Leavis first advocated for the protection of youth through media literacy education in 1933.

Since the 1960s, researchers in communication and education studies have witnessed a gradual evolution in the understanding of media literacy. The emphasis has shifted away from resisting media and advocating for "parental" or "protectionist" approaches to media literacy education. Instead, there is a greater focus on the agency of students in actively engaging with media literacy education. Starting in the 1990s,

with the rapid development and widespread adoption of modern digital technologies such as the Internet, the public ceased to be mere passive recipients of media information and became creators and primary disseminators of content. Consequently, the focus and primary content of media literacy education have continued to evolve, placing increased emphasis not only on critical awareness and interpretation of media forms and content but also on cultivating innovative thinking and communication skills.

The concept of “digital literacy” was first introduced by Israeli scholar Yoram Eshet-Alkalai in 1994. He defined it as “the ability to understand and use various digital resources and information displayed on a computer, including five frameworks: visual literacy, reproduction literacy, branching literacy, information literacy, and social-emotional literacy.”(2004) In 1997, Paul Gilster defined digital literacy as the ability to acquire, comprehend, evaluate, and integrate various digital information and emphasized the importance of digital technology as a “basic life skill.”(1997) This underscores that digital literacy no longer positions individuals in opposition to digital technology but emphasizes the symbiotic relationship between people and digital technology, considering it an essential component and effective tool for achieving sustainable development.

### **3. Digital Gender Divide**

The digital gender divide refers to the significant differences in digital information technology between different gender groups. While the development of modern information technology has brought about some positive changes in improving the status of women in socioeconomic contexts. However, as the digital age continues to advance, gender equality development faces unprecedented challenges. According to the “Global Gender Gap Report 2023” by the World Economic Forum(2023), the proportion of women in STEM fields is only 29.2%, and the representation of women in the field of artificial intelligence stands at a mere 30%. Additionally, gender equality in courses related to technology literacy, artificial intelligence, big data, and other technical disciplines on the Coursera online learning platform falls far below 50%. These objective data and real-life situations indicate that the digital gender divide is no longer a latent issue in today’s society. Unequal distribution of digital resources, biases in gender identity construction, and the sense of insecurity women experience in digital spaces all demand attention and solutions.

#### **3.1 Gender Inequality in Digital Resources**

The digital gender divide is primarily manifested in the impact of gender on the accessibility of digital resources. The United Nations Summit adopted the “2030 Sustainable Development Agenda,”(2015) with Sustainable Development Goal 5 emphasizing the achievement of gender equality and the empowerment of all women and girls, particularly highlighting the use of technologies, especially information and communication technologies, to promote the empowerment of women. People’s lifestyles are undergoing a series of changes with the advent of the digital age. For example, medical institutions nationwide are actively promoting digitalization to provide digital medical services such as online consultations, appointment scheduling, and self-diagnosis. While these developments offer more convenient options for people, they also increase the difficulty of accessing medical services for those unfamiliar with digital methods. This group must have access to digital resources to enjoy digital medical services. However, the “2023 Gender Mobile Gap Report” released by the GSMA (Groupe Speciale Mobile Association) in Germany(2023) shows that in low and middle-income countries, 900 million women are not yet connected to mobile broadband, and 440 million women do not have mobile phones. Furthermore, women are 19% less likely to use mobile internet than men, equivalent to approximately 310 million fewer female mobile internet users than male users. According to the “Measuring Digital Development: Facts and Figures 2022” data published by the International Telecommunication Union of the United Nations(2022), globally, 63% of women have access to the internet, while the percentage for men is 69%. This indicates that women are still on the periphery of the digital realm, and their inability to access and acquire digital resources is a prominent manifestation of the growing digital gender divide.

The influence of societal culture is a primary reason why women are in an unequal position in accessing digital resources. Outdated societal norms such as “women have no talents, they have virtues” and the division of labor where men work outside and women work inside the home are widely accepted, hindering the full expression of women’s individual abilities. This backward cultural environment, as an intangible form of oppression, restricts women’s potential and places them in a secondary position in the accumulation of advanced digital resources. The dual environmental pressures continually stifle women’s curiosity and innovative spirit, placing them at a disadvantage in re-

al-world professional competition, significantly impacting their personal growth and adaptability to societal development. The socioeconomic and cultural development demands women to actively participate in societal activities, balance and reconcile their societal and familial roles. Yet, traditional social morals and gender role divisions continue to habitually dictate women's roles. This leads to sharp role conflicts and role psychological barriers, as women are expected to fulfill the physiological duties of pregnancy, childbirth, and breastfeeding while also spending time and energy keeping up with the development of the digital age. This inevitably places women in a dilemma when they have the opportunity to access educational courses on how to better utilize digital resources.

