



OPEN ACCESS

EDITED BY

Yu-Chun Kuo,
Rowan University, United States

REVIEWED BY

Janika Leoste,
Tallinn University, Estonia
Vanessa Camilleri,
University of Malta, Malta
Anthony Philip Williams,
Avondale University, Australia

*CORRESPONDENCE

Hannes Schilling
✉ Hannes.Schilling@tu-braunschweig.de

RECEIVED 01 September 2023

ACCEPTED 17 October 2024

PUBLISHED 06 November 2024

CITATION

Schilling H, Hirschberger S and Kauffeld S
(2024) A focus group study of students'
expectations of digital onboarding tools in
higher education.

Front. Educ. 9:1287387.

doi: 10.3389/educ.2024.1287387

COPYRIGHT

© 2024 Schilling, Hirschberger and Kauffeld.
This is an open-access article distributed
under the terms of the [Creative Commons
Attribution License \(CC BY\)](#). The use,
distribution or reproduction in other forums
is permitted, provided the original author(s)
and the copyright owner(s) are credited and
that the original publication in this journal is
cited, in accordance with accepted academic
practice. No use, distribution or reproduction
is permitted which does not comply with
these terms.

A focus group study of students' expectations of digital onboarding tools in higher education

Hannes Schilling*, Stephanie Hirschberger and Simone Kauffeld

Institute of Psychology, Industrial/Organizational and Social Psychology, Technische Universität Braunschweig, Braunschweig, Germany

In higher education, the array of roles performed by digital tools has been increasing rapidly. While some areas of higher education, such as teaching, already employ digital tools, the use of such tools in student onboarding has not yet been thoroughly explored. This study sought to develop a better understanding of student perspectives regarding digital onboarding tools through an investigation that built on the technology acceptance model and expectancy–value theory. The goal was to identify what students expect from digital onboarding tools concerning, for example, content and design. To this end, we examined the data from five focus groups using qualitative content analysis. The results revealed that students expect the design of digital onboarding tools to feature websites that are usable on mobile devices and that such a tool should be readily available for their use independently of time and place. Our study also found that digital onboarding tools can influence students' motivation to study. The learnings for higher education institutions are that digital onboarding tools should enhance easy information gain and provide opportunities that foster early socialization with fellow students.

KEYWORDS

digital onboarding, digital onboarding tools, focus groups, higher education, students

1 Introduction

The use of digital tools shapes and supports modern higher education environments (Castañeda and Selwyn, 2018). The influence of digital tools can be seen through the rapid advancement of digitalization in the higher education sector alongside the development of novel technologies. These tools have primarily been adopted in the field of higher education teaching and as additional learning aids in diverse contexts (Lai, 2011). Various technologies have been incorporated into digital tools to support their use for educational purposes; these technologies include information and communication technology (Romero et al., 2019), virtual reality (Radianti et al., 2020), and mobile phones (Bernacki et al., 2020). In higher education, digital tools feature most prominently in teaching and learning; however, their technological applications in other areas remain relatively unexplored.

One such operational area is the onboarding of new students into higher education institutions (Schilling et al., 2022). According to Klein and Polin (2012), onboarding can be defined as “formal and informal practices, programs, and policies enacted or engaged in by an organization or its agents to facilitate newcomer adjustment” (p. 268).

Two factors have increased the usage of digital onboarding in recent times. On the one hand, today, students from all around the world can attend distance learning courses at higher education institutions that are outside their physical reach (Bojović et al., 2020). On the other hand, the COVID-19 pandemic boosted the development of new technologies for higher education where, for example, digital technologies have been used to onboard new students (Roney et al., 2022; Zarembo and Stepanenko, 2021). However, even though COVID-19 amplified and solidified the growth of digital onboarding usage, the switch from in-person onboarding to digital onboarding has given rise to numerous challenges (Motycki and Murphy, 2021; Zarembo and Stepanenko, 2021).

For higher education institutions, one such challenge is the need to translate large-scale onboarding interventions, such as campus rallies or university welcome sessions, into digital formats. Institutions need to implement various technologies, such as telecommunication software or virtual environments, into their onboarding concepts to facilitate student interactions with academic staff and other incoming students attending onboarding events (Carpenter, 2021; Motycki and Murphy, 2021). In addition, not all digital onboarding interventions have equally good participation and acceptance rates (Motycki and Murphy, 2021). This increases the need for studies into the wishes and expectations of new students regarding digital higher education onboarding. Furthermore, onboarding intervention outcomes such as socialization and orientation on campus are harder for higher education institutions to achieve because digital onboarding interventions have limited technological capacity for simulating a real-world onboarding experience (Henning, 2013; Motycki and Murphy, 2021). However, onboarding outcomes such as socialization with other students, and in a higher education environment, increasing student motivation and career decidedness, are important achievements for students, as they are connected to reduced dropout (Bargmann et al., 2021; Behr et al., 2020; Berkling, 2015). The literature argues for an independent digital onboarding tool to support the development of a comprehensive digital onboarding concept for higher education institutions (Schilling et al., 2022). This tool would enable the complex compilation and integration of onboarding interventions for multiple targeted onboarding purposes and a variety of technological requirements.

While numerous studies have examined students' expectations regarding the use of digital tools in higher education settings, most have focused on learning and teaching applications, and very few have examined students' perceptions of the use of these tools for onboarding them into their chosen higher education institution and preparing them for their academic career (Back et al., 2016; Gabriel et al., 2012). Specifically, there is a lack of research on students' perspectives about the content and design demands of such tools. In practical terms, most of the existing research on digital onboarding interventions in higher education institutions has centered around the institutional perspective, while the student

perspective has been disregarded. Failing to investigate the student viewpoint could lead to an exemplary digital onboarding tool being rejected by students or a target audience could be missed; hence, in developing such a tool for students entering higher education, valuable resources could be wasted (Duncan-Howell, 2012). In addition, investigating students' expectations of digital onboarding tools can enrich our understanding of what the design and content of onboarding practices in higher education should look like, especially considering that the image of higher education onboarding, in general, remains incomplete (Kotla et al., 2023; Schilling et al., 2022).

By conducting qualitative focus groups, this article seeks to address the lack of student perspective on digital onboarding and contributes to previous research by investigating what students expect regarding the content and design of digital onboarding tools in higher education. By delving into the anticipated impact of digital onboarding tools on various study-related factors, our study also provides potential avenues for future empirical research focusing on, for example, quantitative analyses of digital onboarding tools. Furthermore, this current investigation contributes to establishing an empirical basis for the development and practical implementation of such tools. Our article also provides higher education institutions and onboarding experts with practical advice on how to design and use digital onboarding tools.

2 Theoretical background

2.1 Technology acceptance model

The Technology Acceptance Model (TAM) is a prominent scientific model that was proposed to explain the acceptance and prediction of the use of technologies (Davis, 1985). According to its latest version, TAM3 (Venkatesh and Bala, 2008), the behavioral intention-to-use (BIU) a technology and its actual use are dependent on an extensive list of external variables, including subjective norm and output quality. The influence of those external variables is mediated by two variables: perceived usefulness (PU) and perceived ease of use (PEOU). While PEOU also directly predicts PU, they both act as predictors of BIU. The mediator PU deals with perceptions of the usefulness of a technology, while the mediator PEOU deals with the technology's user-friendliness (Davis, 1989).

While several theoretical models, besides the TAM (Davis, 1985), can explain technology adoption and usage in education—such as the Concerns-Based Adoption Model (CBAM; Hall, 1974) or the Technological Pedagogical Content Knowledge (TPACK; Koehler and Mishra, 2005)—TAM extensions have proven to be the most adaptable across various higher education technology contexts (Granić and Marangunić, 2019). In comparison, TPACK (Voogt et al., 2013) focuses primarily on the knowledge base teachers need to effectively adopt digital technology. CBAM, on the other hand, centers on the role of teachers in the process of change and the implementation of new innovations in educational settings (Khaboli and O'Toole, 2012). An advantage of TAM in the context of higher education is its strong emphasis on individual-level perspectives (most often those of students) regarding the prospective and actual adoption of technology

(Granić and Marangunić, 2019), making it more suitable for the purposes of this study compared to CBAM (Hall, 1974) or TPACK (Koehler and Mishra, 2005).

