Asian Journal of Distance Education

Women's Empowerment Through Learning Using Technology

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Abstract: Technology has shaped people's lifestyles globally. Today, the majority of the world's population seeks help through technology as a portal to learning with the wide variety of learning materials available. Women in both developed and developing countries can access learning through technology, yet the scholarly community do not have an up-to-date collective view of how technology is being used to provide learning materials to empower women around the world. Therefore, this systematic review included an aggregated and qualitative synthesis to investigate extant empirical work over five years, 2017-2021. Following a rigorous PRISMA selection process, 40 articles were included in the final analysis from 80 countries. The findings reveal that the majority (60%) of studies took place in Sub-Saharan Africa. From the grounded coding, five industries emerged as areas providing empowerment through the learning materials: health, agriculture, environment, entrepreneurship, and communication. Women were empowered by learning in three main areas: health, communication, and entrepreneurship. This study provides information for funders, policymakers, advocates, and women. This study revealed areas in need of future research, including additional systematic reviews to explore gray literature not published in scholarly outlets and academic publications published in non-English language journals.

Keywords: empowerment, women, gender, learning resources, systematic review.

Highlights

What is already known about this topic:

- Technology is used to access learning materials
- Empowerment is important in the advancement of women

What this paper contributes:

- Unique findings in what industrial areas women were empowered through learning with technology
- Unique findings in how women were empowered through learning with technology

Implications for theory, practice and/or policy:

- Provide an understanding of how women can be empowered and what is being currently used.
- Provide an understanding of areas that need to be developed as ways to empower women.

Published by Asian Society for Open and Distance Education (ASODE), Japan
ISSN 1347-9008 http://www.asianjde.com/

Introduction

Technology has empowered women to make choices and shape their own lives in a move toward gender equality (Grabe, 2011). In many high-income countries, women are more self-reliant than their counterparts in rural and low-income countries with a lack of access to resources and cultural gender barriers (Dhanamalar et al., 2020). Technology now enables access to learning resources and provides a way to circumvent gender barriers (Rajahonka & Kaijam, 2019). Scholars postulate that technology is the driver of women's empowerment through those learning materials (Bhat, 2019). While there appear to be studies showing how women can be empowered with technology, it is unclear to what extent women were empowered across geographical or industrial areas, what types of technology were used, and the benefits they received. Therefore, the purpose of this study is to conduct a systematic review to gain a collective view of how technology is being used to empower women.

Literature

Women Empowerment

Women's empowerment plays a critical role in the development of a society (Dhanamalar et al., 2020), as women are able to make choices and become active members of a community and develop capacity. The term Women's empowerment emerged in the academic literature in the 1970s with a trend in gender equality (Freire, 1970; Grabe, 2011). In recent years, women's empowerment has been described as a goal in seeking gender equality and equity (Mackey & Petrucka, 2021). In studies across the last decade, it has been used as a term to describe women as having choice or control over their options (Chew et al., 2015; Lindsay et al., 2013; Vivakaran & Maraimalai, 2017). In this study, women's empowerment is when women gain agency, resources, and/or capabilities to make decisions on matters of importance (Kabeer, 1999; Mosedale, 2005) through learning gained from access to information via technology. As women have opportunities with technology, they are able to gain access to information, learn, and make decisions that overcome social, political, and economic obstacles (Cummings & O'Neil, 2015).

In low-income countries, women's equity issues are more prevalent. Women are often deprived of access to educational health and financial systems due to societal norms, religion, and attitudes, preventing access to the formal labor market (Lechman & Paradowski, 2021). Nonetheless, in the World Development Indicators database (International Telecommunications Union, 2020), data reveal that since the 1990s, female labor-force participation rates have been slightly increasing. Between 1990 and 2019, female (15+) labor participation has increased by 1.4pp, 10.5pp, and 2.8pp in various regions worldwide.

Women and Technology

Technology has played a part in increasing women's learning accessibility and choice in the economic realm and other aspects of life. Studies have highlighted that women's learning through access to finance, mobile money, and inclusive aspects of finance or microfinance, and digital-based health, agriculture have promoted higher female engagement in the formal economy and production and service sectors (Çetin et al., 2020). Technology has advanced women's engagement in the scientific field and provided political and institutional empowerment (Asongu & Odhiambo, 2020).

Technology is the catalyst for empowerment as it provides different ways of accomplishing tasks at any time and location. The activities can be entirely online without leaving home if needed. Technology also offers opportunities to enhance the learning of all possible subjects, with a wealth of instructors providing video and text directions in multiple languages. Throughout this study, "technology" refers to digital technologies needing a source of power, such as mobile devices, laptops, and desktop computers (Crompton, 2014), and the Internet, applications, and programs used on those technologies.

