Empowering Senior Adults in the Digital Age: A Bibliometric Analysis of Enhancing ICT Skills in Training Programs at Daoer Zenee Paroki Santo Antonius, Jakarta, Indonesia

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A R T I C L E   I N F O

ABSTRACT

This study investigates the impact of Information and Communication Technology (ICT) on senior adults, emphasizing how enhancing ICT skills can improve their independence, social inclusion, and overall well-being. As the global senior population increases, understanding ICT's role in facilitating active aging becomes essential, especially in developing regions. This research addresses a significant gap in digital inclusion for seniors, focusing on the issue of digital illiteracy that restricts their participation in modern society. The central research question explores effective strategies to enhance ICT capabilities in older adults for fostering social inclusion and active engagement. While existing studies have examined the benefits of ICT for seniors, this research specifically targets seniors in Jakarta, Indonesia, shedding light on regional challenges and effective strategies that have not been thoroughly explored. Employing a bibliometric analysis and field study methodology, the research follows PRISMA guidelines, reviewing 18 empirical studies that met the inclusion criteria. Findings indicate that digital literacy, self-sufficiency, and social connectivity are essential capabilities for seniors, with participatory learning and intergenerational support recognized as effective strategies for skill improvement. These capabilities enhance mental health, reduced isolation, and greater independence. The study concludes that tailored ICT training programs, particularly those emphasizing participatory and community-based approaches, are vital for empowering seniors. The implications suggest that policymakers and organizations should prioritize digital literacy initiatives to promote seniors' well-being and active engagement, ultimately addressing the digital divide to ensure inclusive aging in an increasingly digital world.

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1. INTRODUCTION

Information and Communication Technology (ICT) capabilities are increasingly recognized as essential for enhancing the quality of life among seniors. Integrating ICT into the daily lives of older adults significantly supports their independence, social engagement, and overall well-being. As the

population of older adults continues to grow, understanding the relevance of ICT capabilities becomes crucial for individual and societal health outcomes.

One primary benefit of ICT for seniors is its potential to enhance independence. Research indicates that technology can assist older adults in performing daily activities, thereby improving their quality of life (Arthanat, 2021; Mitzner et al., 2016). For instance, mobile health applications and telehealth services enable seniors to manage their health conditions effectively, reducing the burden on caregivers and healthcare systems (Arthanat, 2021; Wang et al., 2020). Furthermore, ICT facilitates social connections, which are vital for combating loneliness and social isolation, common issues among older adults (Chen & Schulz, 2016; Tsai et al., 2015). Studies have shown that ICT interventions help seniors connect with family and friends, engage in community activities, and access support networks, ultimately improving their mental health and social well-being (Jiménez et al., 2021; Winstead et al., 2013).

Despite these benefits, barriers to ICT adoption among older adults persist. Many seniors encounter challenges related to digital literacy, hindering their ability to use technology effectively (Nurhasanah et al., 2020; Vaportzis et al., 2017). Tailored training programs have been shown to increase comfort and proficiency with ICT, enhancing engagement with technology (Arthanat et al., 2016, 2019). However, it is important to note that not all training methods are equally effective; some seniors may prefer individualized instruction over group sessions, which can exacerbate feelings of exclusion (Betts, L., Hill, R., & Gardner, 2017). A nuanced approach to ICT training that considers the diverse preferences and capabilities of older adults is necessary for successful implementation.

Moreover, ICT tools must be designed to be user-friendly and accessible, accommodating the varying levels of technological proficiency among seniors. Research highlights that older adults tend to be optimistic about technology when it is designed with their needs in mind (Chanyawudhiwan & Mingsiritham, 2022; Kwan & Lai, 2013). For example, tablets are suggested as a means to bridge the digital divide due to their intuitive interfaces, making technology more approachable for seniors (Tsai et al., 2015). Additionally, integrating health monitoring systems and telemedicine can provide critical support for older adults, particularly those with chronic conditions, by facilitating remote consultations and continuous health monitoring (Vollenbroek-Hutten et al., 2017; Wang et al., 2020).

The importance of enhancing Information and Communication Technology (ICT) skills for healthy aging, well-being, and participation in the digital society is increasingly recognized in contemporary research. As older adults navigate a progressively digital world, improving their ICT skills is essential not only for personal well-being but also for active societal engagement.

