

Digital leadership at universities – a systematic literature review

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Abstract

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The environment in which organisations (including universities) operate is increasingly enforcing digital transformation, the success of which depends not only on the technology to be implemented but also – and in particular – on the human factor. Leaders play a major role in guiding the organisation through the change process. This article attempts to synthesise researchers' scientific pursuits to date when it comes to digital leadership at universities. The purpose of this work is to evaluate and synthesise the published literature referring to digital leadership at universities and to identify future directions for research on academic digital leadership. A systematic review of the literature was conducted in order to identify the state of the art and to integrate and synthesise the existing body of literature on this topic. The research was undertaken based on two main databases: Scopus and Web of Science. In line with the selection stages and criteria adopted, 20 articles were subjected to the final analysis. Keyword mapping was carried out as part of the review, which made it possible to create three clusters. The first cluster combines leadership with the area of digital competence building, the second cluster focuses around digital transformation at universities, and the third cluster is related to digital leadership, namely the characteristics of digital leaders. The results of the analysis combined with the rapidly increasing popularity of topics related to digital transformation in its broadest sense demonstrate that the contemplated research field is in the early growth phase and requires further exploration.

Key words

digital leadership, university, e-leadership, higher education, digital transformation, systematic review

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Introduction

Digital technology has changed and is changing organisations in an irreversible way. “Rapidly changing technological innovations disrupt lives and workplaces” (Launer et al., 2022). Regardless of the size, companies in various sectors have transformed their jobs

into digital ones (Cortellazzo et al., 2019). Digitisation creates new challenges for leaders, including educational leaders. The COVID-19 pandemic was such a challenge for the educational sector. Many authors stress its impact on the accelerated digitisation of higher education institutions and on the initiation of likely deep and permanent changes (Jorge-Vázquez et al., 2021; Rodríguez-Abitia et al., 2021; Marinoni et al., 2020).

The concept of digital leadership emerged in the 21st century with the progress of digital transformation. Many authors have stressed the importance of leaders in the digitisation of organisations (Sanatigar et al., 2017; Bozkurt and Sharma, 2020; Fullan et al., 2020). Research by Patiar and Wang (2020) has shown that digital leaders inspire their workers to engage in innovative behaviour at work thanks to the mastery of digital data and other digital resources.

Difficulties in defining and operationalising the concept of digital leadership are observable. Other terms describing digital leadership also appear in the literature, such as *ICT leadership* (Cifuentes-Álvarez and Vanderlinde, 2015), *technology leadership* (Yuting et al., 2022), and *e-leadership* (Avolio et al., 2001). While analysing the concept of *digital leadership* in the literature, Ebel and Drews (2021) demonstrated that the relationship between the concepts of *digital leadership* and *e-leadership* is unclear. In their opinion, the concept of digital leadership is more extensive than e-leadership. While e-leadership uses technology to support the existing business (Das Guta, 2011), digital leadership is an instrument for achieving the objectives of digital business models, digital organisation and employee management (Oberer and Erkollar, 2018; Kane et al., 2019). They suggested the following definition of digital leadership: ‘...it is a complex structure aimed at the customer-oriented, technology-based business model through the transformation of the role, skills and style of a digital leader, implementation of a digital organisation including

management, the vision of values, structure, culture and decision-making processes as well as the adaptation of the management of people, virtual teams, knowledge, communication and cooperation on an individual level (Ebel and Drews, 2021).

The concept of *digital leadership at universities* is new and not yet established in research. It refers to the integration of the portfolio of technologies, tools and instruments such as the Internet of Things (IoT), e-platforms (webinars), social media, artificial intelligence, Big Data and machine learning (Antonopoulou et al., 2020). Sterrett and Richardson (2019) maintain that digital leaders have to demonstrate knowledge and experience in technology integration in the educational context. Despite the growing interest in the discussion about the relationship between leadership and digital technology, the collected studies address the various disciplines in a fragmented manner, which makes it more difficult for universities to find useful patterns of digital transformations (Schwarz Müller et al., 2018; Cortellazzo, 2019).

An exploration of the literature shows a lack of systematic reviews of the literature on digital leadership at universities. Similarly to other organisations, universities see a great need to initiate digital transformation processes that would encompass teaching, administrative, and scientific processes alike. There is a lack of scientific studies and solid research that would systematise the knowledge in this area. The complexity of the leadership process and the interdisciplinary nature of the issue of digital leadership at universities require research to be carried out in this area.

This raises the need to systematise the current knowledge in the area of digital academic leadership and to identify the existing streams of research and the emerging future directions thereof.

The structure of the article is as follows. The next section of the article presents a description of the methodological approach and

the steps taken as part of the systematic literature review. The data collected in the research process is then presented, in the form of both bibliometric data and qualitative content analysis of the contents of the articles selected for analysis. The discussion section presents the contribution, identifies the potential directions for future research in the area of digital leadership at universities, and outlines the limitations of the analysis conducted. The article ends with some concluding remarks.