Extant Systematic Reviews

Scholars have conducted systematic reviews to explore and understand the collective scholarly work on technology in different fields. Yet, there seems to be a significant gap in the literature on women getting access to learning materials with technology and even further in the collective knowledge of how technology is used to empower women. A few recently published systematic reviews focused on women using technology for health purposes. For example, Dantas et al. (2021) explored how women manage urinary incontinence using mobile health applications (apps). Their study findings indicate that the apps offer the potential to assist women in managing their illnesses. However, the study seemingly dismisses uncovering the benefits women receive from using apps. Instead, their findings focus on the usefulness of the apps per se. Similarly, systematic reviews of both Iyawa et al. (2021) and Sayakhot & Carolan-Olah (2016) investigated the use of mobile apps for managing health-related information during pregnancy.

The systematic review of Homko et al. (2007) elaborated on how Internet technology helped women learn how to monitor glucose control in indigent women with gestational diabetes mellitus. The authors' findings showed that women receiving information through technology had enhanced feelings of self-efficacy in understanding diabetes. In a similar study, Samoocha et al. (2010) conducted a systematic review examining how health professionals use technology to deliver cancer follow-up information to women. While these extant systematic reviews are helpful and offer a better understanding of the use of technology by women, their focus is solely on how women are empowered by connecting to health. Most of the systematic reviews are about technology and women's health, with essential analytical connections of how this empowered women.

Although there were a few reviews about women's empowerment, they did not entail using technology or were related to the concept of empowerment with technology. For example, Nandi and Niroumand (2021) explored how frugal innovation helps employment, empowerment, and gender equity in rural India. However, the article's focus is not specific to women's empowerment. A study by Nandi and Nedumaran (2021) investigated boosting the finances of the poor rural farmers in India. The authors explore how rural farmers, particularly women, aspire to adopt agricultural technologies, resources, and new techniques to empower women. These studies help go beyond health into other industries.

All these extant reviews provide a valuable contribution to the field of women and technology. Nevertheless, other systematic reviews do not closely examine women's empowerment with technology in developing countries, except for the studies on boosting the aspirations of the female farmers from lower socioeconomic in India to adopt technology for their benefit. Literature on women's health and technology usage help provide context about women's tendencies in using technology. However, those reviews dismiss the broader picture of women's empowerment through technology outside the health field.

Therefore, the purpose of this study is to conduct a systematic review to gain an up-to-date collective view of how technology is being used to provide learning materials to empower women around the world. From this overarching inquiry, three sub-questions guide this study:

1. In what countries did the studies take place, and what were the economic classifications of those countries?
2. What type of industry were the women and girls empowered and what kind of technology was used?
3. In what ways did technology empower women and girls?

Methodology

Research Model/Design

To answer the three questions that guide this study, a PRISMA systematic review methodology was utilized. The PRISMA Preferred Reporting Items for Systematic Reviews and Meta-Analysis for Protocols (PRISMA-P; Moher et al., 2015) was used as the a priori (Stemler, 2001) roadmap for conducting this systematic review. In addition, the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA principles; Liberati et al., 2009) were used to select the empirical work for inclusion in this study. The PRISMA Principles and PRISMA Protocols ensured a transparent method for reporting the research process and also a rigorous framework that ensures bias is minimized as the research was synthesized (Moher et al., 2015; PRISMA, 2021).

Within the PRISMA methodology, the researchers can then process the data from the selected articles using a variety of methods. In this study, a mixed-methods approach was used. Quantitative methods provided information on the aggregate data, and qualitative data involved a grounded theory (Strauss & Corbin, 1995) design was employed to unpack the extant research. Both these methods provide a summary of the research on how technology is being used to empower women and girls and allow the researchers to generate new theories from that collective understanding (Gough et al., 2017).

Search strategy

This systematic review involved a review of extant research from 2017-2021. With the rapid advancements in technology, it was important to ensure recent literature was examined. Only primary research and peer-reviewed journal articles were selected for examination in this systematic review to ensure a level of confidence in the quality of the articles gathered (Gough et al., 2017).

Search

An electronic and a hand search were used in this study. The electronic search included the educational databases within Women's Studies International, Psychology and Behavior Science, ERIC, Applied Science & Technology, Computers & Applied Science Complete, Family and Society Worldwide, APA PsycArticles, Gender Studies, and Educational Research Complete. Within each of these databases, journals on the topics of technology, women, and empowerment were selected. Aligned to the research topic and questions, the Boolean search also included terms related to technology, women, empowerment, and learning. The Boolean search with these topics is listed in Table 1. The four parts were searched with "OR" in between each synonym and "AND" between each of the topics to ensure the Boolean string included all parts in each article returned by the search engine.

