FACTORS INFLUENCING DIGITAL COMPETENCE OF HIGHER EDUCATION STUDENTS: A SCOPING REVIEW

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ABSTRACT

In today's society, digital competence is becoming increasingly relevant and important for functioning personally and professionally. Twenty-first-century students need competencies to adapt to a new type of individual information and individual-knowledge relationship, therefore, the education system should contemplate new ways for students' development in this so-called information and knowledge society. The purpose of the present scoping review is to provide a comprehensive overview of relevant research regarding factors influencing the digital competence of higher education students. Arksey and O'Malley's five-stage framework underpins the scoping review. Four databases were used to conduct the scoping literature review, including the EBSCOhost, Science Direct, Web of Science and Scopus. The inclusion criteria were peer-reviewed publications written in English from 2016–2022. Initially, 270 articles were found; the full texts of 67 articles were assessed; finally, 23 articles that met the inclusion criteria were included in the present research. This paper reports on three main categories: (1) characteristics of digital competence influencing factors, (2) digital competence measurement instrument, and (3) key findings. The study has identified the influencing factors of digital competence among university and college students, including socio-economic background, motivational belief strategies, attitudes towards ICTs, prior training on ICTs, digital citizenship skills, learning strategies, academic performance, study specialization, form and level. The study provides insights to improve students' digital competence education in universities. Future research should focus on interviewing students and educators to understand their perspectives on factors influencing digital competence.

Keywords: influencing factors, digital literacy, digital competence, university students, higher education

Introduction

Modern-day students have been raised in an era of information and communication technologies (ICTs) and exhibit a strong attachment and integration with a plethora of technological devices such as computers, video games, digital music players, video cameras, cell phones, and various other tools that are ubiquitous in the present-day digital era (Kennedy & Fox, 2013).

Students' digital competence plays a vital role in the new learning paradigm (Zhao et al., 2021). Digital competence can be understood as a beneficial component that allows making use of attitudes, knowledge, and processes related to information and communication technologies, through which students acquire skills to facilitate the transfer of knowledge and generate innovation (Iordache et al., 2017; Krumsvik, 2011). As they are the main subjects of education, students should be prepared to use digital competence in their academic life and careers (Radovanović et al., 2015).

Moreover, influenced by the Covid-19 pandemic, innovation has shifted teaching and learning, profoundly affecting learning models and philosophies. As prominent educational participants, students must be equipped with digital competence to face new challenges. However, most students must have the required or more detailed knowledge of digital competence.

Digital competence is becoming a more popular subject of multiple research articles. Digital competence related to the use of ICT is examined and assessed among university students (Arango-Morales et al., 2019; Galindo-Domínguez & Bezanilla 2021; Koyuncuoglu, 2022; Krelová et al., 2021; Martzoukou et al., 2020; Silva-Quiroz & Morales-Morgado, 2022; Vishnu et al., 2022; Zhao et al., 2021) also at the secondary level (Calvani et al., 2009) or is looking at developing these skills among teachers (Benali et al., 2018; Ghomi & Redecker, 2019; Jiménez-Hernández et al., 2020; Romero-Tena et al., 2021) or another workforce (Murawski & Bick, 2017; Shiferaw et al., 2020) in order to create significant educational environments for future citizens.

At the same time, while this techno-social phenomenon of the digital age has created excessive expectations and assumptions among educators and teachers regarding the level of students' digital competence, there is a lack of information about the factors that contribute to the development of digital competence. In order to be able to purposefully develop students' digital competence, it is necessary to find out what factors influence and produce a higher level of digital competence. This scoping review aims to provide a comprehensive overview of relevant research regarding factors influencing the digital competence of higher education students.

Methodology

A scoping review refers to a process of mapping or summarizing the existing literature to understand the range of the field (Davis et al., 2009). To illustrate the search results of the research and to provide an overview of the inclusion and exclusion criteria, the scoping review method was used, which is based on the framework of Arksey and O'Malley's (2005), which consists of five steps:
1) Identifying the research question;
2) Identifying relevant studies;
3) Study selection;
4) Charting the data;
5) Collating, summarizing, and reporting the results.

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To identify the categories of factors influencing digital competence, thematic analysis outlined by Braun and Clark (2006) was used.

