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The Digital Divide: Implications for Training and Education

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Introduction

Digital Divide

- The gap between digital native learners and digital immigrant instructors, where the former surpasses the latter in the ability to use technology (Zenios & Ioannou, 2018)
 - Digital Immigrants (Born before 1980)
 - Digital natives (Born after 1980; Prensky, 2001b; Adjin-Tettey, 2020)
- Variations in digital divide can influence individual digital competence
- Digital nativity alone does not translate to digital competence

Digital Competence

- The comprehensive and transferable set of Information and Communication Technologies (ICT) knowledge, skills, and abilities (KSAs), including problem-solving, communication, and collaboration, applied efficiently, critically, and ethically in the digital economy (Lázaro-Cantabrana et al., 2019)



Study Objective

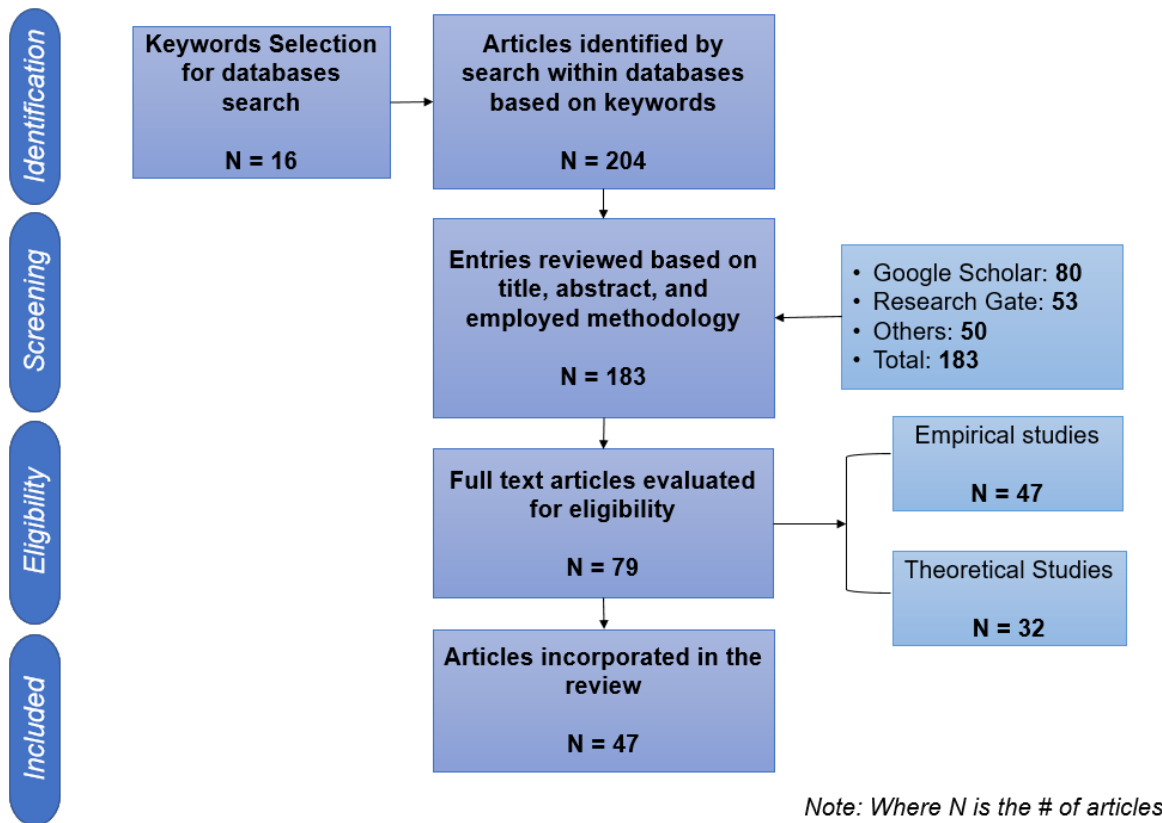


Purpose of the study

- To examine factors influencing the digital divide and digital competence
- To Identify implications for training organizations