Table 1. Boolean Search Terms

	Boolean Search Terms
Part 1	Technology
	Technologies
Part 2	Women
	Girls
	Females
Part 3	E-benefits
	Empower
	Empowering
	Empowerment
	E-empowerment
	Benefits
	Helpful
	Advantage
	Knowledge
Part 4	Learning

Inclusion and exclusion criteria

From both the electronic and hand search, 1,178 articles were selected for inclusion. From an examination of the articles, 32 duplicates were removed, leaving 1146 articles. Next, each remaining article was examined against the inclusion/exclusion criteria listed in Table 2 For an article to be included in the study, it had to align with the inclusion criteria. Two researchers independently reviewed each of the articles. The inter-rated reliability was then calculated using a percentage agreement (Belur et al., 2018). The researchers reached an inter-rater agreement of 93% for the coding. After discussing the misaligned articles, a 98% agreement was achieved.

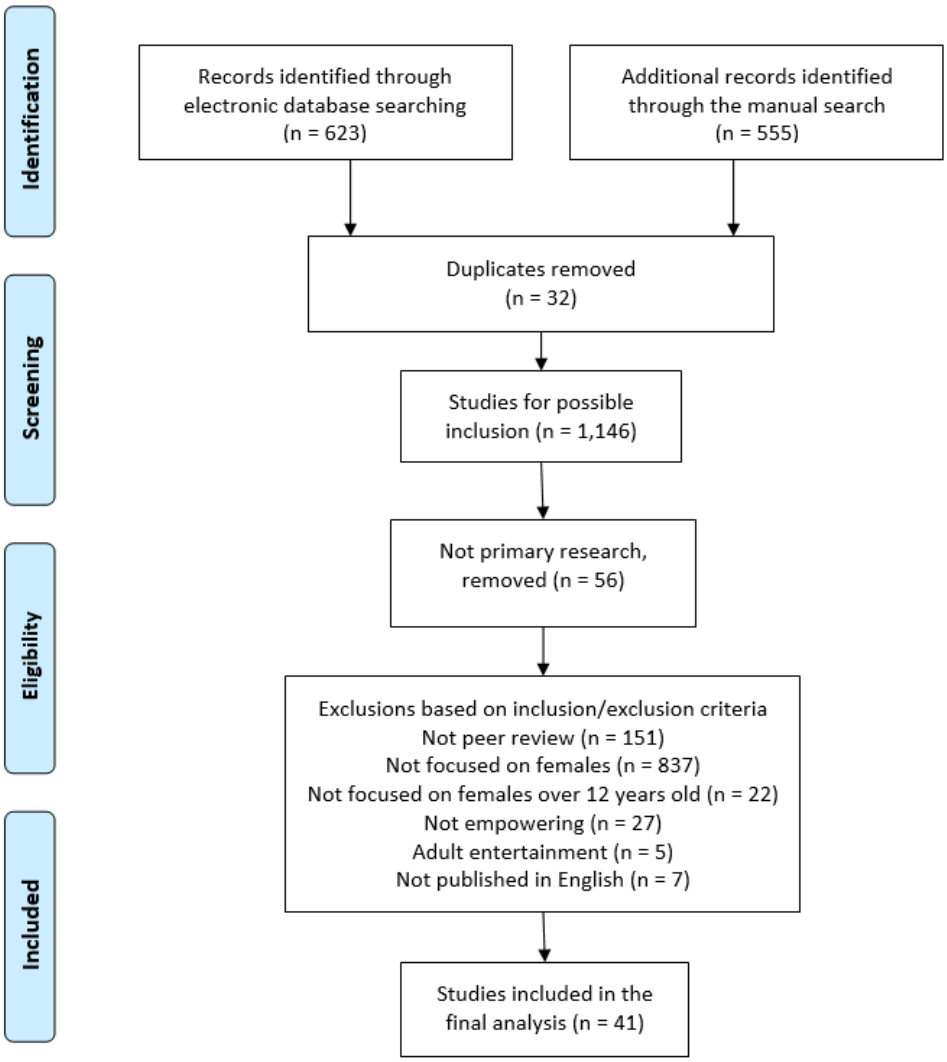
Table 2. Inclusion and Exclusion Criteria

Inclusion	Exclusion
Primary research	Non-peer reviewed research
Peer reviewed	Does not focus on women and girls
Published in English	Below 12 years of age.
The study includes females above 12 years of age	Adult entertainment industry
*Empowers women and girls	

**other synonyms of empowerment*

After examining the articles against the inclusion and exclusion criteria, there resulted in a total of 40 articles for inclusion in this study.