Identifying the Research Question

To conduct a scoping review, the researchers formulated the following research question: What factors influence the level of digital competence among students in higher education?

Inclusion and exclusion criteria

Available publications were searched for in the following databases: the EBSCOhost, Web of Science, Science Direct, and Scopus. Studies were included if they were original English-language research articles, focusing predominantly on primary research studies on factors influencing the digital competence of higher education students. Any studies focused on other components of digital competence or target population were excluded. The detailed inclusion and exclusion criteria are given in Table 1.

The keywords and search terms used were organized as follows: ("digital competence factors") AND ("students" OR "university").

Table 1   Inclusion and exclusion criteria

Criteria	Included	Excluded
Time frame	2016–2022	Before 2016 and after 2022
Publication type	Online peer-reviewed articles	Policy documents, books, reports
Focus	Studies with a primary focus on factors Influencing Digital Competence	Articles focusing on other variables
Language	English	Other languages
Target population	Articles focusing on higher educatin students and digital competence assessment	Articles focusing on pupils, other population (seniors, special needs, adults)

Results

Study selection

The literature identification phase yielded 270 publications from the designated databases. Upon reviewing the abstracts, a substantial number of irrelevant articles, especially those regarding distinct populations, were identified. Subsequently, 42 records were removed, and the titles and abstracts of 228 articles were subjected to screening. Adhering to the predetermined inclusion and exclusion criteria, the abstracts of 67 publications underwent evaluation, resulting in the exclusion of 44 papers. Ultimately, 23 studies met the inclusion criteria. The selection of the workflow for the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) study can be observed in Figure 1.
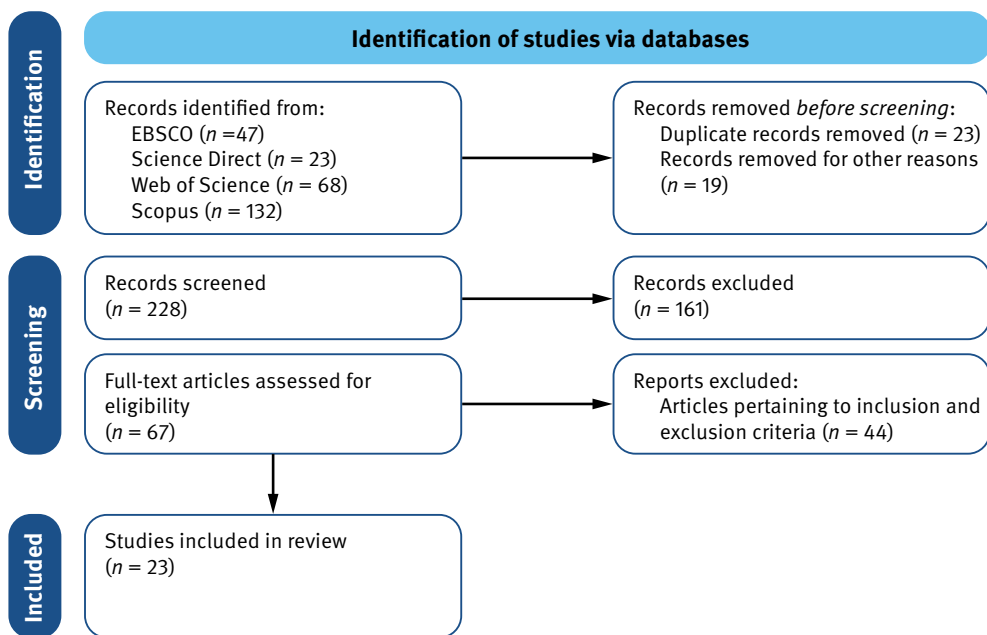
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Identification of studies via databases

Records identified from:
    EBSCO (n =47)
    Science Direct (n = 23)
    Web of Science (n = 68)
    Scopus (n = 132)

Records removed *before screening*:
    Duplicate records removed (n = 23)
    Records removed for other reasons
    (n = 19)

Records screened
(n = 228)

Records excluded
(n = 161)

Full-text articles assessed for
eligibility
(n = 67)

Reports excluded:
    Articles pertaining to inclusion and
    exclusion criteria (n = 44)

Studies included in review
(n = 23)

Figure 1   Flowchart depicting the search process for the scoping
review in accordance with the PRISMA guidelines

Characteristics of included studies

This section presents an initial overview of the studies. Included studies are summarised according to author(s), year of publication, country, study participants, study design, digital competence assessment instrument, influencing factors characteristics and key findings in Table 2.

