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Contextualising thesis process digitalisation at a university in Ghana

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This study utilised thesis process as a case to investigate how its digitalisation can improve operational and pedagogical processes. A thesis management system (Wihi), developed during thesis process digitalisation in a Finnish university, was piloted at the University of Ghana. The purpose was to see if the system supported the thesis process at the University of Ghana and if good practices were transferable. A total of 44 system users from the University of Ghana participated in the pilot to develop a more fluent and effortless thesis process for students, supervisors and coordinators. Eight of them were selected as informants for the study through interviews and a focus group. The data were coded and analysed using theory-based content analysis. The study's findings reveal that the manual thesis process in use was laborious and dispersive, resulting in supervisors and coordinators frequently losing track of students' work progress. The digitalisation improved the administrative and educational experiences of all the parties concerned, helping students and supervisors to maintain a transparent thesis process-based discussion and to better plan writing schedules. Additionally, coordinators were able to use data from thesis processes to support their decision-making. The results demonstrate that the good practices of thesis process digitalisation can be transferred across these two universities.

Implications for practice or policy
- Universities should prioritise user-friendly digital tools that improve thesis work processes and provide valuable data for educational and administrative decision-making.
- When assessing technology acceptance in cross-cultural work settings, decision-makers can focus more on common core processes than cultural factors thanks to the increasing effects of globalisation and digitalisation.
- University leaders should offer appropriate training for education staff to promote smoother technology adoption, which can effectively reduce resistance to change.

Keywords: thesis process, digitalisation, higher education, qualitative research, content analysis

Introduction

During the COVID-19 pandemic, the digitalisation of educational processes gained significant prominence in the Global South due to the urgency to migrate teaching and learning online (Kolog et al., 2022). To ensure the continuity of formal education amidst the peak of the pandemic, so that students would be able to secure their future professional career (Altbach et al., 2009), many universities made the transition to online teaching and learning. Although numerous educational institutions were forced to suspend their activities due to their limited capacity to leverage digital resources effectively (Leite & Lagstedt, 2021; Peters et al., 2022), it became evident that those equipped with digital capabilities were striving to embrace technology to prevent financial losses and rebuild public trust in terms of educational management.

These circumstances highlighted the urgency for higher education institutions in the Global South to adapt and embrace digital technologies. The pandemic exposed the vulnerabilities and gaps in traditional educational systems, emphasising the need to harness digital resources to ensure the continuity and resilience of education. The challenges posed by the pandemic prompted a general re-evaluation of existing education curricula, learning objectives, teaching methods in remote, blended and in-person settings and the role of education in society, with a particular focus on how the digitalisation of educational process can enhance academic outcomes (Lagstedt et al., 2023; Qureshi et al., 2021). This not only addressed the immediate challenges imposed by the pandemic but also laid the foundation for a more digitally inclusive and flexible education system in the future towards a comprehensive transformation in how education is delivered, managed and perceived in the context of digitalisation (Azorín, 2020).

Taking into account the increasing effects that digitalisation has brought on the higher education sector at an international scale (Benavides et al., 2020; Marks et al., 2020; Qureshi et al., 2021), this study aimed to investigate the digital transformation of higher education across two countries and its potential impact on student academic performance, research supervision and educational management processes. Given that thesis process is a core academic task common to higher educational institutions worldwide, we chose it as a case for this study. In pursuit of this goal, we explored the transferability of digitalisation experiences and best practices across two universities, one in Ghana and another in Finland, with the aim of facilitating international digitalisation projects involving stakeholders from the public and private sectors coming from different cultures in the Global South and the Global North – a practice that has gained traction through increased development aid and international collaboration funding focused on post-secondary education in the past years (International Commission on the Futures of Education, 2021; World Bank & UNESCO, 2022).