Digital literacy is a crucial determinant of life satisfaction among older adults. Research indicates that higher levels of digital literacy are positively correlated with improved mental health outcomes, including reduced depressive symptoms and enhanced cognitive functioning (Hong et al., 2023; Lee, 2024). For instance, a study in South Korea found that older adults with better digital literacy reported greater life satisfaction and overall health (Lee, 2024). Similarly, research from China highlighted that access to ICT significantly improves various dimensions of quality of life, including cognitive ability and social integration (Yang et al., 2022). Therefore, fostering digital literacy among older adults is vital for promoting their mental health and quality of life.

Tailored educational programs play a significant role in enhancing digital literacy. Initiatives designed specifically for older adults, considering their unique needs and learning styles, have effectively bridged the digital divide (H. J. Choi & Park, 2022; Ngiam et al., 2022). Community-engaged learning programs offering one-on-one mentoring have successfully increased digital skills among low-income older adults (Miller et al., 2024). Such targeted interventions improve digital literacy and empower older adults to use technology for health management and social engagement, enhancing their independence and quality of life (Miller et al., 2024).

The impact of digital literacy extends beyond individual well-being to broader societal participation. As older adults gain confidence in using digital technologies, they are more likely to engage in online communities and access essential services, mitigating feelings of isolation and loneliness (Hu, 2024). The COVID-19 pandemic has underscored the importance of digital connectivity, revealing that older adults who maintained digital contact reported higher levels of subjective well-being (Hu, 2024). This highlights that improving digital literacy is crucial for fostering social inclusion and active citizenship among older adults.

While the literature extensively addresses the impacts of ICT on business, health, and education ecosystems, there is a significant gap in research focusing on how ICT specifically affects

the social well-being of seniors. This lack of attention highlights the need to better understand how to improve ICT skills among older adults to enhance their engagement in the social digital ecosystem. This study aims to identify effective strategies for enhancing ICT capabilities among seniors to promote social inclusion and active citizenship. The central research question is: What strategies can effectively enhance ICT capabilities in older adults to foster their social inclusion and active participation in society? The research questions are: (1) What ICT capabilities are needed for seniors? and (2) How can seniors enhance their ICT skills?

Capabilities And Social Well-Being For Seniors

The integration of Information and Communication Technology (ICT) into the lives of older adults significantly impacts their social well-being and overall quality of life. Research indicates that digital inclusion enhances various aspects of seniors' lives, including cognitive abilities, social integration, and community satisfaction. For example, (Yang et al., 2022) highlight that ICT positively influences older adults' quality of life by facilitating social connections and access to resources essential for maintaining well-being. Additionally, studies show that during the COVID-19 pandemic, many older adults increasingly utilized digital technologies to maintain relationships, thereby reducing feelings of loneliness and depression (Cho & Cho, 2023). This shift emphasizes the importance of digital engagement in fostering social support and enhancing mental health among seniors.

Understanding the barriers to digital inclusion, especially for older immigrants and refugees, is crucial in this context. (Ekoh et al., 2023) notes that language barriers, cultural differences, and varying levels of digital literacy can prevent older adults from fully benefiting from digital technologies. Addressing these barriers is essential to ensure equitable access to the advantages that ICT provides. Furthermore, (Graham et al., 2021) emphasize that personalized digital coaching programs can significantly increase engagement among older adults, suggesting that tailored approaches to digital literacy can enhance social interactions and support networks. This notion is supported by (Matenga-Ikihele et al., 2023), who highlight the role of intergenerational support, particularly from family members, in helping older adults navigate new technologies.

The need for inclusive digital literacy programs is further reinforced by (Kokorelias et al., 2022), who argue that older adults, particularly those from lower socioeconomic backgrounds, face significant barriers to accessing digital resources. This highlights the necessity of community-based interventions that teach digital skills while considering the unique needs of older adults. (McCosker et al., 2023) advocate for involving older adults in designing and implementing digital inclusion initiatives to ensure these programs are relevant and effective.

2. RESEARCH METHOD

Databases and Search Strategy

Searches were conducted in several electronic databases: Google Scholar and ResearchGate. In each database, the following combinations of keywords was searched: ("ICT training for older adults" OR "Information Communication Technology training elderly" OR "Technology training for seniors" OR "Digital skills training for older adults" OR "Senior ICT education" OR "Elderly technology training programs" OR "ICT skills development for seniors") AND ("Digital literacy programs for older adults" OR "Elderly digital literacy" OR "Digital skills for seniors" OR "Technology literacy in older adults" OR "Senior citizens digital literacy" OR "Digital inclusion elderly" OR "Elderly access to digital resources") AND ("ICT adoption in seniors"

"Technology adoption strategies elderly" OR "Older adults ICT implementation" OR "Adoption of technology among older adults" OR "ICT acceptance elderly" OR "Barriers to ICT adoption in seniors"

"Facilitators of ICT use in older adults") AND ("ICT training and digital literacy for seniors" OR "Digital literacy and technology adoption in elderly" OR "ICT training strategies for older adults" OR "Digital skills and ICT adoption elderly" OR "Barriers to digital literacy in older adults" OR "Senior ICT training and adoption strategies" OR "Elderly digital literacy and social inclusion" OR "ICT training programs and digital skills for seniors".