2.2 Higher education students' expectations

The variables in the TAM can form the basis for higher education students' expectations of digital onboarding tools, and prior studies have successfully applied the model to the higher education setting (Abdullah et al., 2016; Chintalapati and Daruri, 2017). For example, external variables such as perceived enjoyment of a technology have been found to predict PU and PEOU, and in turn, predict PU and BIU of higher education e-portfolios (Abdullah et al., 2016). This implies that higher education students expect digital technologies such as digital onboarding tools to be enjoyable and useful before they are inclined to use them. Cicha et al. (2021) also reported similar results in finding that BIU is predicted by PU, which in turn is predicted—from strongest to weakest—by perceived enjoyment, self-efficacy, and subjective norms associated with digital distance learning tools in higher education institutions. Hence, their results suggest that higher education students' expectations of a digital technology intended for their use—in a possible digital onboarding tool, for example—are influenced by their perceptions of the technology's usefulness. In turn, these perceptions are influenced by their perceived enjoyment of the technology, their feelings of self-efficacy about using them, and the social normative pressures of other students using them.

Outside of studies of onboarding and TAM, research has similarly investigated expectations of digital technologies in higher education settings (Ashour, 2020; Keane et al., 2022; Littlejohn et al., 2010). The findings highlight, for example, that higher education students expect higher education digital technologies to be better than those in their previously attended schools (Keane et al., 2022). The wide employment and incorporation of mobile phone applications and students' expectations that information presented by digital tools has been verified and can be trusted have also been noted (Ashour, 2020). Hence, students could expect digital onboarding tools to be mobile-friendly and provide trustworthy information. Specifically, the expectation of receiving trustworthy information in a digital onboarding tool could be of great relevance for students as, in their first academic weeks, they need to adjust to the new higher education environment and process large quantities of new information. The same study also found that students primarily use digital technologies to ease their daily routines and consume information from these tools more passively than actively. This implies that a digital onboarding tool would be seen as more useful if it simplifies students' daily routines, which is important as the first academic semester especially, with its many new tasks, is a stressful period (Denovan and Macaskill, 2017). Furthermore, students from non-European countries are used to using higher education digital tools alongside their in-person interactions with higher education staff (Ashour, 2020), which suggests that European students may also expect a digital onboarding tool to accompany their in-person onboarding or provide a supportive function in their day-to-day academic life.

2.3 Expectancy–value theory

Expectancy–value theory (EVT) was developed as an educational theory to explain students' motivation, persistence, and achievement-related choices while studying (Eccles et al., 1983). Outcomes such as achievement-related choices (e.g., pursuing activities that foster skill development or attempting to complete new assignments) are explained in EVT through two main constructs: expectations of success and subjective task values. In higher education, the former can be explained, for example, as a student's belief they will successfully complete specific technological tasks, while the latter refers to the value the student allocates to those tasks (Eccles and Wigfield, 1995). Subjective task values are further divided into attainment, intrinsic, and utility values, as well as costs (Eccles and Wigfield, 2002). Recent decades have seen the addition of a variety of antecedents to the EVT to explain, for example, expectations of success as well as subjective task values (Rosenzweig et al., 2019).

The different subjective task values in EVT can be used to explain how higher education onboarding through a digital onboarding tool could work. Attainment value explains how students allocate the importance of doing well to tasks in the digital onboarding tool, while intrinsic value depicts how much they enjoy the digital onboarding tool itself or doing the tasks within it (Rosenzweig et al., 2019). Utility value describes the perceived usefulness of the digital onboarding tool tasks; for example, of the value of the tool itself for future study-related outcomes, including motivation to study, retention in the study program, or the safety of their study choice. In contrast to these three subjective task values, costs are negatively oriented and deal with the hypothetical price that students must pay to engage with the digital onboarding tool. A study on the dimension of costs proposed a further splitting of the cost construct into multiple parts, such as task effort costs and emotional costs (Flake et al., 2015). In the context of this current study, the task effort costs describe the expected or actual time and effort students need to put into the digital onboarding tool, while emotional costs describe the negative impact the digital onboarding tool may have on students (e.g., frustration or stress).

Following the logic of EVT, students' expectations of a digital onboarding tool, as examined in this study, should be heavily influenced by their allocated expectations about the success of the tool and the subjective task values they assign to the tool. In particular, attainment, motivation, and utility values should positively influence student expectations regarding a digital onboarding tool, while costs represent their negative expectations related to the tool.

As described above, both EVT and TAM contain many variables that potentially explain what students expect from a higher education digital onboarding tool. Under both theories, students would be expected to report the same or similar variables if asked what they expect from a higher education digital onboarding tool. For example, in line with TAM3 (Venkatesh and Bala, 2008), students might expect a digital onboarding tool to be clearly designed and appealing for it to be perceived as easy to use. Furthermore, they may expect such a tool to be enjoyable and relevant to their success in the first semester. In line with the EVT (Eccles et al., 1983), students might expect that using a digital onboarding tool comes with low time investment and has value

for simplifying everyday study life. We may also expect to see students' expectations that go beyond the variables in the TAM3 and EVT; for example, a digital onboarding tool may come with the expectation of specific technological implementation, such as a mobile phone application. Along these lines, our study was designed to test whether, under the EVT and TAM, students would report the same or different expectation variables and explore students' general perspectives regarding the implementation and use of digital onboarding tools in higher education. The research was guided by the following research question:

RQ: What do students expect from digital onboarding tools in higher education?

3 Materials and methods

The goal of our study was to investigate students' expectations of digital onboarding tools in higher education. To gain a holistic understanding of these expectations, we divided the main question into five smaller sub-questions, which also represent the focus group questions (FGQs):

FGQ 1: What content should a higher education digital onboarding tool have?

FGQ 2: What technologies should a higher education digital onboarding tool use?

FGQ 3: What factors might influence your use of a higher education digital onboarding tool?

FGQ 4: What advantages/disadvantages do you expect from a higher education digital onboarding tool?

FGQ 5: How might your study-related variables, such as motivation, be affected by a higher education digital onboarding tool?

The focus group questions were developed by adapting previous questions from a other focus group study on expectations of new technology implementation and deriving questions from previous literature on technology expectations and digital onboarding interventions (Schilling et al., 2022; Vaportzis et al., 2017; Venkatesh and Bala, 2008). Furthermore, these five questions were specifically focused on the basis that the participants had the possibility to openly explore the space of abstraction concerning digital onboarding tools. The participants were not provided with an example of a digital onboarding tool as it was important to gain their perspective on how such a tool should be designed regarding its technical implementation as well as content. Through the discussion, the participants could potentially build various

shared mental models of a digital onboarding tool. These were then further discussed through our follow-up questions regarding the tools' potential use factors and advantages and disadvantages. Allowing participants the opportunity to consider these issues further strengthened the discussion about their expectations of such a tool and how it should be designed and used. Furthermore, by enabling the participants to elaborate on and discuss the potential effects of a digital onboarding tool on study-related variables, we obtained insight into how such a tool might influence their studies in the first academic year.

3.1 Participants and data collection

As mentioned above, focus groups were chosen for the qualitative data collection. Compared to other types of qualitative data collection, such as interviews, focus groups facilitate the gathering of large quantities of qualitative data in a short amount of time while simultaneously encompassing both individual and group perspectives (Gibbs, 1997). Furthermore, focus groups support gaining a contextual consideration of a specific topic and foster a creative process in participants, enabling the formation of novel reactions and ideas (Kuhn, 2000). This makes focus groups an ideal medium for exploring participants' expectations of digital onboarding tools.

Five focus groups were chosen for this study based on previous research indicating that this is the optimal size for yielding meaningful saturation in code development (Coenen et al., 2012; Guest et al., 2017). Similarly, the same studies considered six to eight participants per focus group as being the optimal size to achieve meaningful code saturation and results. The focus groups in the current study followed a semi-structured interview approach and lasted approximately 60 min; this included the introduction, obtaining informed consent, the focus group itself, and the debriefing (Creswell, 2011). All the focus groups were carried out virtually and recorded using BigBlueButton virtual classroom software (Button, 2022). After the participants joined the virtual room, the leading researchers welcomed the participants and briefly introduced themselves and the purpose of the study, provided data protection information, and collected informed consent. The participants then took turns introducing themselves before the first focus group question was presented by the researchers. The questions were delivered orally and accompanied by a visual presentation of them on a digital screen. The participants were invited to discuss the questions until no one had anything left to say. The next question was then introduced. After all the questions were asked, the recording was stopped, and a short debriefing was conducted.