Taking Ghana as a country from the Global South, available data on higher education indicates that enrolment of students at the university level in Ghana has increased from 1,195,600 in 2005 to 5,470,500 in 2020 (Statista, 2022). The increase in student enrolment over the period requires, however, a corresponding increase in academic user facilities. Conversely, this increase has not corresponded proportionally to the teacher recruitment rate and academic user facilities (Badu et al., 2018). It has been estimated that the teacher–student ratio at the tertiary level in Ghana was 26.52 in 2018 (UNESCO, 2022). Although there are no data from 2022 available yet, it is estimated to rise given the implementation of free education in Ghana since 2018 (Duah et al., 2023). Thus, universities are burdened with the daunting task of managing more academic work from students aiming to finish their degree programmes. This not only affects the academic performance of students and their supervisors due to inefficient management practices and bureaucratic burdens (Kauppinen et al., 2019, 2020, 2023) but also exerts a cascading influence on students' ability to cultivate research competencies and prevents them from nurturing their professional agency (Biesta et al., 2015). Although there are various factors contributing to this challenge, the government's inability to meet the standard requirements for the teacher–student ratio can be attributed to limited financial resources and the modest allocation of resources to the education sector (Cobbold, 2015).

Although these challenges pose a threat to quality education in Ghana and Africa at large (International Commission on the Futures of Education, 2021), digitalising educational processes can introduce efficiency in teaching and learning (Leite & Lagstedt, 2021). However, in some education processes, digitalisation is still in its infancy, as it is the case for the thesis process. As part of academic certification at the tertiary level, students are expected to complete a thesis; however, non-digitalised thesis work has been reported to be challenging for students, supervisors and faculty coordinators across different cultures, both in the Global North and South (Lagstedt et al., 2023).

In this study, we specifically examined the context of Ghana because, to the best of our knowledge, there is no university in the country that has holistically digitalised its thesis processes. To digitalise the thesis process at the University of Ghana, we piloted the use of a cloud-based thesis management system called Wihi. This system was originally developed during the digitalisation of the thesis process at Haaga-Helia University of Applied Sciences in Finland, and the development and success of the thesis process digitalisation has been studied in several research phases (see, e.g., Kauppinen et al., 2019, 2020; Lagstedt et al., 2020; Lindstedt et al., 2020; Lindstedt et al., 2021). The purpose of the pilot was to assess the applicability of the thesis management and

supervision system developed in Finland to the context of the University of Ghana, and whether the good practices developed in the earlier project in Finland (Kauppinen et al., 2023; Lagstedt et al., 2020) would be able to be transferred along with the system to a university in another country. Thus, the focus was not actually on testing the use of the software but on how the previously created process and good practices are transferrable to the new environment with the use of the software. Based on that, the research question of this study was: Are thesis process digitalisation experiences and good practices transferable between two universities in different countries?

In line with our research inquiry, the subsequent section will delve into the theoretical underpinnings of digitalising education and its main objectives, establishing the framework for this study. This will be followed by an elucidation of our chosen methodological approach. Subsequently, we will present the findings, followed by a discussion and conclusion, encapsulating a summary of the discoveries and actionable recommendations for practitioners.

Theoretical background

Work culture and practices are changing rapidly due to digitalisation, and there is a constant pressure to increase work productivity, although some industries are faster to utilise the possibilities of digitalisation than others (Bughin et al., 2017). The higher education sector seems to be one of the lagging ones, even despite the COVID-19 pandemic, which catalysed education digital transformation in many institutions (Benavides, 2020; Marks et al., 2020; Peters et al., 2022). Recent case studies have also reported challenges related to technology integration in higher education settings faced by university faculty members. For instance, Cilsalar Sagnak and Baran (2021) examined teachers' technology integration behaviour for classroom teaching. They found that technology mentoring programmes can improve faculty education practices by addressing typical challenges found in higher education settings, such as lack of time and motivation, insufficient technological knowledge and student management problems. Flavell et al. (2019) also reported that professional development training along with technology integration are impactful in empowering academics on the adaptive use of educational technology solutions with increased levels of confidence and perceived ease of use of the new technologies being integrated into the educational settings.

More specifically to thesis work and expert research processes, the literature has shown that currently, while some teachers leverage the capabilities of email and other isolated learning systems to manage students' theses, others still rely on printed paper documents from students and oral agreements (Kauppinen et al., 2019; Lagstedt et al., 2020). The demanding task of building beneficial student-teacher collaboration in academic projects as well as engaging and guiding students through their research processes (Abbas et al., 2020) becomes then, often, ineffective, primarily due to the challenges that teachers face in, for instance, manually tracking and logically connecting past reviews and comments to students' thesis work (Lagstedt et al., 2023). Therefore, digitalising the thesis process and unifying it in one platform would help recording communication and intermediate stages so that possible differences in interpretations of agreements are kept to a minimum (Lindstedt et al., 2021) as well as tracking the progress of individual learners' trajectories, providing timely feedback and extra support for those students struggling with their research paths (Rönkkönen et al., 2023). Having concrete institutional measures to provide personalised supervision to higher degree students has been reported to be strong predictors of student well-being, burnout and study completion (Cornér et al., 2017). Moreover, Dupont et al. (2015) found in their research that not only supervisor but also institutional support (in the format of thesis seminars, which provide guidance on research skills and institutional bureaucracies) are associated with student motivation to undergo their thesis work, which in turn predicted greater behavioural, cognitive and emotional engagement, leading to better academic performance to finish their graduation studies.