Figure 1. PRISMA Diagram



Coding

The grounded coding (Strauss & Corbin, 1995) was utilized to analyze the data in the articles to respond to the three questions directing this study. I*n vivo* (Saldana, 2015) coding was also used to keep the language consistent with the primary research. The grounded coding design used a constant comparative method as researchers identified important text from the articles on how women were empowered. Through an iterative process, the initial codes led to axial codes with a constant comparison of empowerment with empowerment, empowerment with codes, and codes with codes. The codes were considered theoretically saturated when all data on empowerment fit with one of the codes.

Findings and Discussions

The findings and discussion are organized based on the three research questions that guided this study. The first question is essential information about the study context and the country's economic classifications to remind the readers. The following question uncovers in which industries women used technology for learning materials and what types of technology women and girls use as a tool to empower themselves. The last question digs deeper into how technology allows women and girls to use technology for networking, communication, health records, agriculture, and small businesses.

Question 1: In what countries did the studies take place, and what were the economic classifications of those countries?

The 40 studies selected for this systematic review were in 80 countries and six continents. The countries included in the systematic review are low (L), lower-middle (LM), upper-middle (UM), and high-income (H) countries classified based on the World Bank's world countries' economic status. As presented in Figure 1, Africa had the majority of studies with 60%, all of which were in Sub-Saharan Africa instead of north Africa. Asia had the second majority of the studies with 17%. Europe and North America had other significant studies on women and technology, consisting of 10%. There was one study from Australia and three from South America. The focus on Sub-Saharan countries may be due to the raised focus from multi and bilateral organizations to fund studies to support women in these countries. Sub-Saharan countries typically have less access to technologies and finances than many developed areas of the world, especially women Myovella, et. Al, (2020), therefore organizations are interested in ways to support these populations.

In opposition to Mackay's (2021) posit that women from poor socioeconomic status are "left out of research and studies that aim to support women's empowerment" (p. 8), the findings of the economic classification of the countries in this study show a more excellent representation of lower-middle-income countries (see Table 3). Most of the studies reviewed in LM countries were from Africa, Asia, and South America (N=33). High-income countries (N=30) were predominantly the United States, Canada, and Europe. Lower-income countries (N=26) and upper-middle-income countries (N=13) were mainly in Asia and Africa, as shown in Figure 2.

Figure 2. Countries

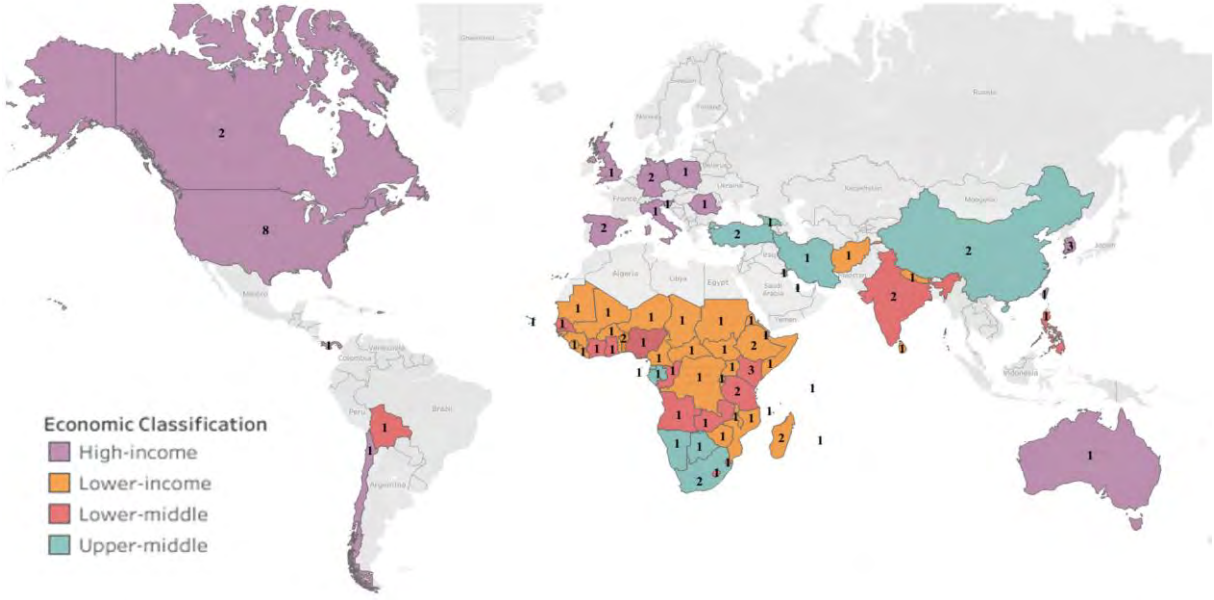
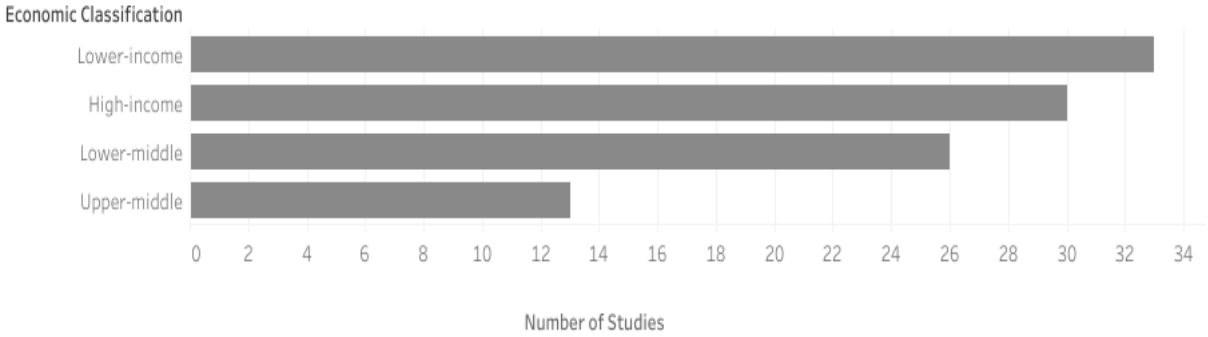