This scoping review identified 23 articles from 15 different countries. The majority of the studies were conducted in China and Spain, with five studies each. Two studies were conducted in Chile, and one study each in the United Kingdom, Taiwan, and Malaysia. Out of the 23 studies, 22 employed a quantitative approach, which involved a descriptive, cross-sectional correlational design. The remaining study used a mixed-methods design.

Table 2   Characteristics of included studies

Classification	Number	%
Research design		
Quantitative	22	96%
Mixed-design	1	4%
Location		
Asia (China, India, , Korea, Vietnam)	10	43.5%
Europe (Spain, Czech Republic, Germany, Greece, Turkey, UK, Scotland, Ireland & Greece)	10	43.5%
South America (Chile, Mexico)	3	13%

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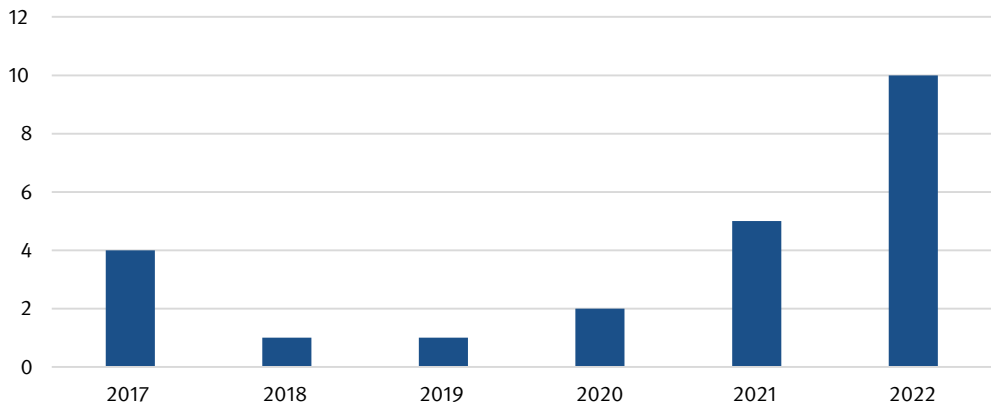
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Figure 2. Numbers of articles identified per year

Table 3 Factors influencing digital competence level

Sociodemographic	Individual	Family	Personal factors in learning and learning environment	External
• Age • Gender (male) • Higher economic profile • Parents' education level • Urban areas	• Prior training on ICTs • Personal effort to learn ICT • Digital informal learning (DIL); • Personal innovativeness • Technological Self Efficacy • Task Value Beliefs • Goal Orientation • Time management • Success status	• Prior Digital Experience with Family • Parental support	• Study program specialization • Study level • Study form • Students' approaches to learning • Curriculum proposal • Academic performance • Academic self- efficacy • Student autonomy • Teaching role	• Covid19 • Digital citizenship skills

The results show that there has been a significant increase in interest in digital competence and its influencing factors in recent years, as most articles reviewed were conducted between 2020 and 2022 (see Figure 2).

The articles that were included in the selection process are shown in Appendix A, which provide an overview of the studies' design, population, characteristics of digital competence influencing factors and key findings.

The study samples varied in size, with the smallest being 59 participants (Martzoukou et al., 2022) and the largest being 17,301 students (Cabero-Almenara et al., 2022).

This scoping review explores five thematic categories of digital competence influencing factors: sociodemographic factors, individual factors, family factors, personal factors in learning and learning environment, and external factors (see Table 3).

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Discussion

This scoping review compiled digital competence influencing factors among higher education students (see Appendix A). One of the most studied factors affecting digital competence is socio-demographic factors such as gender, place of residence, and income. A total of 23 studies were collected in this scoping review, of which 9 investigated the level of digital competence depending on gender. The obtained results show that men self-assess digital competence higher than women; this finding is confirmed by the results of 6 studies (Casillas et al., 2017; Nguyen & Habók, 2022; Prabhu et al., 2022; Vishnu et al., 2022; Wild & Schulze Heuling, 2020; Zhao et al., 2021). However, at the same time, several studies indicate that gender does not have a significant impact on digital competence (He & Chang, 2017; Koyuncuoglu, 2022; Vázquez-Cano et al., 2017).