Screening and Detailed Assessment Process

The study adhered to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines (Lisboa et al., 2024). A total of 200 records were obtained from digital

databases, from which 50 duplicates were removed. Researchers independently screened the titles and abstracts of the remaining 150 articles simultaneously. Inclusion and exclusion criteria were applied throughout the screening process, and any discrepancies were discussed to reach final decisions by consensus among the evaluators.

Inclusion and Exclusion Criteria
To select articles for the review, the following inclusion criteria were applied: (1) only peer-reviewed, empirical articles in full-text form were considered, all published in English, regardless of publication date; (2) participants in the studies were required to be seniors aged 55 years or older; and (3) the studies needed to utilize quantitative, qualitative, or mixed methods. For meta-analyses, only quantitative methods would be analyzed.
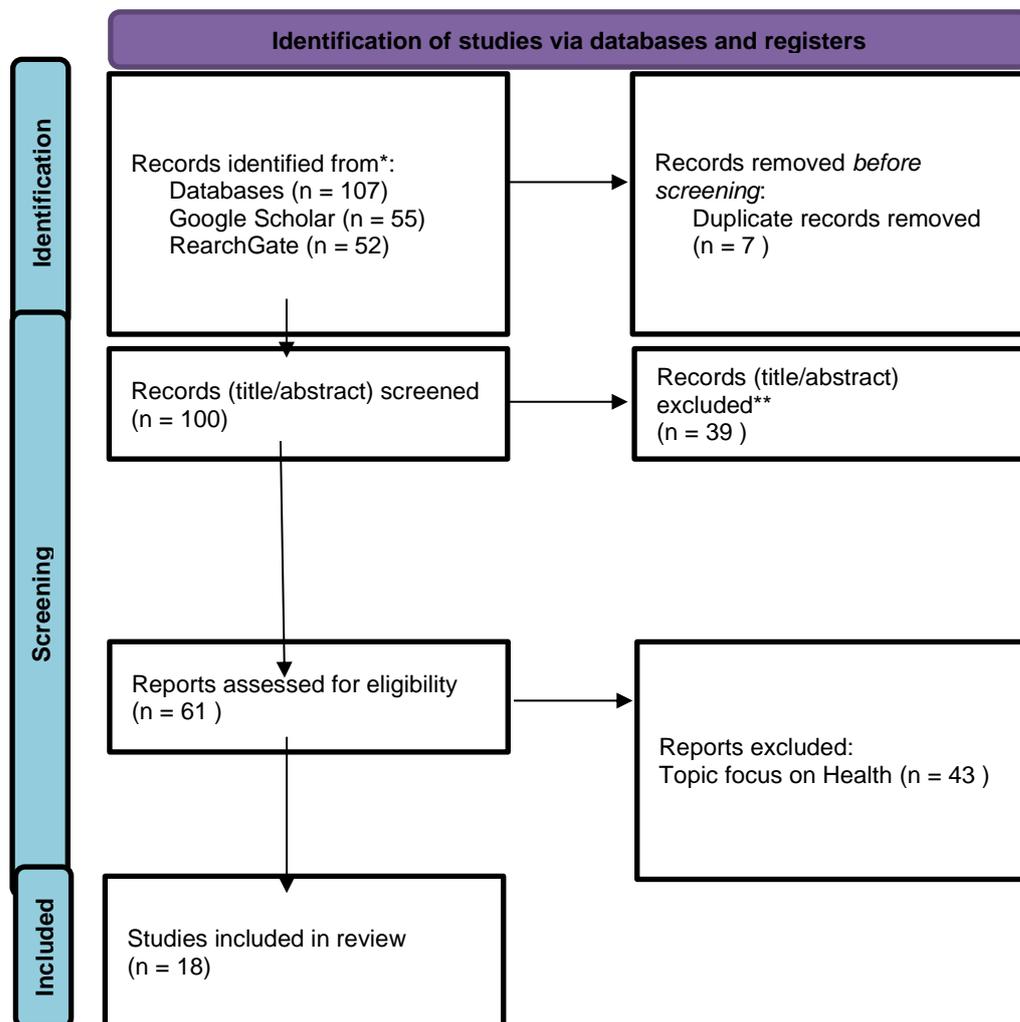
Articles were excluded for the following reasons: (1) they were not available in full text; (2) they were published in a language other than English; (3) they did not employ a defined tool to measure ICT capability or social well-being for seniors directly; and (4) they were reviews, opinions, editorials, case studies, or empirical studies that only mentioned or superficially discussed ICT capability and social well-being without conducting an in-depth analysis.