The participants were higher education students recruited via convenience sampling through the researchers' social network and the university's higher education network in Germany (Rapley, 2014). The focus groups were conducted in German; therefore, all the participants were required to speak fluent German. The sampling strategy was selected to ensure that the focus group participants could potentially represent students from different higher education settings, including those who exclusively studied in distance learning environments or were required to work part-time as part of their course requirements.

Four of the five focus groups achieved the optimal size of six to eight participants (Guest et al., 2017); however, the fifth focus group comprised only five participants due to short-notice cancellations. In total, 33 participants took part in the study, 23 of whom identified as female (70%) and 10 as male (30%). From these 33 participants, only one student was required to work part-time as part of the course requirements and none of the students exclusively pursued their studies through distance learning. The mean age was 22.3, and the predominant study subject was psychology (20 out of 33 participants). A detailed overview of the participants' demographics is provided in Table 1. The larger proportion of female participants can be explained by the prevalence of psychology students collected through the convenience sampling approach. This proportion is in line with a recent report by the German Statistisches Bundesamt (2022) that revealed that psychology students are predominantly female (75%). Furthermore, a meta-analysis centered around coaching, which offers support similar to that of an onboarding tool, concluded that women were especially likely to use and benefit from such interventions (de Haan and Nilsson, 2023).

3.2 Data analysis

The data from the focus groups were analyzed using a combination of deductive and inductive qualitative content analysis, as described by Mayring (2021). In line with the study's research questions, deductive codes were extracted from existing research and theories before transcripts were thoroughly investigated to narrow down the possible range of information extractable from the transcripts. As previously noted, research on digital onboarding interventions in higher education institutions is scarce (Schilling et al., 2022), and information about student perspectives regarding such interventions is lacking; this made it necessary to extract inductive codes from the transcripts and add them to existing deductive codes to build a richer and more complete coding scheme that was capable of addressing the range of the research questions (Mayring, 2021).

Two researchers independently scanned the literature and previous theories to obtain deductive codes for the coding scheme, which were then merged in a shared research meeting. To facilitate the application of the deductive codes and extract the inductive codes, the focus group recordings were transcribed, paraphrased, and generalized (Mayring, 2021). The inductive codes were then developed iteratively in coding meetings wherein two researchers jointly analyzed the five focus group transcripts in MAXQDA (Rädiker and Kuckartz, 2019). Following the generation of the complete coding scheme, a third researcher independently coded the five transcripts. Comparing the two initial researchers' codings with those of the independent researcher resulted in a coding scheme containing main codes and subcodes that yielded information relevant to answering the research questions. Differences in the coding were discussed in a shared research meeting and resolved by carefully examining the codes. Before the coding differences were discussed, inter-rater reliabilities were calculated using the kappa coefficient (Brennan and Prediger, 1981)

with the following results: code occurrence in the documents, $\kappa = 0.89$; code frequency in the documents, $\kappa = 0.72$. The code occurrence value, $\kappa = 0.89$, represented an almost perfect agreement between raters, and indicated a good fit between the rater-developed coding scheme and the content of the focus groups (Landis and Koch, 1977). In addition, the code frequency, $\kappa = 0.72$, signified substantial agreement between raters; in other words, the raters allocated the codes in a highly similar manner across the documents, which represented a well-suited coding scheme that closely fit the focus group content.

3.3 Qualitative quality criteria

We used multiple approaches to ensure rigor and trustworthiness in our qualitative study. First, we worked closely with our focus group participants, implementing a member check to ensure the credibility of the results; hence, the participants were allowed to provide comments, additions, and feedback on the focus groups for weeks after the data collection ended (Merriam, 1998). However, outside of providing direct feedback and comments at the end of the focus groups, only two participants gave comments at a later date, and as these did not add to the focus group content, they were not included in the analyses. Further rigor was ensured by conducting every step of this study—including research question creation, data collection and analysis planning, code and subcode development, and peer debriefings—in shared research and feedback meetings between the authors (Merriam, 1998; Patton, 2014). Through rigorous detailing and reflection on every step of our research process, as presented in the different sections of this article, transparency, intersubjectivity, and replicability were achieved (Lüders, 2004).

4 Results

The main codes in the final coding scheme followed the five sub-questions (FGQ 1–FGQ 5) used in the qualitative focus groups. Subcodes were counted and ordered by the frequency at which they were assigned to the main codes in the transcripts (Morgan, 1993). As the frequently assigned subcodes reflected topics that were especially important to the focus group participants, the following discussion of the results focuses on these themes. A full list of the codes, subcodes, counts, and exemplary text passages can be found in Table 2.

4.1 Content onboarding tool

The main code “Content onboarding tool” concerns focus group participants' expectations about the content of a digital onboarding tool. The most allocated subcodes were “Information & materials” (37 times), followed by “Communication possibilities” (27 times).

The participants expected the primary focus of a digital onboarding tool to be the provision of information and

TABLE 1 Demographics of study participants.

Focus group (FG)	Number (N)	Age	Sex	Study subject	Semester	Bachelor /master
1	1	21	Male	Industrial Engineering and Management	1	Bachelor
1	2	21	Male	Economics	2	Bachelor
1	3	24	Female	Social Work and Management	3	Bachelor
1	4	23	Female	Psychology	5	Master
1	5	19	Male	Biology	1	Bachelor
1	6	25	Male	Teacher Education	11	-
2	1	23	Female	Psychology	1	Master
2	2	26	Male	Industrial Engineering and Management	-	Master
2	3	22	Female	Psychology	1	Bachelor
2	4	19	Female	Psychology	1	Bachelor
2	5	24	Male	Computer Science	4	Bachelor
2	6	22	Female	Social Sciences	6	Bachelor
2	7	22	Female	Psychology	1	Master
2	8	28	Female	Psychology	5	Master
3	1	19	Female	Psychology	5	Bachelor
3	2	34	Female	Psychology	7/1	Bachelor/Master
3	3	20	Female	Psychology	3	Bachelor
3	4	19	Female	Psychology	3	Bachelor
3	5	20	Female	Psychology	4	Bachelor
3	6	21	Male	Psychology	3	Bachelor
3	7	20	Female	Psychology	3	Bachelor
4	1	20	Female	Psychology	3	Bachelor
4	2	21	Female	Psychology	3	Bachelor
4	3	24	Female	Psychology	7	Bachelor
4	4	20	Female	Psychology	3	Bachelor
4	5	20	Male	Psychology	1	Bachelor
4	6	21	Female	Psychology	1	Bachelor
4	7	20	Female	Psychology	3	Bachelor
5	1	21	Female	Social Sciences	5	Bachelor
5	2	27	Female	Organization, Governance, Education	-	Master
5	3	24	Female	Computational Sciences and Engineering	3	Master
5	4	26	Male	Organization, Governance, Education	7	Master
5	5	21	Male	Mechanical Engineering	3	Bachelor

materials they considered relevant for commencing their studies. For example, they were interested in obtaining information about timetables, module syllabi, examination regulations and administration, student financing tips, and so on. In addition, the possibility of accumulating information relevant to students on all degree programs and making it generally available, was an idea that emerged, while program-specific information would be visible only to the students concerned:

“...The onboarding tool should allow students to clarify as many of their questions about their studies as possible. Therefore, the information available should include different aspects of studying, for instance, about contact persons in different areas, about recreational activities at the university, about exams and exam registrations, and also about financial aspects of studying...” (Fg2, N6)

TABLE 2 Coding system.