1. Methodology

The purpose of this work is to evaluate and synthesise the published literature referring to digital leadership at universities and to identify future directions of the research of academic digital leadership.

The following research questions were asked in this article:

RQ1. Is the concept of digital academic leadership widely covered in the literature?

RQ2. What types of empirical research are conducted in the area of academic digital leadership?

RQ3. What are the newly emerging research directions related to this research area?

The answers to these questions were sought by using a systematic literature review, which is a repeatable, scientific, and transparent process (Tranfield et al., 2003). It includes three main stages: (1) data collection, (2) data analysis, and (3) synthesis (Hanelt et al., 2021).

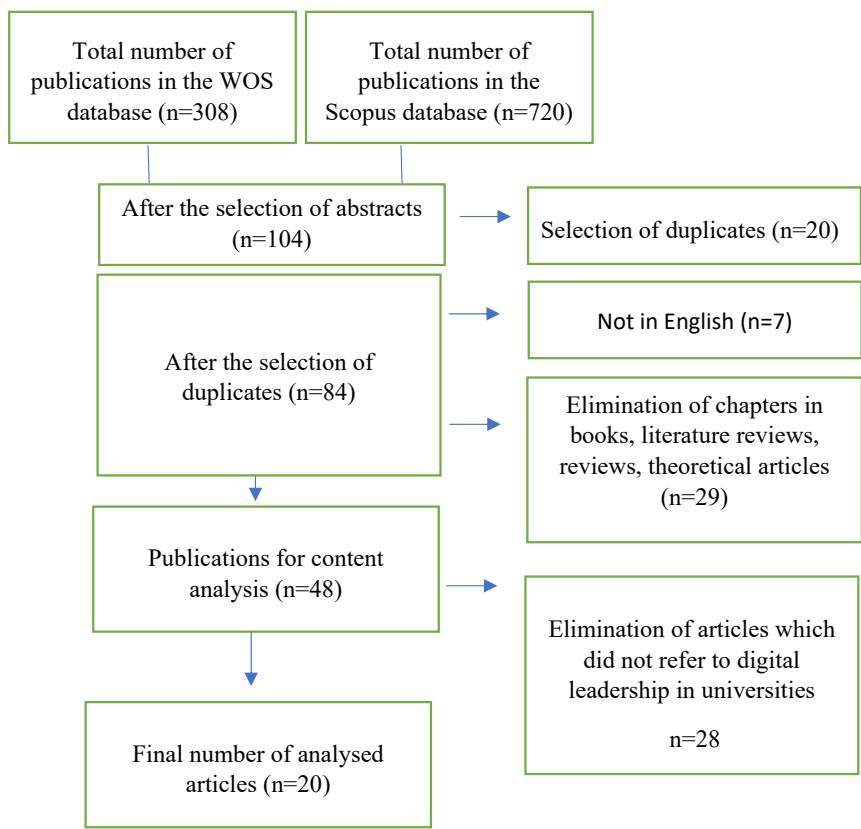
The systematic literature review procedure included both quantitative research (bibliometric analysis) and qualitative research based on content analysis (Cortellazzo et al., 2019; Zupic and Cater, 2015).

A systematic review of the literature was conducted in order to identify the state of the art, to integrate and synthesise the existing body of literature on this topic and propose possible directions for further research. The procedure was comprised of three stages:

1. Separation of databases and the collection of publications,
2. Selection of publications and database compilation,
3. Bibliometric analysis, content analysis and verification of the usefulness of the results obtained in further research.

The research was conducted on two main databases (Scopus and Web of Science) containing periodicals with the most significant impact in the field of knowledge. The focus was on searching for texts referring to issues of digital leadership in higher education, which is why a set of words was chosen for the analysis, which were searched for in the titles, abstracts and keywords of publications contained in the two above-mentioned databases ((TS=(digital)) AND TS=(leadership)) AND TS=((‘higher education’ OR university)). A combination of higher education and university education was purposefully included in the analysis. Both these terms are used to refer to higher education. However, *higher education* is a broad term that covers secondary school education in certain countries, which, in the final stage of the analysis (analysis of the full texts of the articles), resulted in the exclusion of all publications that did not refer to university education. The analysis was conducted from 1 June to 10 June 2022. The search strategy is presented in Figure 1 in the form of a PRISMA diagram (Moher et al., 2009).