Table 3. Economic Classification of Countries



While gender inequality, a gap between socio-economic backgrounds, and income disparity are global issues, they are more evident in low and low-middle-income countries (UNESCO, 2021). Therefore, funds and researchers might be drawn to exploring such issues in LM countries more than in high-income countries.

Question 2. What type of industry were the women and girls empowered and what kind of technology was used?

Industry

Technology was used in different industries as a tool to empower women. From the grounded coding, Women used technology for empowerment in the field of (1) health, (2) agriculture, (3) environment, (4) entrepreneurship, (5) and communication, as shown in Table 4. The most common industry was health, including reproductive health, keeping health records, managing insomnia, dietary benefit, fitness, Human Papillomavirus (HPV) knowledge, and Health literacy. Women used health applications on their devices to retrieve information about managing records concerning health, e.g., HIV, HPV, breastfeeding, partner violence, nutrition, etc. Also, women gained help through advanced technology. For instance, career-oriented women prolonged their reproductive period by freezing their eggs (viz., Göçmen & Kılıç, 2017). Also, women used social media to communicate with a broader community and instill their virtual presence in public (Lovell & Harris, 2020; Malhotra & Ling, 2020).

Table 4. Empowerment Industry Shown in Main and Sub-Categories

Empowerment Industry	Axial Code
Health	Women's health
	Reproductive health
	Keeping health record
	HIV/HPV knowledge
	Health literacy
	Testing HIV
	Fitness
	Dietary
	Managing insomnia
Agriculture	Investments
	Decision making
	Access to resources
	Farming best practices
Environment	
Entrepreneurships	Online banking
	Business finance
Communication	

Many health studies were anticipated, with many systematic reviews focused on women, technology, and health. It was interesting to see the trend in agriculture as gender bias is often connected with manual roles, such as agriculture, and often focuses on women in parts of the household (Doss et al., 2018).

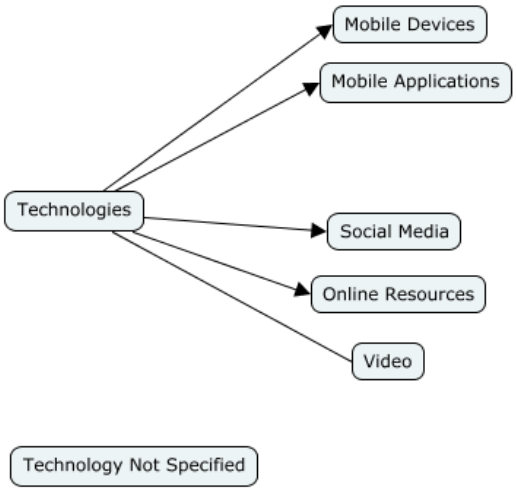
Types of Technology

Different types of technology were used by women and girls as a tool for empowerment, as shown in Figure 3. Of the 40 studies, many were focused on mobile phone use, with two describing mobile phone usage and nine investigating the use of mobile apps by women in different countries. Another seven other studies focused on women's empowerment through social media, which may also have been via a mobile device. Mobile phones were used in various ways and for different purposes, from small business finance managing to storytelling, creating a virtual community, and creating an audience. Mobile phone apps were helpful tools for women to learn, share, and get awareness in different fields. Whether in software or electronic devices, other types of technology are used by women in different areas, including agriculture, health, entrepreneurship, etc. Mobile devices can be a tool of choice in many developing countries with a lower cost than desktop computers, higher portability, and multiple functionalities.