### **3.2 Distorted Gender Identity Construction**

The involvement of women in the field of digital technology and participation in digital information sharing are significantly lower compared to men. As a result, the digital gender representation in the digital space tends to be monolithic. In the field of artificial intelligence, digital male characters are often portrayed as tall, brave, possessing superhuman abilities, tremendous physical strength, and invincibility. In contrast, digital female characters lack specific visual representations and are often limited to voice-only roles. For instance, the default setting for digital assistants, which are designed to follow user instructions, often utilizes female voices. This standardized presentation of gender images is also associated with concealment. International non-governmental organization "Global Witness" (2021) stated that social media platforms such as Facebook have been ineffective in preventing discriminatory ad placements targeting specific demographics. Furthermore, their algorithms exhibit bias in deciding which users see or do not see certain ads. In one experiment, nearly all Facebook users who received job advertisements for mechanical workers were male, while users who received job advertisements for daycare nannies were overwhelmingly female. These stereotypical gender representations in the digital space are an extension of real-life scenarios and reinforce inappropriate gender stereotypes through their hidden nature. Consequently, the portrayal of women in the digital space is likely to be rigid and passive rather than diverse and proactive.

This monolithic portrayal of societal gender roles is influenced by gender stereotypes. Gender stereotypes refer to simplified generalizations about the characteristics of different gender groups that are formed in society. These gender stereotypes can often blind individuals, suppressing the diversity of gender characteristics and rich personalities within different gender groups. This notion leads to a psychological phenomenon known as "stereotype threat effect," a social phenomenon proposed from a psychological perspective by Steele and Aronson in 1995. It refers to the potential decrease in individual performance when a certain group is influenced by negative societal stereotypes about them. This phenomenon has been confirmed in various fields, and when this threat is related to gender stereotypes, it is referred to as "gender stereotype threat." Specifically, myths such as "girls are suitable for studying humanities, and boys are suitable for studying sciences" may make women feel uncomfortable in STEM fields and may also have a negative impact on men's performance in the humanities. The reality of a monolithic digital gender representation also reflects the relatively low number of female professionals in the digital technology field and their limited opportunities for holding senior leadership positions in this field. This often results in a lack of gender equality perspectives in the development of digital technology and the presentation of related content. It establishes a predominantly male-driven digital space culture, transplanting and extending gender stereotypes and discrimination issues from traditional societal spaces to the digital realm.

### **3.3 Threats to Digital Security**

The digital living space, facilitated by digital information technology, provides women with extensive opportunities for active participation in social, political, economic, and cultural life. It enables communication and the exchange of life experiences among various groups of women. However, the issue of digital gender-based violence has become increasingly complex and severe, making it challenging to address effectively. According to the definition of the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), digital gender-based violence refers to violence based on gender carried out through digital or online means. This includes actions that cause physical, psychological, or gender-based harm, suffering, threats, and the deprivation of an individual's freedom of movement. Digital gender-based violence encompasses multiple types, such as online stalking, malicious dissemination of personal intimate/gender-related information, among others.

Taking doxing, malicious online discourse, and online stalking harassment as examples, these behaviors have commonalities in that they involve obtaining the personal information and whereabouts of the victim through their social media and interpersonal networks and disrupting the victim through online networks and communication technology to attract their attention and interfere with their emotions. These actions have led to concerns and fears among the victims about their personal safety, placing them in a vulnerable gender position that makes them easily observable, commented upon, and violated, placing them within the realm of digital gender-based violence. Information disseminated online without confirmation and without consent is often devoid of authenticity and context. However, due to technological interventions, these derogatory messages are spread, become uncontrollable, and are permanently stored, gradually evolving into a culture of humiliation.