Final Selection Process
Following the initial screening of the abstracts, 18 articles were identified as relevant for further assessment. Researchers then conducted a full-text screening of all 18 articles to select those for final inclusion. Any uncertainties were discussed, and consensus was reached regarding the articles included in this systematic review.

Quality and Risk Bias of Selected Studies
The methodological quality of the included studies was assessed using a coded Excel spreadsheet that listed all the studies. Relevant information from the selected primary studies was extracted into this spreadsheet. The final analysis focused on two key items: (1) whether the sample included only seniors and (2) whether the variables under study encompassed ICT capability and social well-being. The researchers discussed their analyses, and after addressing any disagreements, they reached a consensus on the final decisions.

Identification of studies via databases and registers

Identification

Records identified from*:
  Databases (n = 107)
  Google Scholar (n = 55)
  RearchGate (n = 52)

Records removed *before screening*:
  Duplicate records removed (n = 7)

Screening

Records (title/abstract) screened (n = 100)

Records (title/abstract) excluded** (n = 39)

Reports assessed for eligibility (n = 61)

Reports excluded:
Topic focus on Health (n = 43)

Included

Studies included in review (n = 18)

3.   RESULTS AND DISCUSSIONS

Daoer Zenee, affectionately known as Art Cycle, is a beacon of creativity and resilience nestled within a community that champions the empowerment of SWPND individuals—those who are small, weak, poor, neglected, and disabled. This vibrant collective is driven by a profound mission: to love and save the earth. They achieve this by wholeheartedly embracing the principles of reuse, reduce, recycle, and renew. Through these guiding tenets, Art Cycle not only fosters environmental stewardship but also cultivates a sense of purpose and belonging among its members.

The community is primarily composed of senior citizens, individuals who bring a wealth of life experience and wisdom to their artistic endeavors. These seniors, often overlooked in the fast-paced modern world, find solace and expression in transforming recycled materials into stunning art pieces. Their creations are not merely objects of beauty; they are testaments to the power of creativity and the potential for renewal in both materials and lives.

Art Cycle's commitment to sustainability is evident in every aspect of their work. They source materials that would otherwise contribute to environmental degradation, breathing new life into discarded items. This process not only reduces waste but also challenges societal perceptions of value and worth. By turning the mundane into the magnificent, Art Cycle redefines what is possible when creativity meets sustainability.

Despite their artistic prowess and the intrinsic value of their work, the community faces significant challenges in marketing their creations. This struggle is not uncommon among artists, particularly those who operate outside the traditional commercial art world. For Art Cycle, the

challenge is compounded by the demographic makeup of its members, many of whom may not be familiar with modern marketing techniques or digital platforms.

To address this, Art Cycle could benefit from strategic partnerships with local businesses, art galleries, and online platforms that share their commitment to sustainability and social empowerment. Collaborations with younger generations, who are often more adept at navigating digital landscapes, could also provide valuable insights and skills. Workshops or mentorship programs that focus on marketing and entrepreneurship could empower Art Cycle members to take control of their artistic narratives and reach broader audiences. Furthermore, hosting community events or exhibitions can serve as both marketing opportunities and celebrations of the community's achievements. These events can draw attention to the unique talents of Art Cycle's members and foster a sense of pride and accomplishment. They also provide a platform for dialogue about the importance of sustainability and the role of art in social change. In conclusion, Daoer Zenee, or Art Cycle, is more than just a community of artists; it is a movement that embodies the potential for transformation—of materials, individuals, and society.