Regarding the place of residence as a variable affecting digital competence, it should be noted that the digital divide between rural and urban areas still exists. The results of the studies reviewed in this scoping review also show that students who live in the city have a higher self-assessment of digital competence compared to students from rural areas (Silva Quiroz &Morales-Morgado, 2022; Zhao et al., 2021). The authors from the studies above suggested that this difference could be attributed to several factors, including the availability of resources such as access to high-speed internet, computer equipment, and technology-related infrastructure, which are often more limited in rural areas. Additionally, urban students may have greater exposure to digital tools and resources due to their proximity to urban centres where technological advancements are more frequently introduced and utilized.

Also, regarding age as a factor affecting digital competence, the results of the reviewed studies are ambiguous because, for example, within the framework of a study conducted in Spain, it was revealed that younger students show a higher level of digital competence (Cabero-Almenara et al., 2022). On the other hand, in the framework of the research conducted in Germany, on the contrary, older students showed higher levels of digital competence (Wild & Schulze Heuling, 2020).

It must be concluded that currently, there are contradictions as to whether factors such as gender and age affect digital competence because the research results are very different and are based on self-assessment instruments. Therefore, future research should be carried out with objective performance tests.

Another important group of factors affecting digital competence is connected to individual factors, such as prior training on ICTs, personal effort to learn ICT, informal digital learning, technological self-efficacy, task value beliefs, goal orientation, time management and success status.

The results of the included studies reveal that there is a association between previous training in the field of ICT and the subsequent development of the digital competence of students; that is, students who have received previous training showed a higher level of digital competence (Kim et al., 2018; Zhao et al., 2021).

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Another crucial factor influencing digital competence was identified by Chinese researchers. They observed a positive correlation between students' digital competence and their engagement in digital non-formal learning. Moreover, students possessing a higher level of digital competence were found to engage with informal digital learning to a greater extent than those with a lower level of digital competence (He & Chang, 2017).

Digital non-formal learning is an informal learning process using digital technologies such as the Internet, learning platforms and mobile apps. It differs from formal learning in that it is not strictly organized and structured but based on individual interests and needs. On the other hand, in a study conducted in Spain, researchers found that students who managed their time more effectively and considered themselves to be more effective in their study process also showed higher levels of digital competence. The authors of the study mentioned above emphasized that persons who have a solid understanding of the use of information and communication technologies for various purposes (performing various tasks, searching for information, solving problems, etc.) are better able to solve tasks and manage their time, thus feeling more efficient and taking less harmful stress (Galindo-Domínguez & Bezanilla, 2021).

In contrast, a study examined the relationship between motivational belief strategies and digital literacy in digital learning among university students in Malaysia. The results showed that task-value beliefs and goal-orientation strategies promote digital literacy. Task value belief strategies encompass interest, utility, and intrinsic value (Pintrich, 1999). Goal orientation strategies are based on mastery, extrinsic, and relative ability orientation, which is vital in acquiring digital literacy (Wolters et al., 1996). This same study found that technological self-efficacy was the second most significant factor in predicting digital competence. There is an opinion that highly self-efficacious students are more adventurous in trying out anything new and put forth more effort, persistence, and perseverance in accomplishing tasks in digital learning (Prior et al., 2016; Shopova, 2014). Another notable finding from the scoping review was that students with exceptional academic performance exhibited more excellent digital competencies than their peers with low or average academic success levels (Koyuncuoglu, 2022).

Family-related factors were identified as the next group of factors affecting digital competence: prior digital experiences with family and parental support. For example, a study in Korea concluded that students' prior experience with digital technology, particularly with family, positively influenced their level of digital competence and attitude toward using digital technologies in college (Kim et al., 2018). Also, Li and colleagues point out that parental support significantly moderates digitalization, digital competence, and educational performance in college students (Li at al., 2022).