Figure 1. Search and selection strategy – PRISMA diagram



Source: own elaboration

1028 publications were selected in the first phase of the search and 104 titles were obtained after the selection of abstracts. Those articles that did not relate to the issue under study were rejected, despite the fact that they met the criteria set in the keyword combination and treated digital leadership issues rather as a side topic. Articles that referred only to online learning or presented issues related to the implementation of teaching programmes pertaining to digital leadership were also rejected. Because some of the abstracts did not accurately describe the contents of the articles, at this stage, the 104 articles also included theoretical studies, which were excluded only in subsequent stages of the review. After that, repeated articles and all publications in languages

other than English were eliminated. Only empirical articles qualified for the review. Reviews, book chapters and overview articles of a theoretical nature were eliminated. Literature reviews were excluded to avoid duplicated research. Empirical publications presenting quantitative, qualitative or mixed research were left, resulting in a set of 48 articles. The next phase was the qualitative analysis of the full text. A qualitative analysis was then undertaken to verify the research area. Only those articles that referred to leadership in the area of university digitisation remained; articles on research conducted in secondary schools and those publications that referred to the COVID-19 pandemic and focused on crisis management and adaptation to change with the

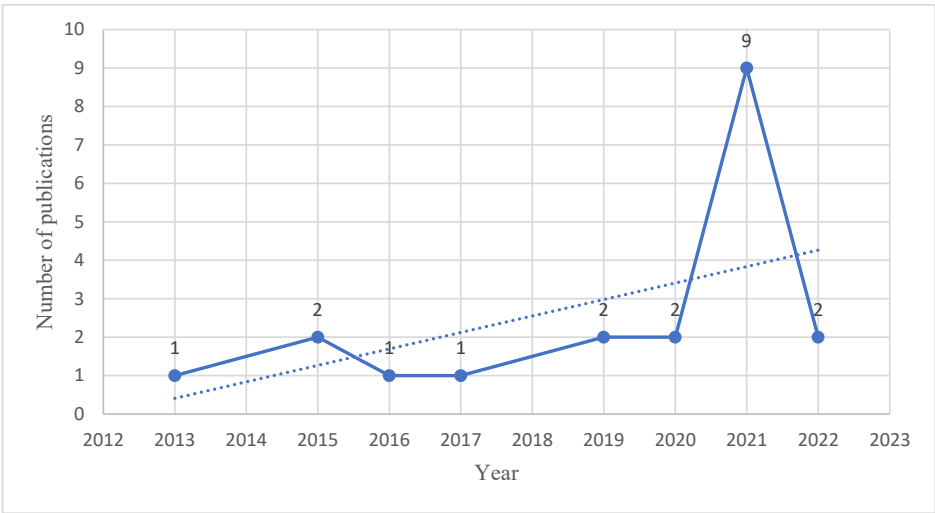
digital leadership aspect not discussed were excluded. In line with the adopted selection stages and criteria, 20 articles were subjected to the final analysis. The very fact that the number of articles presenting empirical research on digital leadership in universities was so small demonstrates that the subject is still very little explored and digital leadership at universities as a research field is in its early growth phase.

2. Research findings

The analysis of the number of publications in consecutive years makes it possible to determine the stage of development of a research area. Publication dates were not a selection criterion at the beginning of the

analysis. The articles eventually selected for analysis were published in the period 2013-2022. Figure 2 shows the publication trend line in the area. It can be seen that nine articles were published in 2013-2020, i.e. one article per year on average. An increase occurred in 2021 when nine articles were published. The figure demonstrates that 50% of the analysed articles were published in 2013-2020, i.e. within a seven-year period, while the other 50% were published within the following two years, in 2021-2022. The increase probably resulted from the COVID-19 pandemic that forced universities to organise their didactic and administrative processes remotely with the use of digital tools, which led to a greater interest in digital transformation at universities.

Figure 2. Number of publications on digital academic leadership in 2013-2022



Source: own elaboration

Considering the citation analysis (see Table 3), it can be seen that none among the selected publications can be called a seminal study. The publication by Garrison and Vaughan had 81 citations, but it should be added that it was published in 2013 and therefore was the oldest of all the articles selected for analysis. Among the analysed

articles, 20% (five) of the articles have no citations and 45% (nine) have no more than 10 citations. A detailed list of the citation rates is presented in Table 3. The data collected shows that the topic of digital leadership at universities has been little explored, with no leading concept or article that would be of key importance to this research area.

20 articles were published in 18 different journals. Considering the research areas of the journals (based on the Scopus classification), it can be seen that half of the journals were classified in the Education area (10), including four in the area of Education and six in the areas of Education and Computer Science. Two journals were classified as being in the Computer Science area. Other journals represented individual areas such as: Multidisciplinary, Social Sciences: Library

and Information Sciences, Social Sciences, Computer Science, Engineering; Psychology; Cultural Studies, Communication; Business, Management and Accounting. The variety of journals in which articles related to digital leadership at universities are published confirms that this area arouses the interest of several different disciplines, with the potential for designing interdisciplinary research, but also justifies the need to systematise and adapt future research directions.

