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Digital ethnography in higher education teaching and learning—a methodological review

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Abstract
To understand how the digitalization of higher education influences the inter-relationship between students, teachers, and their broader contexts, research must account for the social, cultural, political, and embodied aspects of teaching and learning in digital environments. *Digital ethnography* is a research method that can generate rich contextual knowledge of online experiences. However, how this methodology translates to higher education is less clear. In order to explore the opportunities that digital ethnography can provide in higher education research, this paper presents a methodological review of previous research, and discusses the implications for future practice. Through a systematic search of five research databases, we found 20 papers that report using digital ethnographies to explore teaching and learning in higher education. The review synthesizes and discusses how data collection, rigour, and ethics are handled in this body of research, with a focus on the specific methodological challenges that emerge when doing digital ethnographic research in a higher education setting. The review also identifies opportunities for improvement—especially related to participant observation from the student perspective, researcher reflexivity in relation to the dual teacher-researcher role, and increased diversity of data types. This leads us to conclude that higher education research, tasked with understanding an explosion of new digital practices, could benefit from a more rigorous and expanded use of digital ethnography.

Keywords Higher education · Digital learning · Digital ethnography · Netnography · Virtual ethnography · Methodological review

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Introduction

Digital ethnography presents a largely untapped opportunity for research into the experiences and practices of higher education. As a rigorous approach, digital ethnography can generate a special kind of knowledge, rich in context and reality, which is not available to other approaches commonly used in digital and Internet research. Outside of the digital space, ethnographies have contributed to our knowledge of social, cultural, and motivational aspects of teaching and learning (Iloh & Tierney, 2014), and helped us understand how universities and students experience socio-political issues such as inclusion, inequality, or gender, as well as the effects of political reforms and societal transitions (Pabian, 2014; Wieser & Ortega, 2020). However, traditional ethnography explores experiences that take place on campuses and in classrooms. Teaching and learning in digital environments, being no less social, political, or embodied than campus education, could equally benefit from a more widespread employment of ethnographic methods.

Digital learning—by which we mean learning with and through digital tools, platforms, and media—is pervasive post pandemic. Current research privileges a quantitative focus (Drysdale et al., 2013; Martin et al., 2020). With the significant impact of digitalization on all aspects of higher education, this relative lack of qualitative work risks holding back the entire field. Embracing digital ethnography provides a means for rich detailed and rigorous accounts of how students experience contemporary learning. Digital ethnography differs from other approaches that employ online observations, such as learning analytics or usability focussed research, in its focus on holistic datasets that embrace culture and context, insider perspectives, and narratives. Furthermore, digital ethnography can draw from the rigorous ethnographic tradition, with its strong connection to ethics throughout the research process.

Doing educational ethnography in digital and hybrid spaces presents new challenges. Digital educational technologies, i.e. the software and hardware being used by teachers and students, clearly shape higher education. They also influence the ways a researcher may access teacher and student experiences. Long-term immersive field studies, considered distinctive features of ethnography, may not be feasible in their traditional forms, and the creation of detailed accounts of digital practices may require "creative adaptations of the ethnographic method" (Hine, 2015, p. 2). Outside of higher education, ethnographers have begun to address *why* and *how* such adaptations should be done. These perspectives, however, do not fully account for the complexities of teaching and learning in higher education. Aside from a thematic issue of the journal *Ethnography and Education* (Parker Webster & Marques da Silva, 2013), there has been very little attention given digital ethnography in educational research, particularly in higher education research.

To remedy this deficiency, we need a better understanding of the challenges and opportunities of digital ethnography. A good starting point is to examine the experiences and reflections that are presented in the existing, albeit limited, higher education research that employs digital ethnography.

Objectives

This paper reviews digital ethnographic research on teaching and learning in higher education. The objective is to identify and discuss the methodological choices described in the included studies, rather than to review their findings. Specifically, the review will focus on

the challenges and opportunities related to (1) collection of observational and research-elicited data, (2) strategies for improving rigour, and (3) ethical issues. By synthesizing and presenting these insights, we hope to contribute to a more frequent and rigorous use of digital ethnography in this context.