Students' digital competence is also affected by personal factors in the learning and learning environment: study program specialization, study level, study form, students' approaches to learning, curriculum proposal, academic performance, academic self-efficacy, student autonomy and teaching role (Arango-Morales et al., 2019; Galindo-Domínguez & Bezanilla, 2021; Koyuncuoglu, 2022; Krelová et al., 2021; Martzoukou et al., 2020; Wild & Schulze Heuling, 2020; Zhao et al., 2021)

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Differences in digital competence have also been observed among students who study in study programs of different levels, emphasizing that senior-year students show a higher level of digital competence (Nguyen & Habók, 2022; Vishnu et al., 2022; Wild & Schulze Heuling, 2020; Zhao et al., 2021).

Within the framework of the scoping review, only one of the included studies analyzed the level of digital competence of students depending on the specialization of the study program; that is, in a study conducted by Wang and colleagues (2021), it was discovered that strictly female students from humanities and social sciences disciplines and lower-income families demonstrated the weakest digital competence compared to students from natural sciences and engineering disciplines (Wang et al., 2021).

Similar to the specialization of the study program, the form of study as a factor affecting digital competence is rarely studied. Among the 23 studies reviewed, only one study specifically examined the association between these two variables. The findings from this study revealed no statistically significant differences in the form of study (online versus face-to-face) and its effect on digital competence (Krelová et al., 2021). Therefore, further investigation is needed to understand better the relationship between the form of study and digital competence.

Curriculum proposal was identified as another factor affecting digital competence. A study by Arango-Morales and colleagues (2019) found that curriculum proposal has links with digital competence dimensions such as digital knowledge, network leadership and networked collaborative learning. The association of the teaching role with the curriculum proposal was showing that teaching skills, the use of pedagogical methods, and the professional experience of teachers as facilitators of knowledge support the effective management of the curricular proposal (Arango–Morales et al., 2019).

Research results regarding academic success rate as a factor influencing digital competence are mixed. This relationship was investigated in two of the 23 included studies, and in one case, a study by researcher Koyuncuoglu (2022) found no statistically significant differences. On the other hand, in China, it was proven that students with higher grades had shown better self-perception in all areas of digital competence (Zhao et al., 2021).

Another study revealed that student autonomy could affect the level of digital competence, i.e. students with higher independent learning skills also have a higher level of digital competence (Arango-Morales et al., 2019). The study mentioned above also investigated the role of the teacher in developing digital competence among tourism students and concluded that teaching role components as teaching skills, the use of pedagogical methods, and teachers' professional experience as facilitators of knowledge support the effective management of the curriculum proposal. Therefore, it has proven to have clear objectives and remain at the forefront of tourism education, thus helping students better develop digital competence (Arango-Morales et al., 2019).

Analyzing studies on factors affecting digital competence, such factors as digital civic participation skills and the impact of the Covid-19 pandemic were also identified. A 2021 study conducted in Spain confirmed that the crisis caused by the pandemic had

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an impact on students' self-assessment of digital competence. Researchers Romero-Tena and colleagues found that students who did not experience the Covid-19 pandemic showed a higher digital competence self-assessment than those who had to study during the pandemic conditions (Romero-Tena et al., 2021). The effects of isolation, social distancing, and fear of contracting Covid-19 have impacted and potentially altered students' perceptions of their environment and themselves, leading to unfavourable learning outcomes. As education plays a crucial role in acquiring essential digital competencies today, there is a need to reconsider curriculum plans to better adapt to the demands of students' and teachers' digital competence.

On the other hand, the researcher Martzoukou conducted both in 2019 and 2021 in some groups of students, found that the previous daily participation of students as a digital citizen can contribute to several essential skills, such as the ability to identify information in different contexts, students' digital learning, digital abilities completing academic work, information literacy skills and the skills to manage their digital well-being and identity (Martzoukou et al., 2020; Martzoukou et al., 2022).

Limitations

The approach of this scoping review had limitations. First, the selection process, the inclusion, and the exclusion criteria have influenced the outcomes of this scoping review. The exclusion of non-English studies further limits the inclusion of potentially relevant studies. This scoping review did not conduct a quality appraisal of the research included, which may have influenced the interpretation of the research results. In most of the included studies, a correlational design was used, which does not allow for making unambiguous conclusions about causality. Therefore, they identified factors related to digital competence rather than only influencing factors.