Some of those technologies used by women were not specified or named by the authors. Instead, "technology" or "online information" was used. This is interesting as the focus may have intentionally been targeted on how women were empowered and less on the technology. Nonetheless, knowing the types of technology used can provide helpful information to those policymakers and funders who are also interested in the details of what supported the women.

In rural areas with no internet connectivity through the phone (i.e., LTE, 3G, or 4G), the mobile phone has broadened women's communication methods. It connects inside and outside their community (Aminuzzaman, Baldersheim & Jamil, 2003). The extensive use of mobile/smartphones from the data of this study is similar to the findings of other studies (viz., Dantas et al., 2021; Iyawa et al., 2021).

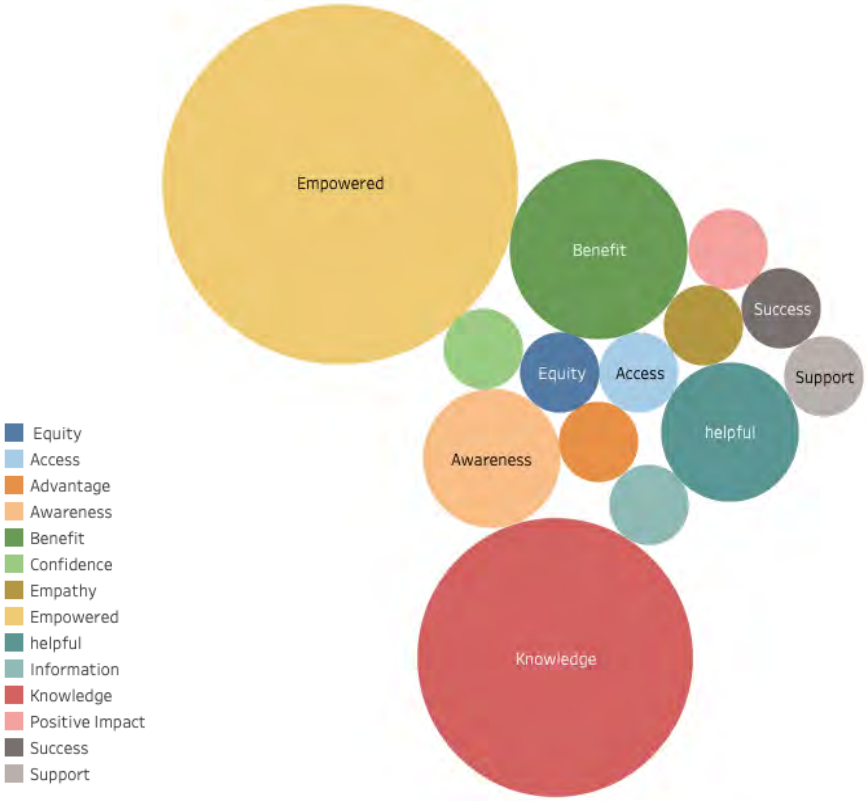
Figure 3. Types of Technology



Question 3. In what ways did technology empower women and girls?

The terms were extracted from the articles through grounded coding and analyzed to examine how technology empowered women. The coding revealed that different empowerment terminologies, such as success, benefit, advantage, awareness, confidence, knowledge, empowerment, etc., were used interchangeably in the collected studies. For all terms related to women receiving information, access to services, or other types of help by using technology, see Figure 4. These terms reflected a clear trend in women making decisions like Mackey's (2021) examination of the empowerment language used.

Figure 4. Empowerment Terms



Note: Those terms more frequent are represented by larger circles and labels. Those less frequent are just a circle in the color to match the key.

The terms “empowerment” and “knowledge” were used more frequently than other words. The choice of language may be connected with the study industry and those trends in the nomenclature. The term “Knowledge” was used in the health industry (Bayigga et al., 2019; Wu et al., 2020), whereas “empowerment” was used in the field of agriculture (Achandi et al., 2018; Maligalig et al., 2019), environment (Solís et al., 2019), and leadership and communication (Riquelme et al., 2020). The most common term was “empowered” which connects to an earlier study by Nandi and Niroumand (2021) who described women learning with technology in rural India experienced empowerment

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How Women were Empowered

In examining the aggregated studies, the grounded coding revealed four themes of learning about: health, communications, and entrepreneurship. These are delineated in the following sections.