Digital ethnography in higher education

Ethnography has been defined in a multitude of ways. For the purposes of this paper, we follow Hammersley (2018), in defining ethnography as a research strategy that prioritizes fieldwork-based collection of rich unstructured data through observations and accounts of participants in order to make detailed descriptions of what they do and why they do it. *Digital ethnography* is the application of this ethnographic approach to contexts where the field is predominantly a digital environment. This typically means that data is generated through online fieldwork, i.e. observations of social life as it plays out in and across online environments (e.g. virtual worlds, learning management systems, or social media), as well as a reliance on interacting with and eliciting accounts from study participants through digitally mediated communication (e.g. instant messaging apps or video calls). In terms of purpose and epistemological stance, *digital ethnography is ethnography*, but the adaptation of the methods to the digital field means that the ethnographic *practice* changes. Angelone (2019) suggests a number of necessary adaptations and new challenges that arise with these new practices. These can be grouped under the headings of *data collection*, *rigour*, and *ethics*. Most practices related to *data analysis* are similar to other qualitative traditions and will only be lightly addressed in this review, primarily under the heading of rigour.

In accordance with most newer textbooks and handbooks (e.g. Hjorth et al., 2017; Pink et al., 2016; Varis, 2016), this paper uses *digital ethnography* as the umbrella term; it is one of several labels describing ethnographic research in digital contexts (Hetland & Mørch, 2016). This encompasses *virtual ethnography* (Hine, 2000), *netnography* (Kozinets, 1998), and *cyber-ethnography* (Ward, 1999), as well as the more generic *Internet ethnography* and *online ethnography*.

Data collection

Ethnographic data are often described as detailed and unstructured (Pabian, 2014). Unlike the highly structured types of data used in statistical analyses, unstructured data "typically take the form of open-ended verbal descriptions in field notes, of transcriptions of audio- or video-recordings, of images of one kind or another, of extracts of text from documents, and so on" (Hammersley & Atkinson, 2007, p. 161). Traditionally ethnographic data collection involves long periods of immersive fieldwork and observation. This means that ethnographic analyses do not just rely on what study participants say they do, but also includes observations of what they are doing.

The *embedded*, *embodied*, *and everyday* nature of the Internet (Hine, 2015) means that our digital lives rarely play out in a single digital environment. Collection of rich data for digital ethnographies therefore often requires the researcher to follow study participants through several digital and sometimes physical spaces (James & Busher, 2013; Parker Webster & Marques da Silva, 2013). Where digitalization is associated with remote learning and even a globalization of the student body, access to the physical spaces may be unfeasible, and many digital ethnographies rely solely on digital data collection.

In the digital space, the meaning of *observation* changes. Traditional ethnography prioritizes participant observation, where the researcher participates in the practices of the community that is being researched (Aktinson & Hammersley, 1998). This has some advantages, such as an insider's view where the researchers themselves experience first-hand what it is like to be part of the community. One consideration with participant observation is that the researcher's presence will influence the data in predictable and unpredictable ways. Because of this, the unobtrusive observations offered by *lurking* (i.e. non-participant observation) in digital spaces may be attractive, and consequently form a big part of many digital ethnographies (Murthy, 2008). In higher education, such unobtrusive observation may include both observations of interactions, e.g. on social media or in virtual worlds, but also the trace/usage data that are auto-generated by digital platforms.

The textual nature of many digital communities means that some data collection only requires simple copy pasting (Angelone, 2019). This apparent ease of gathering large amounts of textual data disguises the fact that online texts are rarely static and stand-alone, but rather evolve over time and derive much of their meaning through their chronological relation to other texts. Traditional ethnography clearly differs between contemporaneous observations in the field and the collection of atemporal documents and objects. This difference is less meaningful in digital ethnographies, where the observations may be of asynchronous text-based interactions, while the digital documents and objects are continuously evolving in interactions between members of the community.

The non-observational types of data collected in digital ethnography are much like traditional ethnography, namely interviews, surveys, and other forms of research-elicited rich data, such as diary entries with texts, audio/video recordings, or photos created by study participants (Salmons, 2016). Digital documents, such as curricula, assignment descriptions, rubrics, student outputs, and feedback comments, may also be valuable data for analysis.