Relevant codes	Relevant subcodes	Counts	Exemplary text passage
Content onboarding tool	Information & materials (deductive code)	37	The onboarding tool should allow students to clarify as many of their questions about their studies as possible. Therefore, the information available should include different aspects of studying, for instance, about contact persons in different areas, about recreational activities at the university, about exams and exam registrations, and also about financial aspects of studying. (Fg2, N6)
	Communication possibilities (deductive code)	29	The tool should allow users to contact any professors and lecturers as well as other fellow students and tutors. For this purpose, respective chat rooms could be a good option. (Fg1, N5)
	Information from students (deductive code)	8	The onboarding tool should also offer a place in which students provide information for other students like a blackboard or rooms for study groups. (Fg1, N5)
	Quizzes and exams (deductive code)	6	The tool could also include self-tests to query and check the knowledge learned by now. (Fg3, N6)
	Handling of documents and requests (inductive code)	4	The tool should include a tab where files from courses can be found, such as professors' presentation slides or exercise sheets. (Fg1, N5)
	Group work (deductive code)	2	When working in groups, the tool should provide the ability for students to sign into groups, form groups or find related links for these groups on other apps. (Fg3, N1)
Onboarding tool technologies	Apps and mobile applications (deductive code)	43	The tool should also be available as an app for smartphones and tablets. In doing so, it should contain an adapted design for the particular device. If the design is not adapted for mobile devices, it reduces the usability and will be less used. (Fg2, N7)
	Websites/homepages (deductive code)	30	The onboarding tool can be designed as a website, which also needs to be available and adapted for mobile devices. Most of the time, websites are not really mobile friendly, and therefore, the onboarding tool needs to pay attention to the clear structuring of the website on mobile devices. (Fg4, N4)
	Learning platforms (deductive code)	19	The onboarding tool should offer opportunities for exchange with others. Furthermore, it should be usable as an online learning platform. (Fg3, N5)
	Telecommunication software (deductive code)	14	The ability to communicate with others via video chat could be helpful for the users. However, there might be certain limits to this, depending on the program used. (Fg2, N7)
	Virtual environments (deductive code)	13	The tool could help users find their way around their new environment at the start of their studies by providing a virtual map of the buildings and rooms. Further details, such as occupancy schedules, could be added as well. (Fg1, N4)
Factors influencing onboarding tool use	Perceived ease of use (deductive code)	67	To make the use of the onboarding tool as simple as possible, the design should be technically clear and intuitive. Therefore, no additional effort, such as an introductory course, should be needed. Also, all information should be clearly arranged and easy to find. (Fg5, N2) I think there should be no duplication of functions in the onboarding tool. That means that the same information is not passed on via multiple paths, but only via the one selected. (Fg1, N5)
	Perceived usefulness (deductive code)	41	The tool should only contain the most important information in order to not overwhelm students and to emphasize the main functions. Usefulness for students should be the priority. Besides, the goal should be to highlight the information students need to begin their studies. (Fg3, N7) I would also find it interesting with a tool like this if it not only provided relevant content for me in my first or second week of study, but could also fill knowledge gaps beyond that. (Fg2, N1)
	Time saving (deductive code)	11	The onboarding tool should be designed to make it easier for students to get started, without complicating it. Therefore, it should also save them time instead of giving them extra work to do. (Fg1, N2)
	Subjective norm (deductive code)	6	The onboarding tool kind of needs to be an obligation. For example, it could be advantageous to query the knowledge learned with the tool afterward to motivate students to actually focus on the content. Otherwise, students might not approach the tool in a focused way. (Fg4, N6)
	Voluntariness (deductive code)	5	The onboarding tool should be voluntary and not mandatory in order to be more likely to be used. (Fg2, N7)
	Visibility (inductive code)	4	The onboarding tool needs to be made visible by the higher education institution to represent an offer for students and that everyone can access it. (Fg5, N1)

(Continued)

TABLE 2 (Continued)

Relevant codes	Relevant subcodes	Counts	Exemplary text passage
Advantages/disadvantages of an onboarding tool	Availability (deductive code)	45	A huge advantage of the digital onboarding tool is the independence of location. It makes it more family-friendly and commuter-friendly as you are less dependent on location but, perhaps, also on time. Video on demand could also be offered to simply catch up. (Fg2, N7) A big advantage is the independence of location, so that students who, for example, have not found an apartment or do not want to move at all, have the possibility to be picked up at the beginning. (Fg5, N4)
	Networking possibilities (deductive code)	43	It might be helpful for students using the tool to be able to ask others for help. Therefore, they should be able to either contact other fellow students or higher education staff depending on the particular problem. (Fg1, N3) The most important thing is the possibility to connect and socialize with other students. I doubt that a digital onboarding tool can make that possible in any way. (Fg5, N3)
	Compressibility (deductive code)	28	The information in texts should be reduced to the essentials to avoid unnecessarily long searching. (Fg1, N3)
	Completeness (deductive code)	16	All information should be complete and bundled in one place so that everyone can access them. (Fg1, N4)
	Potential for change (inductive code)	5	The onboarding tool can be improved and shaped continuously by involving the opinions of students through digital voting and surveys. Thereby, it is also possible to find out which questions are still unresolved and which topics are particularly relevant at the moment. (Fg2, N5)
	Individuality (deductive code)	5	The onboarding tool should not only enclose the content from face-to-face events. Instead, a wider variety of information should be offered so students can individually decide and choose what content they need. (Fg2, N1)
	Truthfulness (deductive code)	4	All information presented in the Onboarding tool should be verified facts. Information needs to be truthful to be trusted. (Fg1, N5)
Influence of an onboarding tool on study-related variables	Motivation (deductive code)	41	The onboarding tool can have a positive impact on students' motivation by supporting them in the early stages of their studies. However, a hybrid model of online and face-to-face onboarding could enhance the positive effect even further. (Fg5, N4) I think such a tool can probably take away motivation rather than give more motivation (Fg4, N5)
	Safety (inductive code)	14	The tool can give students a sense of safety at the beginning of their studies, as they can find all the important information they need there. Thereby, questions and problems at the beginning can be solved without already having to ask a professor for help, which might intimidate some. (Fg1, N4)
	Informedness (deductive code)	12	The onboarding tool can prepare students before they start their studies and provide them with important preliminary information so that they are ready for their courses. (Fg5, N3)
	Frustration (deductive code)	11	Using the onboarding tool can prevent students' frustration at the beginning of their studies by making relevant information for the study start easily accessible (Fg5, N2)
	Stress (deductive code)	2	The tool can provide students with guidance at the beginning and thus avoid unnecessary stress. (Fg3, N3)

In addition to Information & materials, the participants also expected a digital onboarding tool to enable communication between incoming students and other students or university staff. Examples mentioned of such communication possibilities were sharing information on digital blackboards, messengers, or chatrooms. If the digital onboarding tool itself has no communication possibilities, then it should be integrated with other communication software, such as Skype-Chats or BigBlueButton:

“...The tool should allow users to contact any professors and lecturers as well as other fellow students and tutors. For this purpose, respective chat rooms could be a good option...” (Fg1, N5)

In summary, our participants expect digital onboarding tools to help them obtain information relevant to starting their studies and allow them to communicate with fellow students or higher education staff.

4.2 Onboarding tool technologies

“Onboarding tool technologies,” the second main code, involves the platforms on which a digital onboarding tool can be built. The dominant subcodes were “Apps and mobile applications” (43 times) and “Websites/homepages” (30 times).

The participants were unsure whether an app or a website would work better as an onboarding tool. Nevertheless, the consensus was that there should be a mobile version of the

onboarding tool with a suitable user interface to allow users to access the tool “on the go.” Regarding the homepage, participants expressed a preference for having all the information available on a single website, which should be easily accessible by mobile phone. The apps and websites/homepage should also include specific features, such as the ability to share information or communicate with others:

“...The tool should also be available as an app for smartphones and tablets. In doing so, it should contain an adapted design for the particular device...” (Fg2, N7)

“...The onboarding tool can be designed as a website, which also needs to be available and adapted for mobile devices. Most of the time, websites are not really mobile friendly, and therefore, the onboarding tool needs to pay attention to the clear structuring of the website on mobile devices...” (Fg4, N4)

Thus, overall, our participants expect digital onboarding tools to be developed as websites/homepages that can be adapted to mobile devices; for example, via smartphone apps.

4.3 Factors influencing onboarding tool use

“Perceived ease of use” (67 times) and “perceived usefulness” (41 times) were the most relevant subcodes in the main code “Factors influencing onboarding tool use.” Specifically, this main code reflects participants’ expectations of the factors that would influence their usage or non-usage of a digital onboarding tool.