Considering this theoretical background, this study concentrated on digitalising thesis-related processes in the format of student learning, teacher supervision and coordinator thesis management as well as its transferability from a university in Finland to another in Ghana, by means of a cloud-based platform called Wihi that was developed in the first country and pilot-tested in the second.

Wihi records schedules, documents the dialogues and saves all the thesis activities between thesis coordinators, supervisors and their students. The work phases and comments regarding different versions of the project can be viewed at anytime and anywhere, thus providing transparency for all project stakeholders, including the thesis coordinators, who can monitor and support students and supervisors accordingly. In addition, the platform also supports decision-making regarding thesis processes: for example, a coordinator can accept or reject a topic proposal and assign it to a supervisor, supervisors can move a student from one phase to the next one, students can create research tasks related to each phase of the thesis work and evaluators can grade the final version in the platform.

In the thesis digitalisation project in Haaga-Helia University of Applied Sciences (Finland), which resulted in the development of Wihi, the thesis process was perceived as improved, and the information system supporting it was considered useful and easy to use: it showed, for example, a streamlined process, better manageability and guidance, visual clarity, a holistic view of the process, easier communication, greater transparency and ease of use (Kauppinen et al., 2023; Lagstedt et al., 2020). On the other hand, some process and information system-related challenges were reported as well: lack of some functions and features, technical problems, inadequate guidance, change resistance. Taking these aspects into consideration for a transferability project, even though it is well known that cultural fit of educational technology solutions is a crucial factor for successful digital integrations (Bagchi et al., 2003; Brocke & Sinnl, 2011), this study took university culture (as organisational culture) regarding thesis writing, supervision and management to be relatively stable across countries based on the study developed by Lagstedt et al. (2023).

From a more specific organisational development point of view, digital change has three levels: digitisation (simply automating existing processes), digitalisation (process development with the help of new information systems) and digital transformation (business area and unit redesign) (Marks et al., 2020; Pihir et al., 2018). The importance of not only automating existing processes (digitisation) but also considering new solutions (process re-engineering) has been emphasised for a long time (Davenport & Short, 1990; Hammer, 1990). Automating the existing processes could give a small-time benefit, but the risk is that old processes are cemented within information systems and process improvements become more challenging. To avoid undesirable outcomes, it is important to keep the three objectives of digitalisation in mind (Kauppinen et al., 2023):

(1) Digitalisation must provide useful and easy-to-use tools for end users. Digital tools substitute manual paper-and-pen processes and help users in their daily tasks and responsibilities by reducing workload. Related to this aspect, the digital tools must be intuitive and easy to learn and use (Davis et al., 1989). There are several rather well-known acceptance models, and quite often the key question is what criteria affect end users' perceptions of whether new technology is useful and easy to use (Venkatesh et al., 2003).
(2) Digitalisation is not just automating existing processes. There should be process improvements as well, such as saving time, money and/or other resources (Hammer, 1990).
(3) Developed tools and practices should provide data for decision-makers. Moreover, while the data must be reliable, up-to-date and have sufficient coverage for decision makers, the data gathering should not cause extra work for the end users (Kauppinen et al., 2020).

This study used the three digitalisation objectives as a guiding framework to investigate the research question and discuss if the digitalisation of thesis work process, from the point of view of student thesis work, teacher supervision and coordination thesis management, can be transferred from one country to another by using a digital platform (Wihi) for the writing, supervision and management of thesis work. The research question, then, was limited to the scope of these three digitalisation objectives and did not intend to address other digitalisation transformation-related issues such as change management and the resistance typical from such processes.

Research methodology

Considering the need for more evidence on how digitalising thesis processes transfers across two universities in different countries, this study applied a qualitative approach able to provide a more in-depth, exploratory understanding of the topic and how thesis digitalisation is being implemented in a Ghanaian university.