Rigour

Ethnography is concerned with producing illustrative accounts, rather than generalizable facts, so quality of ethnographic work is often seen as a matter of methodological *rigour* and *trustworthiness* of results, rather than the more positivist concepts of validity and reliability (Golafshani, 2003). Although the exact meanings of rigour and trustworthiness may depend on the epistemological and ontological stance, the same strategies for improving rigour and trustworthiness in digital ethnographies are often suggested. Among these, the most prominent are researcher reflexivity, explicit theoretical stance, triangulation, member checks, and prolonged observation.

Pink et al. (2016, p. 12) consider reflexivity one of the key principles of digital ethnography, and highlight that ethnographic knowledge is always produced in the inherent tension between the subjectivity of the approach and the need to produce a trustworthy account. As the higher education setting will be "close to home" for many ethnographers (Forsey, 2020), reflexive practice is important to cast a light on how the researcher's ideas and assumptions about students, teaching, technology, and education inform and influence the research. Another way of surfacing the influence of researchers' assumptions is to base the research on an explicit theoretical and conceptual framework, rather than ad hoc concepts. This is widely considered to be good practice in all forms of qualitative and interpretive research (Twining et al., 2017).

Data triangulation is the comparison of data from different sources, times, or places about the same phenomenon (Flick, 2004). Researcher triangulation is when two or more researchers are involved in analysing the same data (Archibald, 2016). The purpose of triangulation can be to check the validity of an initial claim, to generate more perspectives, or to seek complementary information on the phenomenon being examined (Hammersley, 2008). Member checks, i.e. returning the output of an analysis to the study participants as a way to seek their feedback to the findings, are a part of the netnographic technique proposed by Kozinets (2002). He highlights its value, especially as a way "to obtain and elicit additional, more specific insights" (p. 9) in cases where the researcher is primarily doing unobtrusive observations. Kozinets (1998) also underlines the need for *prolonged engagement and persistent observation* as a strategy to improve rigour in digital ethnographies. In a higher education setting, however, many digital communities may only exist for the length of a course or module. This can be a considerable limitation because it shortens the time available for immersion and participant observation.

Ethics

Ethics is an integral part of ethnographic research, and educational ethnographers will often find themselves in ethical dilemmas (Busher & Fox, 2019). The digital context presents new ethical issues, not least when it comes to protecting the study participants (and their institutions/organizations) from negative repercussions of participating in the research (Sveningsson, 2004). Ethnographic accounts are characterized by their details about individual experiences, often covering what is normally considered sensitive, and it is a standard practice to promise participants some degree of anonymity in exchange for their consent to be in the study. Unlike online communities with anonymous users, study participants in higher education are rarely anonymous to the researchers, and even when promised anonymity and the institution is not named, it can be hard to keep readers from guessing the location and maybe the participants' identities (Pabian, 2014).

The possibility of collecting digital data without the knowledge of the people being observed may tempt researchers to forego the process of informed consent (Murthy, 2008). If the research team includes teachers or course staff, who already have access to online course rooms, assignments, and other data, then the process of negotiating access and consent may be neglected. In such situations, where teachers use their students as study participants, the ethics of the consent process are harder to handle, as the students may feel obliged to accommodate their instructor, even in situations when participation could add unwanted stress to an already high stakes situation. Regardless of whether the researchers have a pre-existing relation to the study participants, there are important ethical considerations related to accessing and reporting about them. How well do the community and all its members understand the researchers' motivation for collecting data about them, and the extent of what data is collected? Even when study participants have given consent and their identities are protected, the reporting of the study may be harmful to the overall community or identity that they represent.

Methods

In order to identify relevant research papers for the review, we systematically searched five online research databases (ERIC, PsycInfo, Web of Science, Scopus, and IBSS) for references. This was done using a search string that included nine common variations of the term *digital ethnography* in combination with the search term "education".

(*"digital ethnography"* OR *"online ethnography"* OR *"cyber-ethnography"* OR *"virtual ethnography"* OR *"netnography"* OR *"Digital anthropology"* OR *"Techno-anthropology"* OR *"Cyber-anthropology"* OR *"Virtual anthropology"*) AND *"education"*

The anthropology-related search terms were included as they are mentioned in the theoretical literature. All search terms were in English, but the results included some non-English references. No limitations to publication date were set. The searches were conducted on 19 October 2021 and returned 762 records. After removing duplicates and adding two further records, there were 586 records in the pool. In accordance with the PRISMA standards (Moher et al., 2009), titles and abstracts were then screened for relevance in relation to the research questions, leading to the exclusion of 461 records. The remaining 125 records were passed on to a full-text read-through, and 105 were excluded based on the detailed selection criteria described in Table 1.