Methods: Qualitative

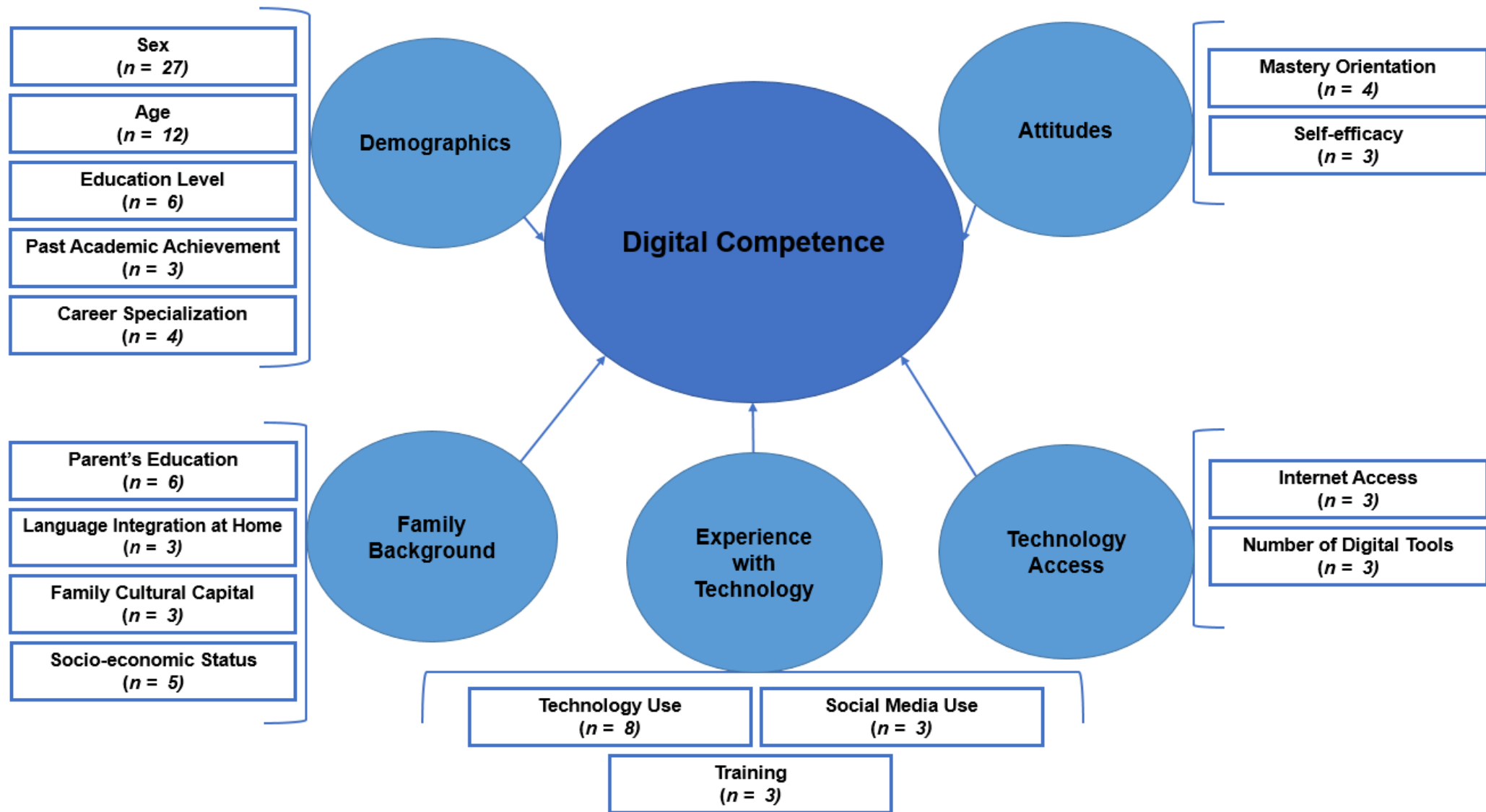
1. Systematic literature review



2. Thematic data analysis (Braun & Clarke, 2006)

- Inductive approach
- 5 steps
- Extracted relevant findings from articles
- Data coding and frequency counts
- Codes transformed into themes (factors)
- Themes grouped into categories

Findings: Factors Influencing Digital Competence



Demographic Factors

Factor	Description	Empirical Support	Findings
Age	Years an individual has been alive	12 studies indicate age significantly negatively influences digital competence (e.g., Anzari et al., 2021; Cabero-Almenara et al., 2023; Prensky, 2001a)	Older individuals were more likely to be less digitally competent compared to younger individuals
Sex	An individual's biological sex at birth (male or female)	26 studies reported the influence of sex on digital competence (e.g., Grande-de-Prado et al., 2020; Nguyen et al., 2024; Orakova et al., 2024)	Sex's influence on digital competence is inconclusive: in some cases, females exceed males in digital competence (e.g., digital literacy, digital resilience) whereas in other instances males exceed females (e.g., computer attitudes, technical literacy)

Demographic Factors Continued



Factor	Description	Empirical Support	Findings
Educational Level	An individual's highest level of education	6 studies reported education level to positively influence digital competence (e.g., Barboutidis & Stiakakis, 2023; Grande-de-Prado et al., 2020; Kaarakainen et al., 2018)	Higher education levels associated with greater digital literacy and competence
Career Specialization	An individual's field of study or employment	4 studies reported a positive influence of career specialization on digital competence (e.g., Barboutidis & Stiakakis, 2023; Çebi & Reisoğlu, 2020; Nguyen et al., 2024)	Individuals in fields, e.g., engineering, demonstrate greater digital competence compared to those in other fields e.g., humanities
Past Academic Achievements	An individual's success in previous academic engagements	3 studies reported a positive influence of past academic achievements on digital competence (e.g., Hatlevik et al., 2015a; 2015b; Jara et al., 2015)	Students with higher academic achievements, e.g., better grades and test scores, tend to have stronger digital competence than their counterparts