Research context: The Education Digitalisation Transformation project

The University of Ghana was chosen for this project because of its participation in the Education Digitalisation Transformation project, which aimed to find effective ways to digitalise thesis processes (see, e.g., Lagstedt, 2022; Lagstedt et al., 2023). The project implementation at the university started in May 2022, when a core team of one thesis coordinator, six supervisors (one woman) and 37 students (15 women) were selected to use Wihi, the digital platform for developing, supervising and managing their thesis work.

After assuring stakeholders' voluntary participation and data security according to the European Union's (2016) General Data Protection Regulation and Ghana's Data Protection Act (Data Protection Commission, 2012), the participants received online training (5 hours of workshop and independent learning) on how to use Wihi according to their respective roles: student, supervisor and coordinator. Such training implemented a teacher professional development approach aimed at not only using the tool for the sake of using technology by itself but also to reflect and consider teaching and learning aspects related to thesis work, especially from the point of view of thesis supervision and coordination for the faculty members.

Study participants

One coordinator and two supervisors (all male) were interviewed. Their work responsibilities comprised of teaching, researching and administrative functions, and they all had up to 5 years of experience in their job position. They had intermediate and advanced levels of technology usage. In addition, five students (2 women) who were finalising their degree programmes and writing their thesis participated in a focus group aimed at investigating their experiences of using the platform. The interviewees were selected based on their strong participation in the Education Digitalisation Transformation project, actively adopting the platform for fulfilling their respective tasks as students, supervisors and coordinators involved in a thesis process. Therefore, this purposive sample would be more able to express, in-depth, their different points of view, experiences and insights regarding the three objectives of thesis work digitalisation (Neuendorf, 2017).

Data collection and analysis

The individual semi-structured interviews and one focus group with students were conducted in September 2022 on the premises of the University of Ghana by the first and second authors, where participants had a calm and safe room in which to speak openly. Both interviews and focus groups were guided by a protocol tailored to explore the participants' experiences on thesis process digitalisation. Prior to the interview and the focus group discussion, the participants' concerns were sought.

The interviews and focus group were audio-recorded and transcribed verbatim. The resulting qualitative data were analysed with the software Atlas.ti version 9 using theory-driven content analysis with a deductive and closed coding method (Neuendorf, 2017) based on the three objectives of digitalisation, as presented in the Theoretical background section. Based on these three objectives, the first and fourth authors pre-formulated five codes (see Table 1). After defining the codes, the coding process was executed separately, first by the fourth author followed by the first. Inter-coder reliability was calculated based on individualised quotations taken from the text corpus, which totalled 101 analytical units. The coding process yielded substantial agreement, except for code 3, which supports the reliability of the findings according to the literature (Neuendorf, 2017).

Results

Table 1 displays the code definitions with examples (participants' voices), their corresponding Cohen's kappa and frequency appearance (number of codes that the two raters agreed on) from the coding process. Code 1 (usefulness) had the highest frequency, followed by code 5 (improved thesis coordination) and code 4 (improved thesis supervision). Codes 2 (easy to use) and 3 (improved thesis writing) had the lowest frequencies. Next, we highlight the most important findings related to the digitalisation objectives. We combined the second and third objectives in our analysis, because we observed that data integration through Wihi supported better decision-making and was also the root factor for improving the thesis work process of the stakeholders.

Digitalisation must provide useful and easy to use tools for end users

The supervisors were the ones with the highest expectations for Wihi supporting their daily tasks and responsibilities, considering their challenges regarding monitoring the progress of many students at the same time. As one participant recalled:

> I think it also helps other supervisors who are very, very busy. And when students send them emails, they don't even read because of the volume of emails. So, you may miss students along the pile of emails they have, but if it's a system, you go in there, it is there […] you can review and get back to them. So, it'll improve the efficiency of supervisory work as well. (Coordinator)

In this sense, Wihi helped supervisors' laborious work of having to gather all students' actions and files and track down their scattered work in their email inbox by integrating everything in one place, substantially reducing their manual work of tracking down students' work and making sense of who was doing what.