For perceived ease of use, the participants mentioned that they would be less likely to use a tool that is too complicated or not elaborately designed and structured. They wanted all relevant functions to be centrally available in one location and the information to be easily accessible. They also emphasized that multiple functions in the tool should not target the same goal and that the tool should contain helpful links to other web pages. Furthermore, the participants prioritized bundling all essential functions into one tool that would replace other websites and tools rather than replicating them. According to the participants, clearly structured content, without excessive detail that could make the tool time-consuming to use, would increase their likelihood of using it. The participants also expressed their wish for a uniform regulation on how to use the tool and how to locate specific information. Finally, the participants addressed the tool’s design, expressing the desire for an appealing design and an interactive interface on both a laptop and a mobile phone. For example, they recommended the use of videos and graphics along with text:

“...To make the use of the onboarding tool as simple as possible, the design should be technically clear and intuitive. Therefore, no additional effort, such as an introductory course, should be needed...” (Fg5, N2)

The participants indicated that they would perceive an onboarding tool as useful if it added value and facilitated their

entry into the higher education institution. In contrast, it would not be useful if it was perceived as an additional burden through a design that made it time-consuming to use or imposed additional responsibilities. Thus, only the most important information and useful functions should be integrated. In addition, the participants believed the tool should only include features that would not be possible via in-person onboarding, which would give the tool more of a support function. They also attributed more usefulness to a tool that would provide possibilities for interaction. Another expectation was that the tool should deliver onboarding interventions over multiple months and be accessible even after the onboarding process was complete:

“...The tool should only contain the most important information in order to not overwhelm students and to emphasize the main functions. Usefulness for students should be the priority. Besides, the goal should be to highlight the information students need to begin their studies...” (Fg3, N7)

Overall, therefore, our participants expect digital onboarding tools to be easy to use, so they are not overwhelmed, and useful to them when commencing their studies.

4.4 Advantages/disadvantages of an onboarding tool

The main code “Advantages/disadvantages of an onboarding tool” is associated with the positive and negative factors that the participants anticipated from a digital onboarding tool. The most frequently allocated subcodes were “Availability” (45 times) and “Networking possibilities” (43 times).

Regarding availability, the participants described the helpfulness of a digital onboarding tool in terms of their ability to use the tool regardless of time and place. They liked the possibility of accessing information again later if they had forgotten something or had questions. In addition, location independence would make the tool more commuter-friendly, especially for students who live elsewhere and cannot always be on campus. A tool that is flexible and available would enable students to use the digital onboarding tool when they are most receptive. It was suggested that pre-courses or counseling services could also be made available through the tool, so reducing the need for students to travel:

“...A huge advantage of the digital onboarding tool is the independence of location. It makes it more family-friendly and commuter-friendly as you are less dependent on location but, perhaps, also on time...” (Fg23, N7)

Networking possibilities followed the topic of the previously mentioned subcode “Communication possibilities,” in the sense that most participants in the focus groups could not imagine that the social aspect of attending university/college, which was very important for them, could be implemented in a digital onboarding tool. They described this as a disadvantage. They found personal contact necessary for them to exchange ideas and ascertain what others were like. They also mentioned perceived difficulties in asking questions digitally due to such issues as

communication technology barriers. Crucially, the participants reported needing to exchange information with lecturers and students from higher years as well as their peers. It also became clear that they wanted contact persons to be available in case they did not understand the information provided online:

“...The most important thing is the possibility to connect and socialize with other students. I doubt that a digital onboarding tool can make that possible in any way...” (Fg5, N3)

“...It might be helpful for students using the tool to be able to ask others for help. Therefore, they should be able to either contact other fellow students or higher education staff depending on the particular problem...” (Fg1, N3)

Overall, our participants expect that if digital onboarding tools are used, then they should be readily available to them, independent of time and place. They also want digital onboarding tools to enable them to form a network with fellow students and higher education staff.

4.5 Influence of an onboarding tool on study-related variables

The last main code, “Influence of an onboarding tool on study-related variables,” predominantly included the subcode “Motivation” (41 times).

The participants want a well-functioning onboarding tool with a clear and appealing design that is perceived as useful. They felt this would increase their motivation by reducing their fear and nervousness and provide a sense of security because of the completeness of information. In particular, a well-functioning tool could make students less worried about missing something, relieve them of some of the burden of organizing their studies, and help them feel they matter to the institution, all of which would increase their motivation. In contrast, a tool that made student life more difficult rather than easier could decrease student motivation. Furthermore, the participants emphasized that networking with other students is essential to increasing motivation while omitting the human aspect and making everything digital could negatively impact motivation. Therefore, the majority agreed that an onboarding tool should focus on supporting in-person onboarding if it does not offer networking opportunities:

“...The onboarding tool can have a positive impact on students’ motivation by supporting them in the early stages of their studies. However, a hybrid model of online and face-to-face onboarding could enhance the positive effect even further...” (Fg5, N4)

“...I think such a tool can probably take away motivation rather than give more motivation...” (Fg4, N5)

These responses reveal that, depending on the design and usefulness of such a tool, our participants expect digital onboarding

tools to influence their motivation to study both positively and negatively. Furthermore, digital onboarding tools should be used to support in-person onboarding.

5 Discussion

This study focused on investigating students’ expectations for digital onboarding tools in higher education settings via a qualitative focus group approach. The participants in this study—who were higher education students—expected two main categories of content in digital onboarding tools: information and materials, alongside communication possibilities. These requirements are not surprising since students’ ability to start and manage academic life relies on successfully gaining information and materials related to their new higher education institution and socializing with other newcomers (Wilson et al., 2016). Unlike the current often-used digital learning tools in higher education, which primarily focus on information acquisition regarding course content (Hunter, 2015), higher education students in this study expect digital onboarding tools to prioritize providing information to help them effectively structure their study program, with learning support being secondary in importance. Our findings concerning the expectation of communication possibilities also set digital onboarding tools apart from tools such as digital learning tools. Rather than solely focusing on collaborative learning activities, students in this study expect communication features to be prioritized so they can establish connections with other higher education students and faculty. Furthermore, the most frequently used digital onboarding interventions outside of digital onboarding tools employed by higher education institutions have been shown to center around information and socialization (Schilling et al., 2022). This alignment between the expected content of digital onboarding tools and the current focus on these types of onboarding interventions represents a fit between students’ expectations of onboarding and the current tactics of higher education institutions.

In contrast, the students who participated in this study expected digital onboarding tools to rely mainly on apps and mobile applications that are based on a website or homepage, which also does not reflect the prevailing higher education practice since digital onboarding interventions are mostly delivered via telecommunication software or on learning platforms (Schilling et al., 2022). These findings can be explained by the fact that current high school students, and consequently, new higher education students, grew up with these kinds of technologies and are therefore familiar with their use and distribution (Calderón-Garrido et al., 2022). Furthermore, our findings regarding expected digital onboarding tool technology go hand in hand with the advantages and disadvantages that the students in this study identified in relation to digital onboarding tools. They expected digital onboarding tools to be readily available for their use whenever and wherever they might want them and felt that the tools should enable them to connect with others. Importantly, the finding concerning the ready availability of such a tool is in line with another study that focused on students’ digital tool expectations in higher education: Back et al. (2016) reported that

students want easy access to a digital tool like in their study a digital learning tool. Such independence and flexibility are mostly achieved by mobile technology, which reflects a trend in general expectations about technology that characterizes today's generation of students (Poláková and Klímová, 2019) and extends to include their expectations concerning the higher education environment (Ashour, 2020; Santos et al., 2019). Another explanation for students' expectations that digital onboarding tools have certain advantages and disadvantages is that the focus on availability and networking potential can be found in the tool's potential to facilitate a location transition from school to higher education. New students may encounter problems finding housing or have a regular commute that hinders them from attending in-person onboarding or networking events, and this can be alleviated by digital onboarding tools that offer similar possibilities in the digital room (Martinez et al., 2021; Motycki and Murphy, 2021). Nevertheless, students fear that digital onboarding tools may be of less use for socialization compared to in-person onboarding, and this represents a disadvantage. However, they still want such tools to help them with socialization, for example, by offering possibilities for them to connect with other students or higher education staff; this represents an advantage in situations where there is no other option for them to contact other students.

Regarding the use of digital onboarding tools, the students in this study pointed to a greater likelihood of increased usage if they are both easy to use and useful. This finding aligns with the core principles of the TAM, in that the PEOU and PU of a technology are the main predictors of its BIU (Venkatesh and Bala, 2008). The participants in this study stated that a digital onboarding tool would be perceived as easy to use or useful if it is intuitive, the relevant functions are clearly explained, and the required effort to use it is as small as possible. These findings are also in line with early definitions of PEOU and PU (Davis, 1989). Furthermore, studies on other types of higher education digital tools, such as digital learning tools, report the same results and underline our findings (Back et al., 2016; Chen et al., 2012).