Tabel I. ICT Capability for Seniors

ICT capabilities needed for seniors	References 2024	References 2023	References 2022	References 2021
Basic Usability and Accessibility: Technologies should be adapted to the needs of older users, considering their functional limitations and the aging process1. This includes ensuring that devices and software are user-friendly and accessible.			(Chalghoumi et al., 2022)	
Digital Literacy: Seniors need to develop digital literacy, which involves the ability to learn, use, and adapt to technology. This capability is crucial for their well-being and quality of life, as it enables them to stay connected and access information.		(Sheahan et al., 2023)	(Kärnä et al., 2022)	
Social Connectivity: ICT should facilitate social interaction to reduce loneliness and social isolation. This includes online social platforms and communication tools that help seniors stay connected with family and friends, thereby minimizing loneliness and enhancing social contact		(Jøranson et al., 2023)	(Blok et al., 2022) (Kokubun et al., 2022) (Kärnä et al., 2022)	(Soja et al., 2021)
Self-Sufficiency and Autonomy: ICT should empower seniors to perform everyday tasks independently, such as online shopping, digital banking, and accessing information. This promotes self-sufficiency, autonomy, and a dignified living				(Bakshi & Bhattacharyya, 2021)
Learning and Digital Inclusion: ICT should provide opportunities for learning and improving digital literacy, which can enhance the well-being and self-esteem of seniors. It is important to prevent seniors' exclusion from the digital community by offering focused training and increasing awareness	(Sari et al., 2024) (Bahadori et al., 2024)			(Soja et al., 2021)
Health and Safety: ICT should support health needs, such as monitoring health conditions, detecting falls, and raising alarms. It should also facilitate communication with family and caregivers, allowing seniors to live independently in their homes			(Astasio-Picado et al., 2022) (Blok et al., 2022)	(Soja et al., 2021)

ICT capabilities needed for seniors	References 2024	References 2023	References 2022	References 2021
			(Sen et al., 2022)	
Understanding and Managing ICT Risks: Seniors should be able to understand and manage the perceived risks associated with ICT use. This includes addressing concerns about privacy, security, and the complexity of technology		(Sheahan et al., 2023)	(Kärnä et al., 2022)	
Problem-Solving and Adaptability: Seniors should develop problem-solving skills and adaptability to manage ICT-related issues. This includes being able to seek help when needed and using technology to address functional, social, or financial problems	(Sari et al., 2024) (Bahadori et al., 2024)	(Sheahan et al., 2023)	(Jung et al., 2022)	

Source: Name (Year)

Tabel II. Improvement of ICT Technology for Senior

How can seniors improve their ICT skills?	References 2024	References 2023	References 2022	References 2021
Seek Inter-Generational Support: Support from younger family members or community volunteers can be crucial in helping seniors learn and adapt to new technologies. This support can foster independence and personal autonomy	(Bahadori et al., 2024)	(Sheahan et al., 2023) (Tirado-Morueta et al., 2023)	(Kärnä et al., 2022)	
Participatory Learning: Engaging in co-created strategies and participatory methods can help seniors overcome barriers and improve digital literacy. This approach allows seniors to actively participate in the learning process, making it more relevant and effective	(Bahadori et al., 2024)	(Sheahan et al., 2023)		
Utilize Online Social Platforms: Seniors can use online social platforms to stay connected with family and friends, which can also serve as a practical way to practice and improve their ICT skills	(Bahadori et al., 2024)			(H. K. Choi & Lee, 2021)
Focus on Practical Applications: Seniors should focus on using ICT for practical, everyday tasks such as online shopping, digital banking, and accessing information. This not only enhances their skills but also promotes self-sufficiency and autonomy		(Sheahan et al., 2023)		(Bakshi & Bhattacharyya, 2021)
Participate in Online Courses and Workshops: Seniors can enroll in online courses specifically designed to improve digital literacy. These courses can help them overcome				(Llorente-Barroso et al., 2021)

How can seniors improve their ICT skills?	References 2024	References 2023	References 2022	References 2021
initial stress, fear, and embarrassment associated with learning new technologies. Offering free courses has been shown to encourage participation, as seen in initiatives by universities for the elderly				
Participate in Structured Training Programs: Engaging in formal courses or non-formal settings, such as peer support groups, can help seniors learn digital literacy skills effectively. These programs should be highly structured, provide feedback, and use simple and consistent user interfaces	(Sari et al., 2024)		(Kärnä et al., 2022)	
Utilize Community Resources: Community-based programs and public libraries can offer access to technology and training, especially in areas with low per capita income. These programs can also foster social interaction and reduce isolation	(Sari et al., 2024)	(Selwyn et al., 2003)	(Sen et al., 2022)	
Address Health-Related Barriers: Seniors facing health-related challenges, such as poor eyesight or cognitive impairments, should seek tailored training that accommodates these needs			(Chalghoumi et al., 2022)	

Source: Name (Year)

Tables I and II provide references that address the research questions: (1) What ICT capabilities are needed for seniors? Moreover, (2) How can seniors enhance their ICT skills? These tables compile relevant studies and findings highlighting the essential ICT skills required by older adults and the effective strategies for improving their digital competencies.