Table 1. Distribution of publications per author

Authors	Journal title	Year of publication	Citation rate
Garrison and Vaughan	Internet and Higher Education	2013	81
Tay and Low	International Journal of Productivity and Performance Management	2017	30
Binh and Le, 2015	Library Management	2015	24
Rodríguez-Abitia et al.	Future Internet	2021	12
Antonopoulou et al.	Emerging Science Journal	2021	12
Rodríguez-Abitia et al.	Sustainability	2020	11
Newland and Handley	Research in Learning Technology	2016	9
Cifuentes-Álvarez and Vanderlinde	Comunicar	2015	8
Antonopoulou et al.	International Journal of Learning, Teaching and Educational Research	2019	7
Antonopoulou et al.	International Journal of Learning, Teaching and Educational Research	2020	5
Antonopoulou et al.	Emerging Science Journal	2021	5
Avidov-Ungara et al.	Journal of Research on Technology in Education	2022	4
Laufer et al.	Educational Technology in Higher Education	2021	2
Holth and Boe	Frontiers in Psychology	2019	1
Pramono et al.	Asian Journal of University	2021	1
Vázquez et al.	Education Science	2021	0
Masrur	Journal of Social Studies Education Research	2021	0
Msila	International Journal of Information and Education Technology	2021	0

Authors	Journal title	Year of publication	Citation rate
Kotula et al.	Procedia Computer Science	2021	0
Yuting et al.	Education and Information Technologies	2022	0

Source: own elaboration

The majority of research approaches represented in the articles are quantitative – 50% (10) of the analysed articles were based on quantitative research, 40% (eight) of them were based on qualitative research and 10% (two) represented mixed approach (Figure 3).

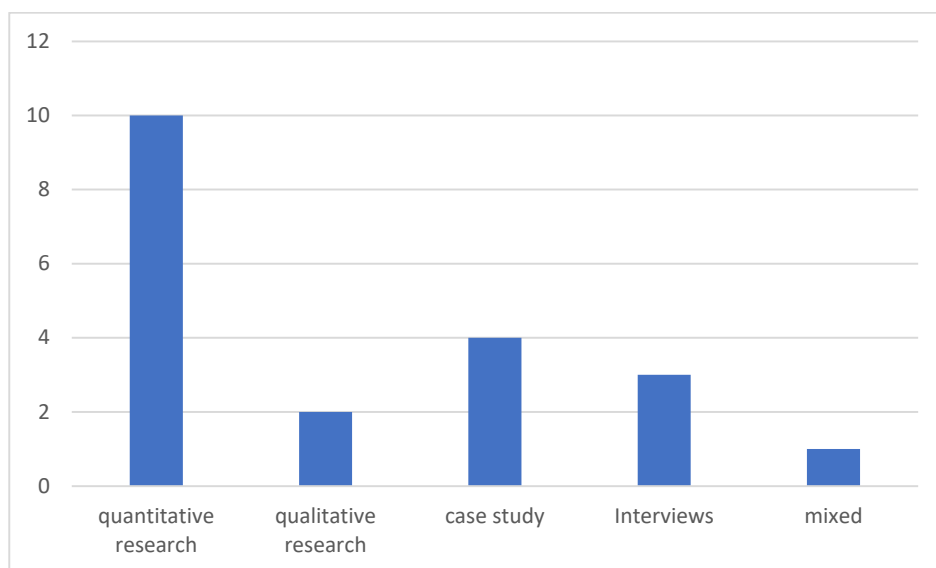
In the case of quantitative research, a survey questionnaire was the research tool used by the authors of the publication. Research samples ranged from 15 to 298 people. The largest research samples consisted of teachers. Of the 10 articles which made use of quantitative research, four referred to research conducted among teachers and the

other six referred to research conducted among university staff, e.g. members of the Senate, heads of individual university departments and library staff.

Qualitative research was based on the analysis of the content of interviews (15%; three), case study description (20%; four), the analysis of the social media content published by representatives of university authorities (one) and analysis of metaphors (one).

Mixed research used both the quantitative approach, most often with the use of questionnaires, and the qualitative approach, e.g. interviews, observations and documentation analysis.

Figure 3. The research approach applied in the analysed articles



Source: own elaboration

Figure 4 shows a network diagram based on the co-occurrence of the 24 most important keywords used by authors. The system was

generated with the use of the Fruchterman-Reingold algorithm. The size of each apex is proportional to its degree (frequency of

occurrence as a keyword). Colours indicate clusters of keywords identified with the use of the leading eigenvector algorithm (Newman, 2006) (see Table 1). Dotted lines connect the apexes belonging to different communities. The analysis was conducted with the use of the bibliometric package in the R language (Aria and Cuccurullo, 2017).