The naturalization of the male gaze is one of the underlying factors contributing to the frequent occurrence of digital gender-based violence incidents. The male gaze (2008) refers to the portrayal of women and reality from a heterosexual male perspective, objectifying women to cater to the desires of heterosexual men. The male gaze often objectifies the image of women, presenting them as objects to fulfill male desires and attention. This objectification reinforces the notion that a woman's primary value lies in her appearance and sexual attractiveness. Such a cultural atmosphere provides fertile ground for the emergence of digital gender-based violence because perpetrators view women as objects rather than individuals with rights and dignity, making it easier to engage in digital gender-based violence against them. Behind the male gaze, there are complex power dynamics that play significant roles in digital gender-based violence. Perpetrators often seek to maintain or strengthen control over women through digital gender-based violence to satisfy their own gender and power needs. This infringes on the rights and dignity of the victims and reflects deeply ingrained gender inequality issues in society. In the digital space, this inequality issue may become more pronounced because attackers can more easily engage in digital gender-based violence in a relatively anonymous environment, leaving victims feeling more helpless and exposed. To address this issue, we need to challenge this viewing pattern and take proactive measures to protect potential victims, working toward broader gender equality goals.

## **4. Promoting Gender Equality and Development through Digital Literacy Education**

### **4.1 Enhancing Inclusive Education**

With the gradual establishment and improvement of lifelong education systems, digital literacy education should make full use of existing educational institutions, develop multi-level, multi-type training programs, and establish an educational system suitable for women's development, continually narrowing the digital gender divide. The Digital Competence Development System project launched in the European region in 2018 is a specialized learning and training program designed for adults in Europe who lack basic digital literacy. Education is inherently a systematic social engineering effort. Therefore, providing women with top-down digital literacy education, coordinating and mobilizing resources, and establishing appropriate training and necessary tracking services with feedback systems are essential to bridge the digital gender divide through digital literacy education.

On the other hand, while the development of digital technology has brought convenience to people's lives, it has also increased the economic expenses related to digital activities. Women may face economic burdens and psychological pressures, limiting their opportunities to receive digital literacy education. As a result, governments, businesses, and various nonprofit organizations should actively develop free and secure digital public learning platforms. They should provide affordable, high-quality digital literacy learning resources and create a relaxed learning environment with flexible schedules and diverse learning formats for women, thus alleviating the economic and psychological burdens women face when engaging in digital literacy education.

Furthermore, inclusive digital literacy education, when implemented, should pay special attention to the broad coverage of the target audience to ensure that all women, particularly those from marginalized groups, can benefit. Some educational programs have already achieved positive results in this regard. For example, Lenovo Group (2023) has initiated the "Purple Collar Project," aimed at nurturing multi-skilled "purple-collar" talents in the technology field while providing educational opportunities for children, especially girls, in remote areas. To achieve gender equality through digital literacy education, it is crucial to address the real needs of women based on their backgrounds and experiences. Accordingly, the goals, core content, and emphasis of digital literacy education should be tailored to different learn-

er profiles. For example, for women who have never been exposed to the concept and content of digital literacy, education should focus on increasing their understanding of basic digital literacy concepts and their significance, sparking critical thinking. For women who understand the importance of digital literacy but need to learn how to apply it in real life, educational plans should be designed to align with their daily lives, finding practical solutions and designing evaluation metrics accordingly.

Finally, when promoting digital literacy education, we must consider that women from different backgrounds and experiences may require different forms of digital literacy training. Therefore, the training methods must be women-friendly and easily understood. One reason some educational and training programs have had poor outcomes is that the teaching methods adopted fail to be comprehensible and acceptable to women. For instance, providing copious written materials to women with limited literacy skills or assigning extensive homework to women who need to juggle work and household responsibilities are not effective strategies. In this regard, community organizations and women's unions and other institutions implementing digital literacy education can create teaching materials that rely primarily on visual aids and use textual explanations as supplements, reducing the difficulty of reading and increasing learner engagement.

## **4.2 Increasing Women's Participation**

The degree of women's involvement in decision-making regarding digital literacy education is a vital indicator in bridging the digital gender divide. Achieving a participation rate of 50% or higher for women in all aspects of digital literacy education planning, including leadership, management, and decision-making within digital literacy implementation institutions, is essential for ensuring that women's voices are heard and for creating a force that incorporates gender considerations into decision-making. In the context of decision-making for digital literacy education, women's participation is not merely a symbol of striving for gender equality; it is also a critical factor in ensuring that digital literacy education genuinely addresses the needs and concerns of women. If only sporadic few women are involved in the decision-making processes of digital literacy education, it will be challenging to effectively incorporate women's concerns and needs into educational planning and implementation. This could potentially lead to gender biases and discrimination within digital literacy education, further solidifying the stereotypical images of digital women and perpetuating gender inequalities.