The integration of Information and Communication Technology (ICT) into the lives of older adults has emerged as a critical factor in promoting social inclusion, independence, and overall well-being. The study in Daoer Zenee Paroki Santo Antonius, Jakarta, emphasizes the need to improve ICT capabilities among senior adults, which has significant implications for individual and societal outcomes. This discussion reflects on the key findings of the research, their broader meaning, and their relation to the existing literature.

The study reveals several significant findings. First, it underscores that digital literacy, self-sufficiency, social connectivity, and the ability to manage ICT-related risks are fundamental skills that seniors need to develop. These capabilities allow older adults to actively engage in the digital society, maintain independence, and improve their overall well-being. The study also identifies participatory learning and intergenerational support as effective strategies for improving digital literacy and empowering seniors to utilize technology more effectively.

The findings carry substantial implications, particularly in the context of addressing the growing digital divide between younger and older generations. Digital literacy is not merely a technical skill but a determinant of quality of life for seniors, as it facilitates access to critical services such as telemedicine, online banking, and social networks. As the study indicates, fostering digital literacy among older adults can reduce feelings of isolation and enhance their sense of autonomy, which is critical for mental health and well-being. Moreover, the role of intergenerational support highlights

the importance of family and community involvement in helping seniors navigate new technologies. This is crucial, especially in societies where the older population may not have had exposure to ICT during their working lives.

The findings of this study are consistent with broader research on ICT and aging. For instance, (Yang et al., 2022) similarly identified that ICT positively influences seniors' cognitive abilities and social integration, while studies such as (Winstead et al., 2013) have shown that digital engagement reduces loneliness and improves mental health outcomes. The study also aligns with the work of (Jøranson et al., 2023) and (Blok et al., 2022), who found that technologies facilitating communication help seniors maintain social connectivity, which is essential for combating isolation and loneliness.

Moreover, the study's emphasis on tailored digital literacy programs mirrors findings from (E. Choi & Park, 2022; H. J. Choi & Park, 2022; Ngiam et al., 2022)., who noted that one-on-one mentoring and participatory learning approaches are highly effective in helping seniors acquire digital skills. This supports the idea that digital literacy programs need to be flexible and responsive to the diverse learning preferences of older adults. Furthermore, (Betts, L., Hill, R., & Gardner, 2017) emphasized that such programs should accommodate individual preferences to prevent seniors from feeling excluded or overwhelmed by technology.

This study contributes to the existing body of knowledge by focusing on seniors in Jakarta, Indonesia, offering a regional perspective on a global issue. While much of the existing literature has centered on ICT and aging in Western contexts, this research extends the understanding of how ICT can improve the lives of older adults in developing regions. It highlights the importance of community-based interventions, especially in regions where socioeconomic factors may limit access to digital technology. By focusing on participatory learning and intergenerational support, this study provides actionable insights for policymakers and organizations seeking to enhance digital inclusion for seniors.

In conclusion, this study offers valuable insights into the strategies for empowering senior adults through ICT. The research contributes to the broader discourse on aging and digital inclusion by identifying key capabilities and effective training approaches. Its findings are consistent with existing literature, further validating the critical role of ICT in enhancing older adults' well-being and social participation. Going forward, the study suggests that tailored, community-based interventions, alongside intergenerational support, will be essential in bridging the digital divide and promoting a more inclusive digital society for seniors.

4.   CONCLUSION

This study emphasizes the critical role of Information and Communication Technology (ICT) in empowering older adults, particularly concerning social inclusion, independence, and overall well-being. By identifying key ICT capabilities—such as digital literacy, self-sufficiency, and social connectivity—the research underscores the necessity of developing these skills to enable seniors to engage in an increasingly digital world actively. The findings indicate that participatory learning and intergenerational support are effective strategies for enhancing digital skills among seniors, ultimately leading to an improved quality of life. As the digital divide between generations continues to widen, these interventions are essential for fostering autonomy, reducing isolation, and promoting both mental and physical well-being among older adults. This study contributes to the growing body of research on digital inclusion for seniors by offering practical insights that can inform policies and programs aimed at bridging this divide. Additionally, it adds a regional perspective by focusing on older adults in Jakarta, Indonesia, thereby extending global discussions on ICT and ageing to a developing context.

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