Along these lines, the coordinator reported that, as current practice in the faculty, his responsibilities on monitoring students' and supervisors' progress on their thesis work was a manual process, with documents being sent via emails, setting up of face-to-face meetings and organising student work in electronic folders on his work computer:

> Students will have to submit their proposals, research topics. Then I will, normally I'll keep them, call for a meeting for the department to sit down and look at the topics and then we distribute, […] I use electronic folders, but normally we'don't use pen and paper kind of. […] The topics are sent by email. (Coordinator)

Table 1

Code description, frequency distribution, examples and respective Cohen's kappa

Digitalisation objective	Code and frequency	Identified in the text corpus when participants referred to …	Example with participant quotes	Cohen's kappa
1. Digitalisation must provide useful and easy to use tools for end users	Code 1: usefulness (*n* = 23)	How the digital platform helps (or not) users' daily tasks and responsibilities by automating and ubstituting manual processes and reducing workload	Then I open the folder up where I have the file of the student and then do this check, quite laborious. So, I expect [the platform] to be a one-stop system where I have all this information that I just log on, I click a button, "Okay, I am here, this and that". (Supervisor 2)	K = .63, substantial agreement
	Code 2: easy to use (*n* = 11)	How the platform is intuitive (or not) and has low (or high) need of support to start using the platform	I think it was quite friendly, but you need to use it. […] if you continually use it, you become familiar with it. Just like any learning management system. (Coordinator)	K = .68, substantial agreement
2. Digitalisation should improve process 3. Digital tools should provide data for decision-makers.	Code 3: improved thesis writing from students' perspectives (*n* = 5)	How thesis work process is improved by getting more support, managing their time better, communicating with supervisor faster and getting feedback, having more autonomy and agency over their topic proposal, feeling safer regarding data security and privacy	In terms of deadlines for submission […] I don't know if it can be logged to the supervisor, that by the end of this time, your thesis must be done, so that you know that I have 10 days, 20 days, 60 days to finish my thesis. (Student 1)	K = .43, moderate agreement
	Code 4: improved thesis supervision (*n* = 11)	How supervising thesis work is improved by communicating faster with students and giving timely, personalised and expert-driven feedback, monitoring student's work progress more efficiently, having more opportunity to build positive relationship with students, identifying those who are lagging	Sometimes you have to even organise students to come and sit like this, have interaction with them, let them propose that topic. We discuss with them and all that. But we, here, in a way allows the student to make his own propose on the platform. (Supervisor 1)	K = .70, substantial agreement
	Code 5: improved thesis coordination (*n* = 14)	When coordinator referred to his perception of better coordinating thesis work by monitoring student progress on thesis work and readiness for graduation and by better allocating supervisors for the students	We'll be able to monitor this process, and then we can draw the party's attention whenever any of them is delaying, whether there should be some prompting to let somebody know that "hey, this thing has been with you for two weeks, three weeks, we expect you to respond, you haven't." (Coordinator)	K = .71, substantial agreement

Addressing this issue, the coordinator reported to be satisfied with the support of Wihi in this sense:

> It's support because then it doesn't have to be manual. Students who submit their thesis through the system, I get to know who has submitted, who have not submitted. And that one, nobody holds anybody to blame. (Coordinator)

This decrease in workload spent on laborious non-expert and non-meaningful processes allows supervisors to spend more time on developing quality relationships with their students (Rönkkönen et al., 2023) and coordinators on providing the needed support to both supervisors and students who might be facing challenges and lagging on their thesis work (Cornér et al., 2017).

Students also reported that Wihi helped by supporting the whole process management, overlapping their perspective with their supervisors' point of view:

> It helps with the tracking. People have the issue of, maybe my email got lost, my document got corrected, and all that. So, because all documents are going to be in one place, it's going to be good for tracking and maybe any corrections. If I lose a document, I can easily track it. (Student 1)

However, according to some of their testimonies, Wihi usefulness was reduced due to technical problems faced during the pilot project, as indicated by the student:

> Initially, I faced some issue when we had to submit the proposal. So, at the time, I didn't see the attached file. […] At the moment, I can't say much because my system has a problem with the password and stuff. (Student 3)

At the same time, the students were the ones who were the most unsatisfied about Wihi's ease of use. Some students complained about the colour of the platform, its dullness, and where to upload files and what to do in each phase. As indicated above, some also reported facing some issues with their credentials to log in to the platform, getting frustrated with it. It is important to point out, however, that such credential problems are particular to the format of the pilot project and limited time for training, especially for students. These problems were later addressed by the information technology support team.