Figure 4. 24 most important keywords co-occurrence network diagram

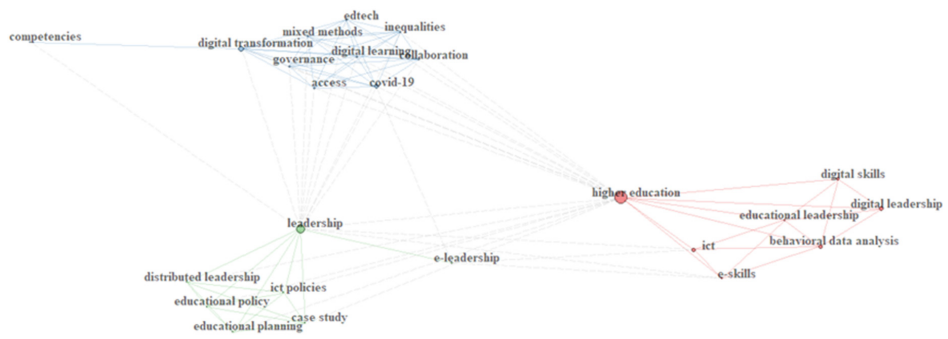


Table 2. Cluster analysis of keywords

Cluster	Keywords
1	higher education, digital leadership, behavioural data analysis, ICT, digital skills, e-skills, educational leadership
2	COVID-19, digital transformation, access, collaboration, competencies, digital learning, edtech, governance, inequalities, mixed methods
3	leadership, e-leadership, case study, distributed leadership, educational planning, educational policy, ICT policies

Source: own elaboration

Higher education is the most frequently occurring expression (in eight out of 20 texts analysed). Three groups were distinguished:

1. The group related to *higher education* where the focus is on developing the digital competencies of university staff and the impact of a leader and leadership on e-competencies;
2. The group related to digital transformation. Transformation most often appears in the context of the COVID-19 pandemic, remote learning, inequality and access,
3. The group related to the concept of leadership. The concept of leadership occurs in a systemic context, not just on the level of an organisation but

also in connection with reforms and education policy.

A list of publications presenting the clusters characterised above is shown below with the indication of the purpose of the research and its main conclusions. The first cluster covers articles that combine leadership with the area of development of digital competencies or the competencies necessary to function in a digital world. Institutional leadership implemented with the use of technological resources and an offer of specific digital skills training programmes determines the degree of acquisition of digital competencies by university teachers (Vázquez et al., 2021). Similar results were obtained by Yuting et al. (2022), who studied Chinese teachers. According

to Masrur (2021), the determination of the direction of digital development by a digital leader can be one of the most influential factors in the development of teachers' pedagogical competencies. Antonopoulou et al.

(2021) indicate the set of digital competencies that an effective digital leader needs, i.e. the use of social media, mobile apps and online tools as well as cloud computing and the use of Big Data.

Table 3. Cluster – higher education

Authors	Purpose	Conclusions
Binh and Le, 2015	Identification of the five main challenges faced by a university library, five key leadership skills and the best ways to develop leadership skills at a university library in the digital age	Some of the challenges: library management at the time of fiscal uncertainty, modernisation of outdated library facilities to adapt them to new services, finding a balance between digital and printed materials, and the continuous development of employees. Five key leadership attributes: vision, integrity, management skills, cooperation skills and communication skills. The five best ways to acquire such skills include the need for mentors, participation in leadership development programmes, practical leadership experience gained at a library, searching for leadership roles and knowing oneself.
Newland and Handley, 2016	Presentation of the implementation of an approach to digital competence development at Brighton University	The development of professional digital competencies requires a systemic approach and institutional engagement. It should be formal and a component of pro-quality procedures.
Vázquez et al., 2021	Search for factors impacting the level of digital competencies of the teaching/research staff	A positive impact of strategic leadership on the development of teachers' digital skills was observed in the area of technology implementation.
Antonopoulou et al., 2021	Looking for a relationship between a specific type of leadership and available digital skills and the relationship between digital skills and the extent to which digital leadership is implemented	A leader practising transformational leadership who has the necessary digital skills is more effective in an academic environment. The more digital skills the leader has, the more advanced his/her digital leadership becomes.
Masrur, 2021	Studying the impact of digital leadership on the teaching competencies of English language teachers	Digital leadership significantly influences the teaching competencies of lecturers at Samarinda universities. Out of 17 indicators of digital leadership, setting a digital direction for subordinates has the greatest impact.
Yuting et al., 2022	Determination of the relationship between technological leadership and the ICT competencies of Chinese teachers in university education	The results point to a material direct connection between technological leadership and the ICT competencies of teachers. Technological leadership is a necessary practice for modern university leaders. Leaders should be aware of their role in the process of inspiring, developing and rationally evaluating teachers when it comes to their digital competencies. It should be up to digital leaders to initiate institutional changes through the use of ICT and to make decisions to include technology in the administrative process and in the development of teachers' professional competencies.