The insufficient participation of women is also reflected in the presentation of educational materials. Despite the increasing presence of female role models in classroom teaching in recent years, they remain a minority and are often relegated to auxiliary roles. Research (2001) indicates that even in prestigious award-winning children's books, there are still biases in the portrayal of gender roles. This implies that female role models remain scarce even in high-quality educational materials. The lack of both quantity and quality in female representation, and their frequent disregard or replacement, contributes to gender biases that hinder women's interest and confidence in excelling in the field. In 2009, Professor Londa Schiebinger of Stanford University, a historian of science and technology, initiated the Gendered Innovations project, which led to the establishment of the Gendered Innovations website, covering various fields such as science, health, medicine, engineering, and the environment. The project (2018) aimed to demonstrate how applying gender analysis can drive technological innovation and excellence. This approach was soon applied in research in fields such as philosophy, political science, and sociology. In the context of digital literacy education, gendered innovation is crucial in that it focuses on multiple differences, inequality patterns, and individual and collective potentials often overlooked or underestimated in educational materials and textbooks predominantly authored from a male perspective. Through gendered innovation, it is possible to eliminate gender biases and stereotypes present in the educational materials used in digital literacy education, providing women with the opportunity to be knowledge producers. Effective digital literacy training materials that bridge the digital gender divide and promote gender equality development can only be created when authors possess a gendered societal perspective and a profound understanding of women's real-life situations. Digitally engaging and motivating digital literacy educational materials featuring women as protagonists are essential in changing the traditional status of women in the field of digital technology. On the other hand, compiling successful case studies in the country to promote digital literacy learning among female students, enhance academic achievements, foster interest, and influence career choices, and presenting these as free reference materials or supplementary learning resources during the digital literacy education process, can provide many women with positive psychological signals. This can contribute to reducing gender disparities and bridging the digital gender divide, thereby raising the overall quality of the national digital literacy.

### 4.3 Strengthening Digital Security Capabilities

Digital literacy education is based on the fundamental concept of empowering women. Alongside teaching women digital concepts and practical digital skills, it should also inspire self-awareness, making them realize their rights and capabilities in the digital space. Currently, handling cases of digital gender-based violence often presents several challenges for relevant authorities. These difficulties may include difficulties in identifying the perpetrators, inapplicability of existing laws, and relatively lenient sanctions for the perpetrators. Therefore, the channels for digital literacy education should be diversified. In addition to formal curricula, workshops and discussion sessions using real-world cases as material for analysis and situational simulations should be organized to encourage learners' autonomy and proactivity and enhance their problem-solving abilities.

Digital literacy education professionals can integrate three protective principles into everyday classroom instruction to assist learners in dealing with digital gender-based violence more confidently. First, educators should emphasize that the support of friends and family is more critical than facing such challenges alone. Secondly, learners should be taught to preserve clear evidence for effective legal actions against wrongdoers. Lastly, learners should understand that their actions serve not only their own interests but also the prevention of more innocent individuals becoming victims. These three principles encompass potential victims, perpetrators, and those in proximity. In contrast to other gender-related issues, cases of online harassment and digital gender-based violence often require assistance and protection from people in the victims' vicinity. These cases frequently erode victims' trust and sense of security in interpersonal relationships, the digital space, and privacy. Therefore, digital literacy education should be combined with the establishment of support systems for women, such as organizing learners into networks for continued mutual support after the educational program concludes. Additionally, collaborating with local women's organizations to provide ongoing support and guidance for women who have undergone digital literacy training is crucial. For some learners, they may continue to face issues related to digital gender-based violence in their actual digital lives, and their participation in digital literacy education will not have achieved its goals if these problems are not adequately addressed. Therefore, support networks after the course is crucial for addressing practical problems.

Furthermore, it's essential to emphasize that women are not just recipients of content in the digital space; they are also producers with agency and the ability to take action. Therefore, in the process of digital literacy education, women learners should understand the importance of not randomly capturing or sharing their own or others' private information and photos, not mocking or blaming victims, and taking steps to protect themselves and others in the digital space, as this is an effective way to prevent the frequent occurrence of digital gender-based violence. However, this does not mean that the responsibility for bridging the digital gender divide should be placed entirely on women. The elimination of violence and discrimination in the digital space, as well as changing traditional societal norms regarding women, requires collective efforts from society and all citizens.

The "Outline for the Development of Chinese Women (2021-2030)"(2021) states that women are creators of human civilization, drivers of social progress, and a crucial force in building a socialist modernization country. Gender equality and the comprehensive development of women are important indicators of societal progress. Among its goals, the outline includes elevating women's media literacy and enhancing their ability to utilize information technology to participate in the high-quality development of the economy and society in the new era.