Wihi usability and ease of use were mostly evaluated as good by the coordinator and supervisors: "You know, the language is there, go here, do there. No, it's quite easy to use" (Coordinator). The fact that these participants are familiar with technology and are intermediate and advanced technology users supports this finding. In addition, complementing the findings from students' experience with the platform, they also suggested that such technology integration must come with more training for students, confirming previous studies on this topic (Cilsalar Sagnak & Baran, 2021; Flavell et al., 2019):

> I am familiar with it now. But most of my students need more training to get used to the navigations. So, I would recommend broad wide training for all students, just like they did for us supervisors, so that we will be on the same platform in the use of Wihi. (Supervisor 2)

Digitalisation should improve processes and provide data for decision-makers

As pointed out, the biggest process improvement recognised by the participants was the fact that Wihi gathers and records all the interactions, conversations, file exchange and thesis-related actions taken regarding a thesis work (e.g., accepting a topic proposal, choosing the supervisor, moving a student from one phase to the next) in one platform. This integrated platform that supports data collection and analysis, for these same reasons, also supports a more informed and up-to-date decision making for all.

For instance, the participants reported how, traditionally, the thesis process is scattered across many platforms and communication means (printed versions, emails, phone calls, WhatsApp messages, personal meetings). Many students are requested to print the different versions of their thesis work and bring them to their supervisors for review. This is quite laborious, expensive and time-consuming. In other cases, students may send their work by email to their supervisors. However, because of the supervisors' crowded email inboxes, they might overlook a student email and not answer it properly. In addition, using email as the main communication tool for thesis management can be considered problematic because of its personal and bilateral character: emails are used between a sender and a receiver at the individual level, while thesis process communication should be structured in a way that supports thesis management at the organisational level.

In order to fix such issues, the participants need to resort to phone calls, WhatsApp messages and personal conversations to get the thesis work properly checked, as illustrated in this quotation from the coordinator:

> I use a mobile phone to call the students. 'You have not submitted your topic. I've given you a deadline. What are you waiting for?' Sometimes they have forgotten. […] So, the mobile phone is used as part of the interaction. (Coordinator)

Because of this situation, coordinators cannot easily monitor how students are progressing in their thesis work or support supervisors and students fully in their tasks.

Because Wihi integrates and records all thesis activities and makes them accessible to all user groups (students, supervisors and coordinators) at any time and place, the system was reported to improve thesis writing and related processes as well as provide the needed data for decision-making. The coordinator was the participant who most emphasised how the platform would improve his work process and provide better data for faculty- level decision-making, as illustrated in the following quote: "I think it [my responsibilities] will change drastically. It [the platform] will make it [work] easier. It'll also simplify the process and it will enable me to track a student's progress" (Coordinator).

Thanks to the digitalisation of the thesis supervision and management process, one of the supervisors was happy to be able to "track the entire process in a coordinated manner, unlike what I'm used to, which is the email I have to search and then track the last mail that I sent in my communication" (Supervisor 2). In addition, supervisors also indicated how the platform not only addresses the challenges just presented but it also gives them more time and flexibility for their supervision, easing their work related to building quality research collaboration with students, providing timely feedback and managing students' situations (Abbas et al., 2020). This came up in terms of supporting students' autonomy and promoting more agency on their thesis work (Biesta et al., 2015), for instance, when students propose their topic by themselves through the platform. Complementarily, Wihi not only improved the management of thesis work but also made it faster, by easing the bureaucratic decisions through "a click" in the system, as reported in the following quote and indicated in the previous section:

> To cut down a lot of bureaucratic processes to make the thesis supervision faster, make the work faster for all of us, the student and myself. So, where we have all the stakeholders knowing exactly where the student is, I think the process will be faster and that is a good thing. (Supervisor 2)

Finally, students recognised the value of the platform through its functionalities for project management (i.e., setting up tasks, deadlines and work status), communication with the supervisors for feedback about their writing and for the fact that the system supports their supervisors and coordinators to monitor student work more efficiently, resulting in better dyadic supervision and institutional (administrative) support for them (Dupont et al., 2015).