Source: own elaboration

Another cluster contains articles referring to digital transformation processes in selected universities. Each of the authors stresses the role of leadership in the university digitisation process. Holth and Boe (2019) stress that digital transformation will be successful only if the management on each level is committed to the digitisation strategy. The research conducted by Rodríguez-Abitia and Bribiesca-Correa (2021) showed that higher education institutions react to changes resulting from Industry 4.0 and Society 5.0 phenomena more slowly than other industries. They blame that fact on the lack of effective leadership, the specificity of the organisational culture that is not very susceptible to change, insufficient innovativeness and financial support for universities. Certain

authors see digitisation in higher education as an opportunity to level out inequalities. Digital leaders can “build bridges over the chasms of inequality” by sharing their resources with other institutions, focusing on cooperation rather than on individual profit, and developing awareness of internal and external inequalities using digital technologies (Laufer et al., 2021). The topic of inequality is also mentioned in research conducted by Msila (2021) at the University of South Africa (UNISA). The author observes that the digitisation of universities is currently being implemented in Africa alongside decolonisation, which makes it a vehicle for social justice and democracy. For participants in the research, digitisation meant the transformation of the institutional culture and university systems.

Table 4. Cluster – digital transformation

Authors	Purpose	Conclusions
Holth and Boe, 2019	Presentation of the digitisation process based on the example of a Norwegian military academy	Technology will continue to play an important role in leadership and the development of soft skills in the army. Digital tools can change the way in which the military evaluates and develops its leaders. Digital transformation will only be successful if the management on each level is committed to the digitisation strategy. Further research on the relationship between digitisation and the transformation of learning processes is necessary.
Rodríguez-Abitia et al., 2020	Description and analysis of ways in which seven institutions of higher education faced the challenge of adopting information and communication technologies and applying them in the educational process	Digital education at the university level has to consider three dimensions: technological – directly related to the selection of appropriate information and communication technologies; pedagogical – related to learning, the development of digital competencies, and educational innovation; and organisational – related to the use of technology for the purpose of cooperation. An approach based on participation and empowerment makes it possible to consider these three perspectives and effectively implement technologies in university education.
Rodríguez Abitia, et al., 2021	A proposal to apply an integrated digital transformation model to assess the maturity level of educational institutions in digital transformation processes and a comparison to other industries	Universities are slower than other industries when it comes to digitisation processes due to the lack of effective leadership and change-resistant organisational culture.

Authors	Purpose	Conclusions
Lauffer et al., 2021	A study of how 85 leaders of higher education institutions in 24 countries experienced digital transformation, using the collected data to identify the factors contributing to an institution's ability to fulfil the potential of digital education when it comes to access, learning and cooperation	Leaders of higher education, especially those who work in well-funded institutions, have a unique opportunity to become digital leaders and build bridges across the chasms of inequality by sharing their resources with other individuals and institutions, prioritising the rhetoric of collaboration over individual gain, and creating awareness of both the internal and external hidden inequalities that can be tackled thanks to digital technologies.
Msila, 2021	What knowledge is of key importance to digital leaders in higher education institutions in the digital age? Why is it critical for managers to be at the forefront of the digitisation process?	Combining digitisation with decolonisation is of key importance in Africa. Additionally, when digitisation and decolonisation are implemented simultaneously, they become vehicles of social justice and democracy. It means that education can be a tool used to liberate and minimise the digital gap. Each employee needs to be a digital leader, which will allow digitisation to permeate organisations.

Source: own elaboration

The third group of articles focuses on digital leadership in the context of leaders' behaviour that promotes the digitisation of universities or selected processes thereof. Antonopoulou et al. (2019, 2020, 2021) argue that transformational leadership supported by appropriate e-skills correlates positively with digital leadership. Many authors stress

the complexity of the digitisation process that requires a systemic approach, the creation of an ICT policy, the commitment and cooperation of representatives of each organisational level and distributed leadership (Garrison and Vaughan, 2013; Cifuentes-Álvarez and Vanderlinde, 2015; Avidov-Ungara et al., 2022).

Table 5. Cluster – leadership

Authors	Purpose	Conclusions
Garrison and Vaughan, 2013	Presentation of two case studies demonstrating how a transformational institutional change related to the blended learning approach is based on the commitment of leadership based on cooperation, engaging all levels of an institution	A change in the approach to teaching and the implementation of blended learning and teaching requires leadership engaging different levels of the institution and distributed leadership.
Cifuentes-Álvarez and Vanderlinde, 2015	Presentation demonstrating how demanding ICT leadership and the ICT policy implementation process are	ICT leadership is a difficult practice, not sufficiently researched in university education. The three main practices of ICT leadership are direction setting, staff development and organisation redesigning. ICT policy planning and modelling are continuous processes. The formulation of an ICT policy plan and the establishment of an ICT unit are prerequisites of support for innovation with the use of ICT in higher education.