Conclusions

Digital technologies have been largely introduced into all fields, including higher education. The current students have grown up surrounded by technology, which reflected in their behaviour and learning culture. This scoping review followed Arksey and O'Malley's methodology and reported results using PRISMA-ScR to provide factors influencing the digital competence of higher education students. This review found that many factors, such as sociodemographic factors, individual and family factors, personal factors in learning and learning environment, and external factors, influence the formation of digital competence. Through the results, students living in a digitally enriched environment at home and at university demonstrate that digital technologies are purposefully used in the study process. To appropriately support students, it is necessary to consider a customized approach based on students' digital experiences, including families, personal traits, attitudes, and efforts, which can nurture different levels of adaptability to digital technologies.

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The digital competence influencing factors discovered in the scoping review could be helpful for both universities and education policymakers in developing digital competence assessment tools and supporting the effective development of digital competence in higher education.

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Appendix A

Overview of the articles identified through databases screening

First author, year, country	Study design	Study population	Key findings	Influencing factor	Thematic categories of influencing factors
Arango-Morales et al. (2019) Mexico	quantitative	400 tourism students	Teaching role, the curriculum proposal, and the student autonomy as elements of professional training impact digital competence to creatively develop and use digital knowledge, manage information in support of academic activities, effectively use the media, and promote collaborative learning and leadership in the network.	Teaching role Curriculum proposal Student autonomy	Personal factors in learning and learning environment
Cabero-Almenara et al. (2022), Chile	quantitative	17301 students	Older students self-evaluated themselves as less competent that the younger students. Students who have never repeated a course show better digital skills than those who have. If the students use more than three digital resources in their learning process, their probability of acquiring a high level of digital competence increases to 66%. For the students who had never repeated a course, the levels of education of both mother and father were significant predictors. As for the students who repeated, only the level of education of the father had an influence on the digital skills of the children.	Age Level of education of the Father Level of education of the Mother Repeated an academic year Use of ICT resources	Sociodemographic Personal factors in learning and learning environment
Casillas et al. (2017) Spain	ex post facto research	580 students	The results show that, of these future educators, men score higher than women in ICT knowledge and use, while women score higher in attitude.	Gender (Men)	Sociodemographic
Galindo-Domínguez & Bezanilla (2021) Spain	quantitative	200 students	Students who managed their time better and perceived themselves as more efficient in their work had higher levels of digital competence	Time management Academic self- efficacy	Individual Personal factors in learning and learning environment
He and Chang (2017), China	quantitative	235 students	University students' digital competence has a positive association with students' DIL, while students with higher level of digital competence tend to more get involved in DIL. No significant differences between men and women were found in the study.	Gender Digital informal learning (DIL);	Sociodemographic Personal factors in learning and learning environment

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First author, year, country	Study design	Study population	Key findings	Influencing factor	Thematic categories of influencing factors
Jiménez-Cortés et al. (2017), Spain	quanti-tative	368 female students	Women who used a wider variety of strategies to learn ICT attained more advanced digital skills. Those who learnt intensively and expansively were the ones who reached the highest level of digital competence	Learning strategies	Personal factors in learning and learning environment
Kim et al. (2018), Korea	quanti-tative	381 uni-versity students	Students' prior experience with digital technology, particularly with family, positively predicts the level of digital competence and attitude toward using digital technologies in college. Prior digital experience with personal effort was verified as positively and significantly associated with attitudes toward digital technologies. Students' prior digital experiences positively and indirectly influence student engagement, which are connected to learning outcomes in higher education. College students who live in a digitally enriched environment at home and school are expected to engage in learning and adopt digital technologies effectively.	Prior experience (training) with Digital technology Family influence Personal effort to learn ICT	Family Individual
Koyuncuoglu (2022) Turkey	quanti-tative	373 stu-dents	No significant differences were found in the digital competence and technology competences of the participating university students in general according to their gender. Students with very high success levels were found to have higher digital competencies compared to students with low and medium success levels. Technological competencies of university students increase depending on digital competence.	Gender Success status	Sociodemo-graphic Individual
Krelová et al. (2021) Czech Republic	quanti-tative	1233 stu-dents courses	Students who studied in high-er-level programs showed higher digital competence. No statistically significant differences were found regarding the form of studies (online vs face-to-face).	Study level Study form	Personal factors in learning and learning environment