It can also help in the grading process. You know that this student is this, this is what we should do for this. I think she's lagging in this area. We need to support her in this area. Maybe these things your supervisor couldn't see. Other people on the platform, on the management perspective, can actually see and maybe chip in to provide. (Student 3)

This finding confirms research that indicates how students value the support coming from their supervisors and their supervision practices as crucial elements to keep their study engagement and well-being (Ryan et al., 2022). In addition, the platform functionalities, such as creating their own topic proposal and a thesis-related task management board, were seen as spaces of student agency by the participants, which aligns with the findings from Atkinson et al. (2021) about the relevance of multiplying such spaces to provide students a stronger sense of ownership over their studies, especially during the COVID-19 pandemic.

To conclude this section, it is important to emphasise the relevance of appropriate training with the new technology integration, as pointed out both in the literature (Cilsalar Sagnak & Baran, 2021; Flavell et al., 2019) and by one of the supervisors:

I think wider training and the creation of awareness of Wihi to all stakeholders within the university is key to embracing the new system. As it stands now, those who are in the piloting team, we have full knowledge of what is happening. So, before it would be ruled out, wider engagement with relevance stakeholders it's key. (Supervisor 1)

Discussion

Based on our research question, we can assume that the experience of digitalising the thesis process with its best practices could be transferred from the university in Finland to the University of Ghana. During the piloting and evaluation process, we observed some clear similarities between the two countries in terms of the thesis process digitalisation, such as similar role of thesis coordinator, thesis supervisor and students and similar phases in the thesis process. Moreover, although research has suggested that systems should be tailored to specific contexts (Bagchi et al., 2003; Brocke & Sinnl, 2011), our results indicate that the platform, originally developed in a Finnish university, will require only minor adjustments to align with the Ghanaian one, such as tailoring the number of phases a thesis work has according to each faculty and department standard practices in the Ghanaian university. With some notable adjustments, the current Wihi system includes a third person serving as a coordinator to oversee thesis activities between students and supervisors. However, this differs from the practice at the University of Ghana, where department heads are typically responsible for assigning students and overseeing thesis processes. Unlike the current Wihi system, these so-called coordinators (i.e., heads of departments) do not propose topics to students; instead, the topic proposal process involves direct interaction between students and their respective supervisors.

In this study, we analysed the digitalisation process at the University of Ghana and identified key features related to the three objectives of digitalisation: providing helpful and usable tools for end users, improving education processes and supplying data for decision-makers (Loebbecke & Picot, 2015). From the results, all three features of digitalisation have been accomplished. Thus, we found experiences and good practices, as in the digitalisation process in the Finnish university (Kauppinen et al., 2023; Lagstedt et al., 2020), such as an improved and easier management process in general, easier communication between student and supervisor, better communication and decision-making transparency for all participants (students, supervisors and coordinators).

In addition, the platform went beyond supporting the dyadic student-supervisor relationship, benefiting the thesis process holistically for all stakeholders by reducing daunting coordination bureaucratic tasks, improving supervision quality, especially in terms of research guidance (Ortega & Kent, 2018) and helping students in keeping their study-related commitments through the platform functionalities – all aspects considered relevant to minimise the challenges faced by higher degree students and increase their well-

being (Roos et al., 2021). And even though both digitalisation processes in Ghana and Finland faced some negative or challenging aspects, in both cases, the new digitalised thesis process had more positive elements than the older, more manual one.

The findings of this study suggest that, at the University of Ghana, the process implementation was rather successful, because the negative viewpoints identified by the participants consisted mostly of opinions related to the user interface and easy-to-solve technical issues. In the Finnish university, the thesis digitalisation process also showed relatively low resistance to change (Kauppinen et al., 2023; Lagstedt et al., 2020). However, further studies on change resistance need to be implemented in the following phases and special attention needs to be given for a broader and more comprehensive training programme, especially one focused on the students. People often resist such changes due to their perception that digital transformation is disruptive (Furr & Shipilov, 2019) and that new technology poses a threat to their established practices.

Moreover, the impact of culture on technology adoption is a well-recognised phenomenon, as indicated by studies such as the one conducted by Brocke and Sinnl (2011). Culture, along with factors like gender and age, influences people's beliefs, values, attitudes and behaviours, which, in turn, affect their acceptance and utilisation of technology. In the context of our study, that is the digitalisation of the thesis process, we explored the adoption of a thesis management system when transitioning from a Finnish university to a Ghanaian one. The findings of this study indicate that cultural factors at play in thesis supervision and management are relatively stable across the two universities in different countries, and they did not pose significant barriers to the acceptance and utilisation of the technology in the Ghanaian university. These results are also encouraging as they demonstrate that effective technology adoption can transcend national boundaries. It highlights the importance of recognising and addressing cultural influences in organisations to enhance the adoption and utilisation of technology in diverse contexts. Understanding the specific cultural and organisational dynamics at play can help shape implementation strategies, provide appropriate training and support and foster a positive environment for technology acceptance and utilisation.