Authors	Purpose	Conclusions
Tay and Low, 2017	Identification of key factors that facilitate the conversion of printed educational resources into e-learning at a university	Key factors facilitating the digitisation of educational resources turned out to be the clear vision and purpose articulated by the top management, openness to change among the staff and their willingness to commit to the modification of working methods, and managerial skills when it comes to the management of relations with key stakeholders. An effective application of the lean management approach.
Antonopoulou et al., 2019, 2020, 2021,	A cycle of articles exploring the relationship between leadership style and digital leadership Verifying whether the studied members of the Senate in selected Greek universities have the profile of a digital leader irrespective of their leadership styles	Like businesses, universities need to change their practices and adapt to be effective in the Internet age. An effective leader implementing transformational leadership and equipped with adequate e-skills will be more effective in adapting educational institutions to the changing realities. Digital leadership has a high positive and statistically significant correlation with transformational leadership.
Pramono et al., 2021	Exploring the impact of digital technology on performance in the research activity area of academics in higher education institutions in Indonesia and Malaysia during the COVID-19 pandemic and the impact of leadership on academics' performance	Higher education leaders play a larger role when it comes to the impact on research results of Malaysian lecturers while Indonesian lecturers are more influenced by the use of digital technologies than by their leaders. Each of them materially influences the design of an effective university policy relating to the optimisation of results of scientific research conducted by faculty members.
Kotula et al., 2021	Exploring how representatives of university authorities use social media during the pandemic to communicate with their stakeholders	By implementing ICT technologies and putting them on social media platforms in leadership practices, business school chancellors and deans can securely communicate with students, school staff and stakeholders.
Avidov-Ungara et al., 2022	Checking how digital leaders, as teachers responsible for the inclusion of technology in teaching, see their roles	An analysis of the contents of the metaphors of 55 digital leaders revealed the typology describing them as change agents. The majority of leaders described the scope of changes related to their role more traditionally as Islands of Innovation (small-scale integration of technologies) and less as a Comprehensive Innovation model (on each level of the organisation) rather than the wider approach of the School Community of Innovation model (the model covering the environment or all stakeholders).

Source: own elaboration

3. Discussion

Leadership as a complex organisational process is strongly influenced by digitalisation (Rybnikova et al., 2022). Digital leadership in universities is increasingly being researched and is an area with great research potential that will continue to evolve. Many authors

believe that digital leadership is a difficult and insufficiently researched practice in university education (Cifuentes-Álvarez and Vanderlinde, 2015; Masrur, 2021).
This article provides a systematic review of the literature related to academic digital leadership. Out of 1028 publications identified in the Web of Science and Scopus

databases, through subsequent exclusions the content of 20 articles presenting empirical research on digital leadership in universities was eventually analysed. The very fact that such a small number of articles met the selection criteria demonstrates how under-explored the subject is among researchers worldwide. One can say that the authors of the collected publications are pioneers when it comes to researching digital leadership at universities. Only 10 articles presenting research relating to that area were published in 2013-2020; a rapid increase in interest in this subject area was observed in 2021, which was surely a consequence of the COVID-19 pandemic and the need for universities to use digital technologies, e.g. in teaching. Therefore, it is possible to assume that the pandemic became a catalyst for the research on university digitisation processes.

The research process sought to answer the following question: Is the concept of digital academic leadership widely covered in the literature? The concept of academic digital leadership does not appear in the analysed articles because *digital leadership*, in the context of institutions of higher education, is not established in the literature. Authors use various terms such as *technology leadership* (Yuting et al., 2022), *e-leadership* (Kotula et al., 2021; Antonopoulou et al., 2019), *ICT leadership* (Cifuentes-Álvarez and Vanderlinde, 2015), *leadership in the digital age* (Binh and Le, 2015) and, in several cases, *digital leadership* (Antonopoulou et al., 2020; Masrur, 2021).

Most authors highlight similar leadership behaviours when describing digital leadership in the collected publications. Such behaviours include team orientation, the engagement of all stakeholder groups and the delegation of leadership, called *distributed leadership* (Laufer et al., 2021; Garrison and Vaughan, 2013; Cifuentes-Álvarez and Vanderlinde, 2015; Avidov-Ungara et al., 2022), the ability to function within a change that requires transforma-

tive leadership (Antonopoulou et al., 2019, 2020, 2021), combining management with technologies (including communication technologies) and digital skills (Kotula et al., 2021; Antonopoulou et al., 2020), innovativeness, readiness for changes (Rodríguez-Abitia et al., 2020; Rodríguez-Abitia and Bribiesca-Correa, 2021), and awareness of the need to develop the digital competencies of university staff (Binh and Le, 2015; Newland and Handley, 2016).

Another research question concerned the types of empirical research conducted in the area of academic digital leadership. The majority of research approaches (50%) represented in the articles are quantitative, while 40% of them were based on qualitative research and 10% represented mixed approaches. In the case of quantitative research, a survey questionnaire was the research tool used by the authors of the publication. Qualitative research was mostly based on the analysis of the content of interviews and case study descriptions. The conducted analysis indicates that the identified publications are not free of cognitive, methodical and methodological limitations. The research is mostly based on case studies or quantitative studies within a single university. It is most often based on small research populations (even as few as a dozen people); advanced statistical analyses are missing in many cases, which restricts the opportunities for the extrapolation of results to a wider reality.