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Li et al. (2022) China	quanti-tative	low-income college students	Findings exposed that with the 1% increase in digital competencies, sports educational performance will also increase by 0.307%	Parental support	Family
Lilian (2022) Malaysia	quanti-tative	583 students (19–22 years of age)	The study's findings corroborate a positive and significant relationship between goal orientation, motivational belief strategies, task-value beliefs and digital literacy competency.	Technological Self Efficacy Task Value Beliefs Goal Orientation	Individual
Martzoukou et al. (2020) Scotland, Ireland and Greece	quanti-tative	61 post-graduate students; 97 under-graduate students	More years of learning and previous experiences as a digital citizen within the everyday life of digital environment indicate a higher level of digital competence.	Year and level of study Digital citizenship skills	Personal factors in learning and learning environment External
Martzoukou et al. (2022) UK	mixed design	59 students	Digital citizenship skills have a positive impact on the development of different technical and higher-level digital competences.	Everyday participation as digital citizen (digital citizenship)	External
Nguyen & Habók (2022) Vietnam	quanti-tative	1661 students	Male students have a better knowledge of digital literacy than female students. Seniors and sophomores have a better DL knowledge than the two other year groups, and seniors achieved the best results in digital literacy tests compared to the other groups.	Gender (Men) Study level	Sociodemographic Personal factors in learning and learning environment
Niu et al., (2022) China	quanti-tative	477 university students	The deep and organized approaches to learning were positively associated with digital competence with statistical significance, while the surface approach to learning was negatively related to it.	students' approaches to learning	Personal factors in learning and learning environment
Prabhu et al. (2022) India	quanti-tative	359 hospitality graduates	Male students had better competence in solving technical problems, identifying needs and technological responses, innovating using technology creatively, and identifying digital competence gaps.	Gender (Men)	Sociodemographic

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Romero-Tena et al., (2021) Spain	quantitative	559 students	Results showed that the group that did not experience the conditions caused by the Covid-19 pandemic showed a higher self-assessment of digital competence than the group of students who had to study during the conditions of the Covid-19 pandemic.	Covid-19	External
Silva-Quiroz & Morales-Morgado, (2022) Chile	quantitative	817 students	The level of digital competence was higher among students of private establishments and those who attend universities located in the central area.	Place of residence (urban area)	Sociodemographic
Vázquez-Cano et al. (2017) Spain	quantitative	923 students	Men had greater perceived competence in digital cartography and online presentations, whereas women preferred to request personal tutorials to resolve doubts about technology and had greater perceived competence in corporate emailing.	Gender	Sociodemographic
Vishnu et al. (2022) India	quantitative	833 students	The mean overall score of digital competence for male students was significantly higher than for female students. Male respondents tended to have higher mean scores in the specific dimensions of digital competence. Post-graduates and doctoral students had a higher mean overall score compared to first-year graduates.	Gender (Men) Study level	Sociodemographic Personal factors in learning and learning environment
Wang et al. (2021) China	quantitative	695 students	Female students from humanities and social sciences and lower-income families demonstrated the weakest digital competence compared to students from nature and engineering disciplines.	Study program specialization Economic profile	Personal factors in learning and learning environment Sociodemographic
Wild& Schulze Heuling (2020) Germany	quantitative	893 students	Students in cooperative higher education institutions had more advanced digital competencies than those in vocational training programmes. Male students showed slightly higher abilities than female ones. Older participants generally had more advanced competences	Study level Gender (Men) Age (older students)	Personal factors in learning and learning environment Sociodemographic

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First author, year, country	Study design	Study population	Key findings	Influencing factor	Thematic categories of influencing factors
Zhao et al. (2021) China	quanti-tative	5164 uni-versity students	Men students rated themselves higher than women students in several sections of digital competencies such as information and data literacy, digital content creation and problem solving. Students in with the higher grades have showed better self-per-ception in all areas of digital competence. Digital competence is perceived to be on average better in students living in urban areas. Students with previous formal training show a higher level of self-perception in terms of digital competence.	Gender (Men) Place of residence (urban area) Academic performance Prior training on ICTs	Sociodemo-graphic Personal factors in learning and learning environment Individual

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