Health

Studies focused on women’s obtaining knowledge and how technology benefited women and girls about their bodies, breastfeeding, diet, and overall increased health literacy. Many studies emphasized that mobile health apps provide information about venereal diseases like HIV, HPV, and other health issues. For instance, Bayigga et al.’s (2019) and Wu et al.’s (2020) studies illustrate how women increased their knowledge about HIV and other venereal diseases and contraceptive methods through mobile and other technologies. The authors indicate that women connect to the community of health workers quickly, ultimately enhancing their knowledge and health. Two studies (Holloway et al., 2020; Kim et al., 2020) in Sub-Saharan Africa and Asia explored the effect of technology on women in testing for HIV and encouraging them to receive relevant vaccinations. A higher number of studies concerning sexually transmitted diseases took in Sab-Saharan Africa, where the number of HIV is high compared to other continents or countries, according to the Global HIV/AIDs Epidemic (2021). Women use technology to receive information, gain health knowledge, and use it as a self-test to check against specific health issues. Akinola et al.’s (2021) study revealed how acceptable it has become among transgender women in the United States to use technology to self-test HIV. The same survey also focused on how technology helped collect data from remote areas and marginalized populations, such as transgender women.

Pregnancy, fertility, health counseling, breastfeeding, and keeping reproductive records were other popular areas where women received knowledge through technology. Seven studies (Diaz, 2020; Faucher & Kennedy, 2020; Guo et al., 2018; Hamper, 2020; Park & Shin, 2021; Wu, Huang et al., 2020) reported positive outcomes of using mHealth or mobile apps in obtaining contraception counseling (Wu, Huang et al., 2020), creating a community of support and knowledge sharing for infertile women, and tracking periods and fertility window on their devices. For instance, Wu, Huang et al.’s (2020) study found that WeChat was helpful for nursing mothers to have exclusive breastfeeding sessions in China. WeChat created a space for mothers to be mindful of timely breastfeeding, encouraging the fact and an online community of nursing mothers. Another study (Göçmen & Kılıç, 2017) on the egg freezing experience of women in Turkey found that technology helped women, especially working women, to postpone motherhood. The study findings also indicated that egg freezing technology positively responded to women’s feelings of aging and reproducing at a later age. Technology was also used in subtle matters such as doctor’s appointment reminders and sharing information with peers (Reyes et al., 2018).

Technology was also used in helping women with mental health, abusive relationships, sleep patterns, and dietary habits and fitness. One study (Lackie et al., 2021) focused on empowering women to fight against stigma regarding mental health issues and encouraging them to seek help and take control of their health problems. Another study (Decker et al., 2020) showed that myPlan Kenya offered information to women about relationship health, safety, and violence. Technology was also used in subtle matters such as doctor’s appointment reminders and sharing information with peers. The studies about health were not limited to apps and mobile devices. The somewhat educational software was used to train women to be fit, flexible, and physically strong (Gholamnia-Shirvani et al., 2018). Juul et

al.'s (2019) study showed positive results in helping women with type2 Diebti manage their diet, weight gain, and confidence. Similarly, Wu, Huang et al.'s (2020) study evaluated changing women's dietary habits through apps.

Health was one of the biggest industries where women sought help quickly from remote areas. Yet, inequality in accessing technology between men vs. women, rural vs. urban, and developed vs. developing still exists. According to the WHO Africa, developing countries worldwide suffer from health the most. It is crucial to make technology, as simple as mobile phones, and its literacy accessible for under-represented women and in remote areas.

Communication

Studies clustered in communication focused on how women used different types of technology to push their boundaries beyond the home to communicate with the community and exert themselves in society. For example, Abubakar and Dasuki's (2018) study from Nigeria and Shockly et al.'s (2020) from Qatar indicated that women used social media apps, like WhatsApp, to connect with their communities and participate in different social, political, and developmental activities in their respective countries. Women used WhatsApp in Nigeria to have their virtual presence in various social and political spaces. In Qatar, for example, women use social media to gain community support and increase their public presence. These two studies particularly mention how Apps or social media have helped women to have their say through online platforms and to be able to extend their voice in social, political, and developmental activities.

Other studies focused on how technology helped boost women's sense of community, agency, self-efficacy, and access to various types of information. One study (Riquelme et al., 2018) found that a sense of self-efficacy and community through technology granted women a sense of mastery and control that led to finding comfort in belonging to a community. Another study (Malhotra & Ling, 2020) indicated how technology provided access to domestic worker women in rural India. Similarly, Hussain and Amin's (2018) study emphasized that technology broke the patriarchal, class, and infrastructure boundaries for women in Afghanistan and increased their agency. Rouhani's (2019) study in Benin focused on using digital storytelling as a mechanism to promote girls' education. The author believes that disseminating girls' stories broadly would help attract families, communities, and decision-makers' attention in bridging the education gap among girls.