The third research question concerned the newly emerging research directions related to academic digital leadership.

The synthesis of the above deliberations makes it possible to formulate recommendations regarding future research directions, including in-depth case studies of digital transformation at universities, their success factors and failures, including the role of leaders in the process based on both qualitative and quantitative research.

Another research direction includes in-depth analyses that make it possible

to describe distinctive features of effective digital leadership at universities, linking them to selected leadership theories and styles (e.g. agile, transformative). The increased interest in *distributed leadership* requires further exploration of the role of leaders in encouraging other members of the university to assume leadership roles and identification of the impact of such an approach on digital transformation processes.

As a consequence, a practical tool could be developed to measure academic digital leadership and help educational leaders assess their current condition and plan directions of development.

An area related to defining the digital maturity of a university and indicators of the various levels thereof is another potentially interesting direction for research. “The practical application of digital maturity models makes it possible to quantify phenomena and processes and to identify the stage an organisation is at on its way to the use of its potential” (Pöppelbuß and Röglinger, 2011). The conceptualisation of such models is therefore another direction of development of research in the area of academic digital leadership.

There is also a lack of empirical research on digital leadership that would present it from a holistic perspective (many stakeholders) on an institutional level.

Another possible direction of research is to show digital leadership in the context of those behaviours of leaders that foster effective digital transformation for universities. On the other hand, leadership can be seen to be shaped and changed by the introduction of information and telecommunication technologies and digitisation.

The analysis also identified a research gap in the area of the research approaches used. A lack of robust research based on mixed methods has been observed. Research carried out using mixed methods “offers richer insights into the phenomenon under study and allows one to reach information that may

go unnoticed and overlooked when only one research approach is used, generates more interesting questions for future research, and addresses the limitations of quantitative and qualitative research” (Caruth, 2013). Considering the complex nature of research on leadership, publications based on mixed methods would offer the most complete analysis (Arnold and Sangrà, 2018).

Another gap relates to the evident lack of interdisciplinary research. A similar conclusion was reached by Arnold and Sangrà (2018), who studied e-leadership for technology-enhanced learning (TEL). Research on digital leadership takes place at the intersection of different fields: education, technology, management, and psychology. Research conducted in interdisciplinary teams would enable a deeper understanding of the issue under study.

Further exploration of digital leadership at universities would allow for a more precise definition of that concept and its establishment in the literature.

Conclusions

Leadership and the *leader's personality* are key elements of an effective university (Antonopoulou et al., 2021). The development of competencies of digital leaders at universities is a contemporary strategic challenge for the academic world (Ehlers, 2020). Universities are facing many challenges related to the greater accessibility of knowledge on the Internet (e.g. open resources, such as MOOCs), the greater mobility of students and the popularity of short forms of education (micro-credentials). Even though the technology is not the only solution to these challenges, leaders need a better understanding of the potential of technology combined with high levels of strategic thinking (Bates and Sangrà, 2011).

The completed systematic review of the literature contributes to the deepening of the theoretical debate on digital transformation

and digital leadership at universities and contributes to identifying existing research gaps in the researched area. The main contribution consists of the systematisation and identification of the research conducted in the analysed area. A small number of publications and the differentiation of research areas tackled by scientists shows that the topic requires further exploration. Recommendations for future research directions were also indicated.

Keyword mapping was carried out as part of the review, which made it possible to create three clusters. The first cluster combines leadership with the area of digital competence building, the second cluster focuses around the digital transformation at universities and the third cluster is related to digital leadership, namely the characteristics of digital leaders. Article grouping will make it possible for other researchers to better understand the area and also indicates further research directions.

The current state of knowledge calls for continued research on digital leadership at universities. According to the recommendations, future research of a theoretical-cognitive nature should be conducted in the direction of conceptualisation or operationalisation of digital academic leadership and in the direction of attempts to link it to the existing leadership theories. The identified directions for further research suggest that subsequent studies should be empirical in nature and based on mixed methods, which would enable researchers to provide the most complete analysis of such a complex phenomenon as leadership. It would also be of great value to conduct research in interdisciplinary teams, so as to enable a deeper understanding of the area under study.

The use of keywords applied in the search strategy can be a limitation of this research. With research of this type, one can always assume that the use of a different combination of words could offer different results.

However, it is worth stressing that the selection of the final set of words was preceded by tests and the selected set offered the most adequate results given the purpose of the research. It should be emphasised that there is a hierarchy of evidence when conducting systematic reviews and knowledge of the world comes precisely from research that has been rigorously and transparently designed (Gebayew et al., 2018).

In light of the fact that this article analysed articles presenting empirical research indexed in two scientific databases, it would be worthwhile to expand the review in the future by including theoretical articles, reviews and book chapters excluded from this analysis.

Due to the elimination of articles published in languages other than English, there is a risk that some publications could have been omitted. Despite the selection of the two largest publication databases, it would be worthwhile to expand the analyses to include additional databases in the future.

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