The PRISMA flow diagram (Moher et al., 2009) in Fig. 1 shows the exclusion process and detailed criteria. The process resulted in a pool of 20 peer-reviewed journal articles for inclusion in the review.

Results and discussion

Overview of studies

Table 2 presents the 20 included studies. All papers were published since 2002. No single country dominated the pool of papers, and seven were by authors from several countries. Although a majority originate in Europe, there were also papers from Australia, Canada, Nepal, South Africa, Thailand, the USA, and Zimbabwe. Half of the studies did fieldwork in education, three in language courses, two in marketing, and one each in information systems, nursing, and project management. Three papers included more than one discipline and one did not specify the disciplinary context.

The digital environments where the fieldwork took place ranged from online virtual worlds and multiplayer computer games to social media, instant messaging apps, learning management systems, and discussion boards. Only one study was done in the live streaming environment.

The favoured approaches to data analysis are thematic and content analysis. Other approaches were discourse analysis, interaction analysis, and grounded theory

Table 1 Criteria for inclusion of studies

Name	Criteria for inclusion
Availability	The paper is available as full-text
Language	The paper is written in English
Methods	The paper describes the use of digital ethnographic methods
Setting	The paper describes empirical research in a higher education setting
Focus	The paper focusses on issues and phenomena related to teaching–learning
Peer review	The paper is peer reviewed
Double reporting	If several papers report on the same study, only the most detailed is included

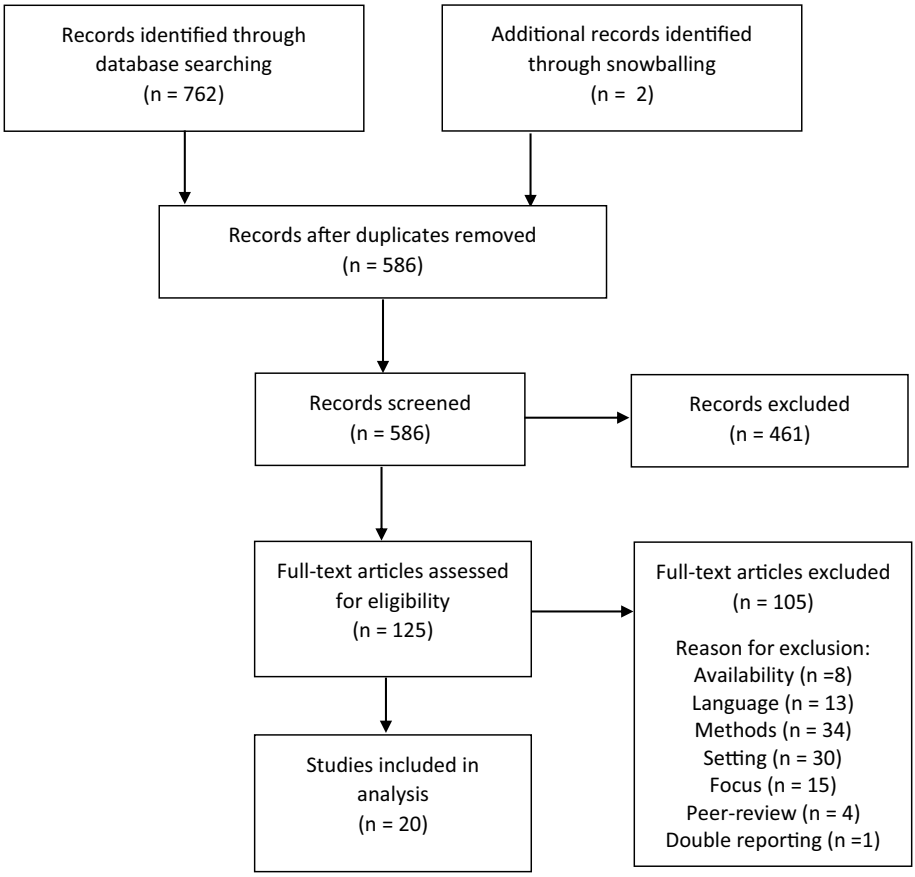

Fig. 1 PRISMA flow diagram

(sometimes referred to as constant comparative method). Two studies used mixed methods (Feliz et al., 2013; O'Reilly et al., 2007). No studies used narrative, phenomenological, or other approaches that specifically focus on the lived experiences of study participants. Generally, the papers do not spend many words describing their data analysis, but their approaches appear similar to what is found in other forms of qualitative research. Some salient aspects of data analysis will be discussed in the rigour section below.