According to the participants in this study, the biggest problem with the PEOU, PU, and perceived predicted use of such a tool was the possibility that it might overburden or overwhelm them. Studies concerning other digital technology in higher education echo the finding that a digital tool should not be burdensome to encourage students to find it useful and actually use it (Bedenlier et al., 2020; Bhatia, 2011). Combining these findings in practice means that higher education institutions should, for example, build digital onboarding tools that focus on the main task of onboarding in the study entry phase, which helps students adjust and prepare for their first semester (Van Rooij et al., 2018). Regarding the information students need in the first semester especially, a digital onboarding tool could have a large impact by collecting all necessary information from various institutional sites and delivering it in a compact and timely manner; this would unburden the information collection process and make the tool useful for all incoming students. This would also be of clear benefit compared to in-person onboarding, as students can repeatedly access onboarding information and process their onboarding journey according to their own time and effort preferences. Another way to make such tools useful and user-friendly is to incorporate familiar onboarding interventions

from secondary school education, such as planners or time schedules.

The findings concerning the influence of digital onboarding tools on study-related variables, especially motivation, were mixed. The participants thought that an exemplary digital onboarding tool would increase motivation for higher education if PU is associated with it. Conversely, they believed that digital onboarding tools could decrease motivation if PEOU and PU are lacking. Importantly, participants emphasized that the motivational aspect of a digital onboarding tool would increase if the onboarding tool supplements rather than replaces in-person onboarding, consistent with hybrid onboarding. This finding corresponds with Back et al. (2016) study concerning students' expectations of digital learning tools in which students reported they would want such tools to be an additional offer next to in-person possibilities. The participants in the current study felt that digital onboarding tools cannot guarantee real connection and socialization between students; therefore, they saw these tools as informational and only capable of supporting socialization in in-person onboarding. While hybrid versions combining digital onboarding interventions and in-person events are currently employed in higher education, their effectiveness and connection with motivation need further investigation (Motycki and Murphy, 2021; Prior et al., 2021). In other areas of higher education (e.g., learning and teaching), scholars have already identified a connection between hybrid versions and student motivation (Aristika and Juandi, 2021; Linder, 2017).

5.1 Theoretical and practical implications

A theoretical contribution of the current study can be derived from the finding that students expect a digital onboarding tool to influence their motivation if it is perceived as useful and easy to use. This finding not only corroborates the assumptions of the TAM but also bolsters arguments for integrating intrinsic motivation as an outcome variable within the model (Venkatesh and Bala, 2008). Furthermore, in line with our findings, intrinsic motivation in the TAM should also be predicted through PU and BIU. Accounting for intrinsic motivation would therefore provide more insight into the relevance of motivational components in technology acceptance and usage, especially since intrinsic motivation is not a part of the current TAM3. This argument is in line with a previous study finding that motivational aspects such as enjoyment positively influence the variables in the TAM (Abdullah et al., 2016).

In addition to this theoretical contribution, this article also has practical implications for higher education institutions. Students in this study expect to receive onboarding interventions via digital onboarding tools that focus on delivering information and can help them communicate and socialize. This finding is consistent with the digital onboarding interventions that are mostly used in higher education institutions today (Schilling et al., 2022), and precludes the need for higher education institutions to develop new, expensive onboarding interventions when a workable solution is simply to incorporate them into a digital tool.

Higher education institutions can also learn from our findings in that their current focus on digital onboarding interventions

delivered via telecommunication software and learning platforms (Schilling et al., 2022) is not in line with students' expectations. Instead, students in this study envision digital onboarding tools as being websites and apps that are adapted for mobile devices. Thus, higher education institutions should focus on such technologies when developing digital onboarding tools. A practical recommendation for higher education institutions wanting to establish such a digital onboarding tool could involve incorporating such a tool into their already existing homepages. This approach would reduce the costs of establishing a new website domain and guarantee the tool's visibility to incoming students. Higher education institutions can then print QR codes and disseminate them across campus to generate visibility and foster the tool's use via mobile apps.

Additionally, as students desire communication possibilities in digital onboarding tools yet do not expect onboarding tools to fully meet their socialization needs, this article provides insight into how higher education institutions need to develop onboarding interventions for digital onboarding tools that focus on facilitating contact between students and other students or higher education staff outside the confines of the tool itself. For example, higher education institutions are advised to incorporate interventions into the tool that encourage students to meet up and make contact during lectures. Wise interventions such as Fast Friends (Page-Gould et al., 2008) could be integrated into the digital onboarding tool to foster meaningful contact between new students outside of the tool. This would not only enable students to fill their need for socialization but also enable higher education institutions to tackle problems of prejudice between student groups. This would also address students' expectations that digital onboarding tools act as supporting tools and do not replace in-person onboarding, which indicates a need for higher education institutions to establish hybrid ways of onboarding students. According to our findings, hybrid onboarding could be established via an in-person plan for socialization and networking events at the start of the semester, while the onboarding tool could deliver information onboarding interventions throughout the rest of the academic year. This hybrid strategy would allow students to engage socially from the outset and foster connections while enabling higher education institutions to precisely time information dissemination to coincide with critical moments in the semester, such as exam preparation periods. Organizations outside of higher education have already developed hybrid onboarding approaches that provide new employees with information and socialization tasks via digital tools while requiring them to connect with fellow employees directly in the workplace (Sander et al., 2022).

5.2 Limitations and future research

The current study has both limitations and perspectives for future research. For example, the sampling method yielded a sample of mainly German-speaking participants from European higher education institutions, which reduced the generalizability of the findings to other cultural contexts. Future studies could therefore include participants from Asian, American, and Arabic countries, whose differing higher education systems could potentially lead to other expectations concerning digital onboarding tools (Burden-Leahy, 2009).

As the implementation of higher education digital onboarding tools has yet to be scientifically investigated, the qualitative design of our study enables an initial starting point for future research. Nevertheless, due to the nature of qualitative designs, our findings are limited and cannot imply correlations or causal relationships between variables such as PU and intrinsic motivation (Flick, 2022). Therefore, quantitative experimental and longitudinal research designs could help identify time-based differences and causal relationships between relevant onboarding and study-related variables.

To facilitate the study of how digital onboarding influences higher education students, it is necessary to establish a basis for longitudinal research designs by designing and developing a digital onboarding tool that can be used in future research activities (Schilling et al., 2022). Due to the scarcity of research in this field, evaluative studies on the effectiveness of digital onboarding tools are currently nonexistent (Schilling et al., 2022). Lastly, the literature on digital onboarding tools in organizations is nearly as constrained as that on digital onboarding tools in higher education; thus, a thorough investigation in this area is also recommended.

6 Conclusion

The findings of the current study not only extend the literature on digital onboarding, particularly regarding the use of digital onboarding tools in higher education, but also support extending the TAM3 by including motivation as an additional variable. Regarding the five sub-questions of our study, we found that students want to gain information about their study programs through digital onboarding tools while also being able to connect with other students (FGQ 1), indicating their recognition of the importance of early information acquisition for academic success and the need for social integration. Despite this, they fear that digital onboarding tools may be of limited use for socialization (FGQ 4). Nevertheless, they still expect these tools to aid in socialization, for instance, by facilitating contact between students or higher education staff. Additionally, students in this study expect digital onboarding tools to be available via mobile-optimized websites (FGQ 2), reflecting current trends in literature and practice for more flexible technology use, allowing students to access resources whenever and wherever they choose (Poláková and Klímová, 2019). Thus, digital onboarding tools should not replace in-person onboarding but rather complement it by providing added informational value, merging the best aspects of both in-person and digital onboarding. Students expect a digital onboarding tool to increase their motivation to study, and they will use it only if it is both useful and user-friendly (FGQ 3 and 5). This supports the assumptions and highlights the need for extending the TAM3 by incorporating motivational variables (Venkatesh and Bala, 2008).

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The study involving humans were approved by the Ethikkommission der Fakultät 2 der TU Braunschweig, ID number D_2022_14. The study was conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

HS: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Validation, Visualization, Writing – original draft, Writing – review and editing. SH: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Writing – original draft, Writing – review and editing. SK: Conceptualization, Funding acquisition, Project administration, Supervision, Writing – review and editing.

Funding

The author(s) declare that financial support was received for the research, authorship, and/or publication of this article.