The above studies were conducted in developing or lower and lower-middle-income countries. The technologies used were not advanced or sophisticated. Women predominantly used mobile phones and often without the internet to connect. Even though women do not have access to cutting-edge technology in rural areas, this study tells us that women could accomplish and benefit with simple mobile phones.

Entrepreneurship

Traditionally, cross-culturally men manage the household and outside business finance. Less advanced technology, such as smartphones or apps, was used to help women manage their small businesses and take control of their finance. Only four studies among the 40 selected articles were focused on women working in small businesses using technology. Of these studies, two focused on online selling, and two on farming or agriculture. Maligalig et al. (2019) and Achandi et al.'s (2018) studies illuminated enhancing women's decision-making ability in the household, better farming, and investment. Along the same lines, Gichuki, Mulu-Mutuku & Milcah's (2018), and Liu (2022) study women's equal share of their access to finance and management through technology, such as mobile money apps. These researchers did not only focus on women's empowerment but also highlighted closing the gender gap in managing finance.

Within technology, gender gap or inequity is predominant in the literature (Maligalig et al., 2019). Arguably, women's access to technology, which often does not require heavy training, boosts women's share in managing finance and all aspects of decision-making. This is mainly where women help in farming and small businesses and take part in online selling from home. This study urges people in the technology industry to consider many new ways or apps based on contexts in developing and developed countries.

Other Studies

A few studies did not fall into the main themes of the grounded coding. However, they are worth noting. One study (Spangenberger et al., 2018) examined enhancing younger women's learning capacity and introducing them to role models to imitate positive attitudes through games on touch screen devices. Another study (Solís et al., 2019) increased secondary female learners' knowledge and confidence about geography, geospatial technologies, and climate change. These two studies closely focus on young women and long-term empowerment; the former trains girls to be better citizens and the latter intrigues girls' attention to innovative technology and the environment. Most of the extant studies focusing on women and the use of technology concentrate on adult women. Research on young women's empowerment through technology is scarce. It needs to be brought up to light how teenage girls use technology to tackle their day-to-day health problems, such as learning about and managing menstruation, chances of pregnancy, and vaginal infections, especially in cultures that discuss these issues are taboo or culturally inappropriate.

Conclusion and Suggestions

This study provides unique findings in one of the first systematic reviews to examine the collective knowledge on how technology provides access to learning materials that are used to empower women worldwide. While there were similarities to extant systematic reviews, this study gained a high number of studies conducted within developing countries, providing scholars with a window into research in this area. The data from this study revealed that work on empowering women with technology took place across six continents. However, a large number (60%) occurred in Sub-Saharan Africa. Five industries emerged from the grounded coding of the studies: (1) health, (2) agriculture, (3) environment, (4) entrepreneurship, and (5) communication. It was interesting to see the big trend in agriculture with the bias towards men in these roles and women in the household (Doss et al., 2018).

Various technologies were used; however, there was a significant trend in the use of mobile devices. These devices have high functionality, with a variety of applications, access to the Internet, and portability. The grounded coding of how women were empowered with technology revealed three themes: health, communications, and entrepreneurship. These topics offer a breadth of support for women to gain gender equity and equity as they provide agency, resources, and capabilities to make decisions on matters of importance.

This study is limited to an examination of articles published in English. While there was a large portion of studies in developing countries, there may have been many that were not selected due to this inclusion requirement. This limitation is a common feature of systematic reviews (Alexander, 2020; Crompton, 2021). It would be valuable if future researchers could conduct systematic reviews going across languages and even focus on languages used in developing countries. Furthermore, to ensure quality, only articles from peer-reviewed journals were included. This excludes the gray literature (not formally published in academic journals) of the many smaller studies capturing small pockets of villages and towns in developing countries seeking to empower women with technology. These are interesting and important works, and it would be interesting for researchers to use this study as a springboard to examine the gray literature in this area. The findings of this study also revealed three main areas: health, entrepreneurship, and communication. While these are three significant areas, there may be many other avenues to empower women that would be worth examining in future research.

This study provides information for funders, policy makers, advocates, and women. It will support funders in understanding what research has been conducted, the gaps there are in the literature and where financial aid should be directed to explore further. Policymakers can implement policies that better support women globally. Advocates can use this study as evidence to make the case for supporting women in how technology can be used and where technology is needed. Women reading this work can gain ideas on how they can be empowered with technology.

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Acknowledgements

Not applicable.

Funding

Not applicable.

Ethics Statement

Secondary data was used in this study, therefore an ethics review was not applicable.

Conflict of Interest

The authors do not declare any conflict of interest.

Data Availability Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Suggested citation:
Tabasum Niroo, W., & Crompton, H. (2022). Women's empowerment through learning using technology. *Asian Journal of Distance Education, 17*(2), 135-152.
https://doi.org/10.5281/zenodo.7117324