The remainder of this section presents a synthesis of findings related to (1) data collection methods, (2) rigour, and (3) ethics (Table 3). This includes discussion of strengths, weaknesses, and potential futures.

Synthesis of data collection methods

The data collection methods are presented in two categories: observational and research-elicited.

Table 2 Description of included studies. Type of analysis italicized when not explicitly named in paper

Author/s (year)	Location	Focus of study	Digital environment	Discipline	Type of analysis
Barbas et al. (2014)	Portugal	Facebook as platform for learning	Social media (*Facebook*)	Unspecified	Grounded theory
Bolldén (2016)	Sweden	Teacher embodiment online	Learning management system (*It's Learning*) and virtual world (*Second Life*)	Education & Language	Thematic analysis
Browne (2002)	UK	Consequences of introducing digital learning in higher education	Learning Management System and CD-ROM	Education	*Content analysis*
Browne (2003)	UK	Student-instructor relationships in online education	Learning management system (*Lotus Notes*)	Education	Thematic analysis
Caruso et al. (2014)	USA	Second Life as platform for learning	Virtual world (*Second Life*)	Education	Interaction analysis & grounded theory
de Gagne et al. (2021)	USA	Explore nursing students' perceptions about effective pedagogy	Discussion board	Nursing	Thematic analysis
Devkota (2021)	Nepal	How universities' shift to online teaching during the pandemic reinforced social inequalities	Live streaming environment (*MS Teams, Zoom, Google Meet*)	Various	Thematic analysis
Emad et al. (2013)	Australia	Competency building and synchronicity in online multi-player games	Computer game	Marketing	Discourse analysis, content analysis & semiotic analysis
Feliz et al. (2013)	Spain	Twitter as platform for learning	Social media (*Twitter*)	Education	*Content analysis* & statistical analysis
Hemmi et al. (2009)	UK	Exploring the pedagogical use of weblogs and wikis	Blogs, wikis, social media (*Facebook*) and virtual world (*Second Life*)	Various	Thematic analysis
Kolbaek and Snis (2019)	Denmark	Learning from experiences in two contexts	Discussion board (Google Groups)	Education	*Discourse analysis*

Table 2 (continued)

Author/s (year)	Location	Focus of study	Digital environment	Discipline	Type of analysis
Kongmee et al. (2011)	Thailand	Online multiplayer games as platform for foreign language learning	Computer game	Language	Not described
Mørch (2020)	USA	Proposing action-breakdown-repair as a pedagogical model	Computer game (*Minecraft*) and virtual world (*Second Life*)	Education	Thematic analysis & interaction analysis
Mørch et al. (2015)	Norway	Learning interpersonal problem solving in virtual world	Virtual world (*Second Life*)	Education	Interaction analysis
Ndlangamandla (2020)	South Africa	Language use in online discussion forums of students learning English for academic purposes	Discussion board	Language	Discourse analysis
O'Reilly et al. (2007)	Canada	Understanding forum activity in mega-classes	Discussion board (probably *BlackBoard*)	Marketing	Learning analytics & content analysis
Rambe (2012)	South Africa	Constructive disruptions and social media	Social media (*Facebook*)	Information systems	Not described
Rambe and Mkono (2019)	South Africa	Relational authenticity in online supervision	Messaging platform (*WhatsApp*)	Project management	Thematic analysis & grounded theory
Ricoy and Feliz (2016)	Spain	Twitter as a platform for learning	Social media (*Twitter*)	Education	Content analysis
Tarisayi and Munyaradzi (2021)	Zimbabwe	Covid19 lockdown experience of students and teachers	Messaging platform (*WhatsApp*)	Education	Content analysis

Table 3 Data collection practices and (italicized) observational data types, approaches to rigour, and discussion of ethical aspects across the included papers