References

- Abdullah, F., Ward, R., and Ahmed, E. (2016). Investigating the influence of the most commonly used external variables of TAM on students' perceived ease of use (PEOU) and perceived usefulness (PU) of e-portfolios. *Comput. Hum. Behav.* 63, 75–90. doi: 10.1016/j.chb.2016.05.014
- Aristika, A., and Juandi, D. (2021). The effectiveness of hybrid learning in improving teacher-student relationship in terms of learning motivation. *Emerg. Sci. J.* 5, 443–456. doi: 10.28991/esj-2021-01288
- Ashour, S. (2020). How technology has shaped university students' perceptions and expectations around higher education: An exploratory study of the United Arab Emirates. *Stud. High. Educ.* 45, 2513–2525. doi: 10.1080/03075079.2019.1617683
- Back, D. A., Behringer, F., Haberstroh, N., Ehlers, J. P., Sostmann, K., and Peters, H. (2016). Learning management system and e-learning tools: An experience of medical students' usage and expectations. *Int. J. Med. Educ.* 7:267. doi: 10.5116/ijme.57a5.f0f5
- Bargmann, C., Thiele, L., and Kauffeld, S. (2021). Motivation matters: Predicting students' career decidedness and intention to drop out after the first year in higher education. *High. Educ.* 85, 1–17. doi: 10.1007/s10734-021-00707-6
- Bedenlier, S., Bond, M., Buntins, K., Zawacki-Richter, O., and Kerres, M. (2020). Facilitating student engagement through educational technology in higher education: A systematic review in the field of arts and humanities. *Aust. J. Educ. Technol.* 36, 126–150. doi: 10.14742/ajet.5477
- Behr, A., Giese, M., Teguin Kamdjou, H. D., and Theune, K. (2020). Dropping out of university: A literature review. *Rev. Educ.* 8, 614–652. doi: 10.1002/rev3.3202
- Berkling, K. (2015). "Connecting peer reviews with students' motivation," in *Proceedings of the 7th international conference on computer supported education*, Vol. 2, (Karlsruhe), 24–33.
- Bernacki, M. L., Greene, J. A., and Crompton, H. (2020). Mobile technology, learning, and achievement: Advances in understanding and measuring the role of mobile technology in education. *Contemp. Educ. Psychol.* 60:101827. doi: 10.1016/j.cedpsych.2019.101827
- Bhatia, R. P. (2011). Features and effectiveness of E-learning tools. *Glob. J. Bus. Manag. Inform. Technol.* 1, 1–7.
- Bojović, Ž., Bojović, P. D., Vujošević, D., and Šuh, J. (2020). Education in times of crisis: Rapid transition to distance learning. *Comput. Appl. Eng. Educ.* 28, 1467–1489. doi: 10.1002/cae.22318
- Brennan, R. L., and Prediger, D. J. (1981). Coefficient kappa: Some uses, misuses, and alternatives. *Educ. Psychol. Meas.* 41, 687–699. doi: 10.1177/001316448104100307
- Burden-Leahy, S. M. (2009). Globalisation and education in the postcolonial world: The conundrum of the higher education system of the United Arab Emirates. *Comp. Educ.* 45, 525–544. doi: 10.1080/03050060903391578
- Button, B. B. (2022). *Big blue button*.
- Calderón-Garrido, D., Ramos-Pardo, F. J., and Suárez-Guerrero, C. (2022). The use of mobile phones in classrooms: A systematic review. *Int. J. Emerg. Technol. Learn.* 17, 194–210. doi: 10.3991/ijet.v17i06.29181
- Carpenter, D. (2021). Transitioning a marquee orientation and transition program for increased new student engagement and retention amidst the COVID-19 pandemic. *J. Coll. Orient. Transit. Retent.* 28:34. doi: 10.24926/jcotr.v28i2.3750
- Castañeda, L., and Selwyn, N. (2018). More than tools? Making sense of the ongoing digitization of higher education. *Int. J. Educ. Technol. High. Educ.* 15, 1–10. doi: 10.1186/s41239-018-0109-y
- Chen, H. H., Lee, M. C., Wu, Y. L., Qiu, J. Y., Lin, C. H., Tang, H. Y., et al. (2012). "An analysis of moodle in engineering education: The TAM perspective," in *Proceedings of the IEEE international conference on teaching, assessment, and learning for engineering (TALE)*, (Hong Kong: IEEE).
- Chintalapati, N., and Daruri, V. S. K. (2017). Examining the use of YouTube as a Learning Resource in higher education: Scale development and validation of TAM model. *Telemat. Inform.* 34, 853–860. doi: 10.1016/j.tele.2016.11.001
- Cicha, K., Rizun, M., Rutecka, P., and Strzelecki, A. (2021). COVID-19 and higher education: First-year students' expectations toward distance learning. *Sustainability* 13:1889. doi: 10.3390/su13041889
- Coenen, M., Stamm, T. A., Stucki, G., and Cieza, A. (2012). Individual interviews and focus groups in patients with rheumatoid arthritis: A comparison of two qualitative methods. *Qual. Life Res.* 21, 359–370. doi: 10.1007/s11136-011-9943-2
- Creswell, J. W. (2011). *Educational research*, 4th Edn. New York, NY: Pearson Education.
- Davis, F. D. (1985). *A technology acceptance model for empirically testing new end-user information systems: Theory and results*. [Ph.D. thesis]. Cambridge, MA: Massachusetts Institute of Technology.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Q.* 13, 319–340. doi: 10.2307/249008

This research was funded by the Federal Ministry of Education and Research grant number (16PX21012). We also acknowledge support with the APC by the Open Access Publication Funds of Technische Universität Braunschweig.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The author(s) declared that they were an editorial board member of *Frontiers*, at the time of submission. This had no impact on the peer review process and the final decision.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