Family Background

Factor	Description	Empirical Support	Findings
Parents Education	The level of education of the mother and father	6 studies report a positive influence of parents' education on digital competence (e.g., Aydin, 2021; Cabero-Almenara et al., 2023; Tran et al., 2020)	Students' parents with university degrees demonstrated stronger ICT competence and digital skills compared to parents without higher education
Socio-economic Status (SES)	A family's social class based on income, school type, and occupational prestige	5 studies reported the positive influence of SES on digital competence (e.g., Jara et al., 2015; Tran et al., 2020; Urbancikova et al., 2017)	Students from higher SES backgrounds tend to have higher digital competence and ICT literacy

Family Background Continued



Factor	Description	Empirical Support	Findings
Family Cultural Capital	The number of resources at home, e.g., the number of books	3 studies reported the positive influence of family cultural capital on digital competence (e.g., Hatlevik et al., 2015a; Hatlevik et al., 2015b; Hatlevik & Christophersen, 2013)	Students with greater family cultural capital, e.g., more books at home, tend to have higher digital competence
Language Integration at Home	The number of languages spoken in the household	3 studies reported the positive influence of language integration at home on digital competence (e.g., Hatlevik et al., 2015a; Hatlevik et al., 2015b; Hatlevik & Christophersen, 2013)	Families that speak multiple languages at home are more likely to produce children with higher digital competence



Experience with Technology



Factor	Description	Empirical Support	Findings
Technology Use and Experience	The use of various technical tools e.g., computers, smartphones, and the amount of time spent using these tools	8 studies reported a positive influence of technology use and experience on digital competence (e.g., Aydin, 2021; Barboutidis & Stiakakis, 2023; Claro et al., 2018)	Increased experience with digital tools was associated with higher levels of digital competence
Training	The educational and professional methods used to incorporate technology in teaching and professional careers	3 studies reported a positive influence of training on digital competence (e.g., Kim et al., 2014; Krumsvik et al., 2016; Reisoğlu & Çebi, 2020)	Teachers with training, e.g., continuous ICT education, reported higher digital competence
Social Media Use	Using social networks, accessing websites with personal accounts, chatting, and downloading media or software	3 studies reported the positive influence of social media use on digital competence (e.g., Cristol & Gimbert; Jara et al., 2015; Lucas et al., 2021; 2018)	Daily social media use led to higher digital skills than less frequent use



Technology Access

Factor	Description	Empirical Support	Findings
Internet Access	The ability of the local user to exchange data with the public internet	3 studies reported a positive influence of internet access on digital competence (e.g., Aydin, 2021; Bariu, 2020; Zhong, 2011)	Internet access at home was positively related to digital skills whereas lack of connectivity stifled digital competence
Number of Digital Tools	The quantity of physical tools (e.g., computers, laptops) and application software tools used for storing, creating, and sharing information digitally	3 studies reported the positive influence of the number of digital tools on digital competence (e.g., Lucas et al., 2021; Kim et al., 2014; Samani et al., 2019)	Teachers' digital competence increased with greater number of tools used for teaching

Attitudes

Factor	Description	Empirical Support	Findings
Mastery Orientation	An individual's focus on personal growth, striving to acquire and improve skills and understanding, and the development of academic competence	4 studies reported a positive influence of mastery orientation on digital competence (e.g., Hatlevik et al., 2015a; Hatlevik et al., 2015b, Hatlevik & Christophersen, 2013)	Individuals scoring high on mastery orientation tended to report higher digital competence and significant ICT use
Self-efficacy	An individual's judgments of their capabilities to organize and execute actions required to attain designated types of performances	3 studies reported a positive influence of self-efficacy on digital competence (e.g., Çebi & Reisoğlu, 2020; Cristol & Gimbert, 2018; Hatlevik et al., 2015b)	Higher levels of self-efficacy were associated with higher levels of digital competence

Conclusion and Future Research

Summary of Findings

- 16 factors influence digital competence, categorized into demographics, family background, technology experience, technology access, and attitudes.

Implications for Training Organizations

- Identify demographic and family background factors to target interventions for individuals with potential for digital competence gaps
- Focus on attitudinal factors in training, provide diverse digital tools, and incorporate outreach programs to enhance digital exposure and skills

Implications for the Military

- Emphasize digital competence in military training; critical due to rise of cyber warfare and new technologies
- Develop strategic interventions for military instructors to bridge digital competence gaps and improve training effectiveness

Study Limitations and Future Research

- The literature review may lack comprehensiveness and generalizability,
 - e.g., majority of studies were from Europe and Asia
- Explore practical digital skills, extend beyond education to sectors like the military, and include more diverse regional studies

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Q & A

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