Additionally, the data indicate that the digitalised thesis process at the University of Ghana was warmly welcomed to improve the manual process. This might be due to the accelerating global digitalisation in education caused by the unexpected COVID-19 pandemic (Lagstedt et al., 2023). In general, the primary features of the experiences and good practices in thesis digitalisation processes with Wihi, framed by the three digitalisation objectives, are similar in both countries and can be considered transferable from one culture to another by system implementation.

This study makes valuable contributions to research, practice and policy in the field of educational digitalisation. In terms of research, the study highlights the importance of developing helpful and usable tools for end users, improving processes and providing data for decision-makers in the context of educational digitalisation. It also sheds light on the fact that, while culture is often recognised as a significant factor on technology transfer, this study revealed a marginal impact of culture on technology acceptance thanks to the processual similarities involved in thesis management across university organisations from different countries. The findings suggest that in a cross-cultural working environment and with the increasing effects of globalisation, the influence of culture on technology acceptance may be diminishing. In terms of practice, this study serves as a guide for educational software developers from different contexts. It provides insights on how to transfer or develop new technologies that are well-suited and tailored to specific organisations with contextual needs. By considering the findings of this study, software developers could tailor their solutions to fit the requirements and preferences of end users in diverse cultural settings, taking into account the relevance of technology training together with its integration process. Finally, by understanding the factors that facilitate technology adoption and adapting policies accordingly, educational institutions and policymakers can enhance the implementation and utilisation of educational technologies.

Conclusion

Digital transformation has recently emerged as a bedrock for competitiveness in all disciplines, including education. Educational digitalisation improves efficiency and brings flexibility. This study explored the experiences of thesis process digitalisation at the University of Ghana. Grounded in qualitative theory-based content analysis, it revealed that the existing approach to managing student theses is laborious, and supervisors often lose track of thesis work progress. This is reportedly so because of the manual nature of thesis process management. However, supervisors, students and coordinators who actively participated in the pilot of the Wihi system were enthused about the extent to which the system improves thesis management process. Additionally, this study has shown empirically why digitalisation must provide a platform for core education stakeholders to improve educational processes and decision-making. In sum, the digital platform impacted thesis work related processes in the following ways: it reduced coordinators' bureaucratic workload and allowed more personalised and timely support for students who were lagging (Lagstedt et al., 2023); it gave the digital conditions for supervisors to provide higher quality feedback and build better relationships with their students (Abbas et al., 2020); and it gave students more security, autonomy and agency for their own project management and writing process (Lindstedt et al., 2021).

As a concluding note regarding the limitations of this study, its sample was quite small, the pilots were relatively short and consequently the interviews' findings are neither representative nor generalisable. However, the purposeful sampling of the research aspired to capture best insights from the professional and student community and increase the validity of the findings, therefore aiming for a possible transferability of the results (Neuendorf, 2017). The data gathered and triangulated from different information systems' user groups (students, supervisors and coordinators) improved the validity of this study as well. Additionally, the data were gathered by two different data collection methods – focus groups and interviews – improving its validity. The reliability of this study was considered by having two of us carefully and independently code the data and ensuring clear meaning of the codes beforehand by defining excluding and including criteria (Neuendorf, 2017). Future studies with broader samples, questionnaire applications and follow-up observations should be undertaken in order to strengthen the research findings and examine the long-term results of thesis digitalisation in Ghana.

We recommend that researchers explore the impact of digitalisation on students' performance and graduation rates. In a nutshell, the digitalisation experiences during the pilot at the University of Ghana were positive and we envision that the experiences shared by the participants in this study will be useful for digitalising subsequent educational processes.

Author contributions

Author 1: Conceptualisation, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review and editing; **Author 2:** Conceptualisation, Data curation, Investigation, Formal analysis, Writing – original draft, Writing – review and editing; **Author 3:** Conceptualisation, Writing – original draft, Writing – review and editing; **Author 4:** Conceptualisation, Formal analysis, Writing – original draft, Writing – review and editing**.**

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