- de Haan, E., and Nilsson, V. O. (2023). What can we know about the effectiveness of coaching? A meta-analysis based only on randomized controlled trials. *Acad. Manag. Learn. Educ.* 22:4. doi: 10.5465/amle.2022.0107
- Denovan, A., and Macaskill, A. (2017). Stress and subjective well-being among first year UK undergraduate students. *J. Happiness Stud.* 18, 505–525. doi: 10.1007/s10902-016-9736-y
- Duncan-Howell, J. (2012). Digital mismatch: Expectations and realities of digital competency amongst pre-service education students. *Aust. J. Educ. Technol.* 28:9. doi: 10.14742/ajet.819
- Eccles, J. S., and Wigfield, A. (1995). In the mind of the actor: The structure of adolescents' achievement task values and expectancy-related beliefs. *Pers. Soc. Psychol. Bull.* 21, 215–225. doi: 10.1177/0146167295213003
- Eccles, J. S., and Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annu. Rev. Psychol.* 53, 109–132. doi: 10.1146/annurev.psych.53.100901.135153
- Eccles, J. S., and Wigfield, A. (2020). From expectancy-value theory to situated expectancy-value theory: A developmental, social cognitive, and sociocultural perspective on motivation. *Contemp. Educ. Psychol.* 61:101859.
- Eccles, J., Adler, T., Futterman, R., Goff, S., Kaczala, C., Meece, J., et al. (1983). "Expectancies, values, and academic behaviors," in *Achievement and achievement motivation*, ed. J. Spence (San Francisco, CA: W. H. Freeman), 75–146. doi: 10.14935/jseej.31.340
- Flake, J. K., Barron, K. E., Hulleman, C., McCoach, B. D., and Welsh, M. E. (2015). Measuring cost: The forgotten component of expectancy-value theory. *Contemp. Educ. Psychol.* 41, 232–244. doi: 10.1016/j.cedpsych.2015.03.002
- Flick, U. (2022). *An introduction to qualitative research. An introduction to qualitative research*. Los Angeles, CA: Sage, 1–100.
- Gabriel, M., Campbell, B., Wiebe, S., MacDonald, R., and McAuley, A. (2012). The role of digital technologies in learning: Expectations of first-year university students. *Can. J. Learn. Technol.* 38:1.
- Gibbs, A. (1997). Focus groups. *Soc. Res. Update* 19, 1–8.
- Granić, A., and Marangunic, N. (2019). Technology acceptance model in educational context: A systematic literature review. *Br. J. Educ. Technol.* 50, 2572–2593. doi: 10.1111/bjet.12864
- Guest, G., Namey, E., and McKenna, K. (2017). How many focus groups are enough? Building an evidence base for nonprobability sample sizes. *Field Methods* 29, 3–22. doi: 10.1177/1525822X16639015
- Hall, G. E. (1974). *The concerns-based adoption model: A developmental conceptualization of the adoption process within educational institutions*. Austin, TX: University of Texas.
- Henning, P. A. (2013). *Student onboarding MIT augmented reality: Mobile learning*. Wiesbaden: Springer VS, 143–158. doi: 10.1007/978-3-531-19484-4_8
- Hunter, P. (2015). The virtual university: Digital tools for e-learning and remote learning are becoming an increasingly important tool for teaching at universities. *EMBO Rep.* 16, 146–148. doi: 10.15252/embr.201440016
- Keane, T., Linden, T., Hernandez-Martinez, P., Molnar, A., and Blicblau, A. (2022). Digital technologies: Students' expectations and experiences during their transition from high school to university. *Educ. Inform. Technol.* 85, 1–21. doi: 10.1007/s10639-022-11184-4
- Khoboli, B., and O'Toole, J. M. (2012). The concerns-based adoption model: Teachers' participation in action research. *Syst. Pract. Act. Res.* 25, 137–148. doi: 10.1007/s11213-011-9214-8
- Klein, H. J., and Polin, B. (2012). "Are organizations on board with best practices onboarding?" in *The Oxford handbook of organizational socialization*, ed. C. R. Wanberg (Oxford: Oxford University Press), 267. doi: 10.1093/oxfordhb/9780199763672.013.0014
- Koehler, M. J., and Mishra, P. (2005). What happens when teachers design educational technology? The development of technological pedagogical content knowledge. *J. Educ. Comput. Res.* 32, 131–152. doi: 10.2190/0EW7-01WB-BKHL-QDY
- Kotla, B., Bosman, L., Chelberg, K., Magana, A. J., and Guzey, S. S. (2023). Lessons learned from remotely onboarding undergraduates into applied energy and entrepreneurship research. *J. Coll. Student Retent. Res. Theory Pract.* doi: 10.1177/15210251231192865
- Kuhn, K. (2000). Problems and benefits of requirements gathering with focus groups: A case study. *Int. J. Hum. Comput. Interact.* 12, 309–325. doi: 10.1080/10447318.2000.9669061
- Lai, K. W. (2011). Digital technology and the culture of teaching and learning in higher education. *Aust. J. Educ. Technol.* 27:2. doi: 10.14742/ajet.892
- Landis, J. R., and Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics* 33, 159–174. doi: 10.2307/2529310
- Linder, K. E. (2017). Fundamentals of hybrid teaching and learning. *New Dir. Teach. Learn.* 2017, 11–18. doi: 10.1002/tl.20222
- Littlejohn, A., Margaryan, A., and Vojt, G. (2010). Exploring students' use of ICT and expectations of learning methods. *Electron. J. eLearn.* 8, 13–20.
- Lüders, C. (2004). "The challenges of qualitative research," in *Companion to qualitative research*, eds U. Flick, E. von Kardorff, and I. Steinke (London: Sage).
- Martinez, S. M., Esaryk, E. E., Moffat, L., and Ritchie, L. (2021). Redefining basic needs for higher education: It's more than minimal food and housing according to California university students. *Am. J. Health Promot.* 35, 818–834. doi: 10.1177/0890117121992295
- Mayring, P. (2021). *Qualitative content analysis: A step-by-step guide*. London: Sage.
- Merriam, S. B. (1998). *Qualitative research and case study applications in education: Revised and expanded from "case study research in education"*. Hoboken, NJ: Jossey-Bass Publishers.
- Morgan, D. L. (1993). Qualitative content analysis: A guide to paths not taken. *Qual. Health Res.* 3, 112–121. doi: 10.1177/104973239300300107
- Motycki, K., and Murphy, D. (2021). Bridging systems, building a coalition, and centering students: A collaborative multi-campus approach to orientation in the time of COVID-19. *J. Coll. Orient. Retent.* 28:4. doi: 10.24926/jcotr.v28i2.3734
- Naeini, F. H., and Krishnam, B. (2012). Usage pattern, perceived usefulness and ease of use of computer games among Malaysian elementary school students. *Res. J. Appl. Sci. Eng. Technol.* 4, 5285–5297.
- Page-Gould, E., Mendoza-Denton, R., and Tropp, L. R. (2008). With a little help from my cross-group friend: Reducing anxiety in intergroup contexts through cross-group friendship. *J. Pers. Soc. Psychol.* 95, 1080–1094. doi: 10.1037/0022-3514.95.5.1080
- Patton, M. Q. (2014). *Qualitative research & evaluation methods: Integrating theory and practice*. Thousand Oaks, CA: Sage Publications.
- Poláková, P., and Klimová, B. (2019). Mobile technology and Generation Z in the English language classroom—A preliminary study. *Educ. Sci.* 9:203. doi: 10.3390/educsci9030203
- Prior, V., Hankins, D., and Gillilan, M. (2021). Realizing the full potential of orientation as a process: Practitioner perspectives on one university's pandemic response for orientation efforts. *J. Coll. Orient. Retent.* 28:6. doi: 10.24926/jcotr.v28i2.3766
- Radianti, J., Majchrzak, T. A., Fromm, J., and Wohlgenannt, I. (2020). A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda. *Comput. Educ.* 147:103778. doi: 10.1016/j.compedu.2019.103778
- Rädiker, S., and Kuckartz, U. (2019). *Analyse qualitativer Daten mit MAXQDA*. Wiesbaden: Springer Fachmedien Wiesbaden.
- Rapley, T. (2014). "Sampling strategies in qualitative research," in *The SAGE handbook of qualitative data analysis*, ed. U. Flick (London: SAGE Publications Ltd), 49–63. doi: 10.4135/9781446282243
- Romero, R., Plaza, I. R., and Orfali, C. H. (2019). Barriers in teacher perception about the use of technology for evaluation in higher education. *Digit. Educ. Rev.* 35, 170–185. doi: 10.1344/der.2019.35.170-185
- Roney, L. N., Iris Johnson, B. S. N., and Ligas, M. (2022). Capturing the moment: Using digital imagery to welcome first-year students. *J. Coll. Orient. Retent.* 29:859.
- Rosenzweig, E. Q., Wigfield, A., and Eccles, J. S. (2019). *Expectancy-value theory and its relevance for student motivation and learning*. Cambridge: Cambridge University Press, doi: 10.1017/9781316823279.026
- Sander, E., Thiele, L., Kröber, C., Kauffeld, K., and Dick, M. (2022). "Onboarding in KMU - Verstehen, Reflektieren, Gestalten," in *Digitalisierung der Arbeitswelt im mittelstand 2*, eds V. Nitsch, C. Brandl, R. Häußling, P. Roth, T. Gries, and B. Schmenk (Heidelberg: Springer).
- Santos, H., Batista, J., and Marques, R. P. (2019). Digital transformation in higher education: The use of communication technologies by students. *Proc. Comput. Sci.* 164, 123–130. doi: 10.1016/j.procs.2019.12.163
- Schilling, H., Wittner, B., and Kauffeld, S. (2022). Current interventions for the digital onboarding of first-year students in higher education institutions: A scoping review. *Educ. Sci.* 12:551. doi: 10.3390/educsci12080551
- Statistisches Bundesamt (2022). *Bildung und kultur: Prüfungen an hochschulen*. Wiesbaden: Statistisches Bundesamt.
- Van Rooij, E. C., Jansen, E. P., and van de Grift, W. J. (2018). First-year university students' academic success: The importance of academic adjustment. *Eur. J. Psychol. Educ.* 33, 749–767. doi: 10.1007/s10212-017-0347-8
- Vaportzis, E., Giatsi Clausen, M., and Gow, A. J. (2017). Older adults perceptions of technology and barriers to interacting with tablet computers: A focus group study. *Front. Psychol.* 8:1687. doi: 10.3389/fpsyg.2017.01687
- Venkatesh, V., and Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decis. Sci.* 39, 273–315. doi: 10.1111/j.1540-5915.2008.00192.x

- Voogt, J., Fisser, P., Pareja Roblin, N., Tondeur, J., and van Braak, J. (2013). Technological pedagogical content knowledge—a review of the literature. *J. Comput. Assist. Learn.* 29, 109–121. doi: 10.1111/j.1365-2729.2012.00487.x
- Wilson, K. L., Murphy, K. A., Pearson, A. G., Wallace, B. M., Reher, V. G., and Buys, N. (2016). Understanding the early transition needs of diverse commencing university students in a health faculty: Informing effective intervention practices. *Stud. High. Educ.* 41, 1023–1040. doi: 10.1080/03075079.2014.966070
- Zarembo, V. E., and Stepanenko, D. A. (2021). Digital onboarding of Russian higher education under pandemic. *Educ. Res. During COVID 19* 1, 173–177.