### References

- [1] BBC News Chinese. "Facebook Advertisements Targeted at Users by Gender Spark Controversy." <https://www.bbc.com/zhongwen/simp/58503598> (2021-9-12).
- [2] Bu, W., Cai, K. "Digital Literacy, Gender, and Sustainable Development: Exploring How to Promote Gender Equality in the Development of Digital Environments from the Perspective of 'Gender and Development' Theory." *Women's Studies Journal*, 2023, (03), 44-57.
- [3] Bu, W., Ren, J. "Beyond the 'Digital Divide': Developing Inclusive Digital Literacy Education." *News and Writing*, 2020, (10), 30-38.
- [4] Chen, J., Wu, X. "Theoretical Connotation and Practical Application of Gendered Innovation: The Contribution of Gender and Sex



Analysis.” *Frontiers of Social Science*, 2018, (04), 67-74+281.

[5] Eaton, E.W. “Feminist Philosophy of Art.” *Philosophy Compass* (Wiley-Blackwell), September 2008, 3 (5), 873-893.

[6] Eshet-Alkalai, Y. “Digital Literacy: A Conceptual Framework for Survival Skills in the Digital Era.” *Journal of Educational Multimedia and Hypermedia*, 2004, 13(1), 93-106.

[7] Gilster, P. “Digital Literacy.” New York: Wiley, 1997.

[8] Gooden, A.M., Gooden, M.A. “Gender Representation in Notable Children’s Picture Books: 1995-1999.” *Sex Roles*, 2001, 45 (1-2), 89-101.

[9] GSMA. “The Mobile Gender Gap Report 2023.” <https://www.gsma.com/r/gender-gap/> (2023-6-8).

[10] Human Development Report Office. “2023 Gender Social Norms Index - Breaking Down Gender Biases: Shifting Social Norms Towards Gender Equality.” <https://hdr.undp.org/system/files/documents/hdp-document/gsni202302pdf.pdf> (2023-6-9).

[11] International Telecommunication Union. “The Internet Is Becoming More Affordable and Accessible, but the World’s Poorest Are Still Denied Access.” ITU ‘Facts and Figures 2022’ Report on Global Connectivity in the Context of Economic Downturn. <https://www.itu.int/zh/mediacentre/Pages/PR-2022-11-30-Facts-Figures-2022.aspx> (2022-11-30).

[12] OECD. “Bridging the Digital Gender Divide: Include, Upskill, Innovate.” [https://www.researchgate.net/publication/329144162\\_Bridging\\_the\\_digital\\_gender\\_divide\\_Include\\_upskill\\_innovate/download](https://www.researchgate.net/publication/329144162_Bridging_the_digital_gender_divide_Include_upskill_innovate/download) (2019-02-01).

[13] OECD. “The Role of Education and Skills in Bridging the Digital Gender Divide.” <http://www.oecd.org/internet/publicationsdocuments/3/> (2020-07-04).

[14] Peng, L., Dong, L. “Policy Suggestions and Implications for Educational Closure of the Digital Gender Gap: Interpretation of the OECD Report ‘The Role of Education and Skills in Bridging the Digital Gender Divide’.” *World Educational Information*, 2020, 33(08), 25-30.

[15] State Council of the People’s Republic of China. “Notice of the State Council on the Issuance of the Outline for the Development of Chinese Women and the Outline for the Development of Chinese Children.” [https://www.gov.cn/gongbao/content/2021/content\\_5643262.htm](https://www.gov.cn/gongbao/content/2021/content_5643262.htm) (2021-9-8).

[16] Tang, C., Chen, Y., Hu, Y. “The Evolutionary Context and Structural Features of Digital Literacy Education Policies in China.” *Library Tribune*: 1-12.

[17] United Nations. “Transforming our World: The 2030 Agenda for Sustainable Development.” <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf> (2015-09-25).

[18] Wang, Z. “Stereotypes Promote and Stereotype Threat: A New Perspective on Stereotype Threat Intervention.” *Psychological Science and Applications*, 2020, 8(10), 619-627.

[19] Xu, Y. “How to Improve Women’s Digital Literacy and Skills.” *China Women’s Daily*, 2022-08-10.

[20] Yan, G., Tian, R., Xiong, Z., Sun, L. “Review of the ‘Digital Gender Divide’ in the 5G Era: Causes and Strategies for Resolution—Implications from the OECD Report ‘Bridging the Digital Gender Divide’.” *Journal of Remote Education*, 2019, 37(05), 66-74.