Author/s (year)	Data collection *(data types)*											Rigour						Ethics	
	Participant observation	Lurking observation	Interviews	Questionnaires	Participant diaries	Field notes	*System usage data*	*Digital objects*	*Text-based interactions*	*Virtual world interactions*	*Audio/video interactions*	Researcher reflexivity	Explicit theoretical stance	Researcher triangulation	Data triangulation	Member check	Prolonged engagement	Informed consent	Confidentiality
Barbas et al. (2014)		+	+						+										
Bolldén (2016)		+	+			+		+	+	+			+		+			+	+
Browne (2002)		+	+	+			+		+						+			+	
Browne (2003)		+	+	+					+				+		+			+	
Caruso et al. (2014)		+	+	+					+	+		+	+	+	+			+	
de Gagne et al. (2021)		+				+			+			+		+					
Devkota (2021)	+	+	+			+		+			+				+				
Emad et al. (2013)		+	+			+				+			+	+	+				
Feliz et al. (2013)		+				+			+										
Hemmi et al. (2009)	+	+	+			+		+	+	+					+			+	+
Kolbaek and Snis (2019)	+								+			+	+	+				+	+

Table 3 (continued)

Author/s (year)	Data collection *(data types)*											Rigour						Ethics	
	Participant observation	Lurking observation	Interviews	Questionnaires	Participant diaries	Field notes	*System usage data*	*Digital objects*	*Text-based interactions*	*Virtual world interactions*	*Audio/video interactions*	Researcher reflexivity	Explicit theoretical stance	Researcher triangulation	Data triangulation	Member check	Prolonged engagement	Informed consent	Confidentiality
Kongmee et al. (2011)	+	+	+			+				+									
Mørch (2020)		+								+			+						+
Mørch et al. (2015)		+	+							+			+						
Ndlangamandla (2020)		+					+		+			+	+						+
O'Reilly et al. (2007)		+					+		+					+	+	+			
Rambe (2012)		+							+				+						
Rambe and Mkono (2019)	+			+					+			+	+	+	+				
Ricoy and Feliz (2016)		+				+		+	+		+								
Tarisayi and Munyaradzi (2021)	+	+	+						+				+						+

Observational data collection

All the included studies collected observational data. The vast majority of these were collected by non-participant lurking researchers—only six studies included actual participant observation. Text-based interactions were the most common type of observational data. It was used in 15 papers. Depending on the digital environment where the research took place, the text-based interactions could take the form of discussion board posts (e.g. Ndlangamandla, 2020; O'Reilly et al., 2007), chats (e.g. Rambe & Mkono, 2019; Tarisayi & Munyaradzi, 2021), or comments on social media (e.g. Feliz et al., 2013; Rambe, 2012).

Seven papers described teaching and learning that took place in so-called virtual worlds—five in *Second Life* and two in multiplayer computer games. All these included observations of virtual world interactions as part of their dataset. The contemporaneous nature of virtual worlds means that the researchers needed either to be present as the online social life unfolded or rely on extensive amounts of screen-capture recordings. Except for Kongmee et al. (2011), observations of virtual world interactions were exclusively done in the virtual world. Several authors stress the fact that screen captured recordings of virtual world interactions quickly become very extensive and time-consuming to analyze. Emad et al. (2013) mention that it was a challenge to collect observational data in a virtual world that was part of an asynchronous course, because the researchers could not be online permanently to observe interactions at any time. They also mention how the vastness of the virtual world makes it impossible to remain close enough to observe and hear all interactions, and that the environment furthermore allows for private messages that were inaccessible for the researchers.

Only two papers included observational data from interactions happening via live video or sound. These data, however, were only used very sparingly in the analyses, as background information for more comprehensive analysis of interview data (Devkota, 2021) and text-based interactions (Ricoy & Feliz, 2016).

Three papers describe the collection and use of auto-generated data from technologies used by students. Browne (2002) collected "quantitative data indicating the number of accesses made to the individual programmes networked to the system" (p. 180), but analysis was more of a quantitative supplement to the qualitative analysis. Ndlangamandla (2020) collected statistics about discussion forum usage, but this was used to describe the context and dataset, not integrated into analysis. In the case of O'Reilly et al. (2007), the data was also used for triangulation, but instead of only analysing aggregated data, it was also analyzed at a student level to provide context for a richer account of a specific student's behaviour in a text-based discussion.

Four studies collected various types of digital objects. Bolldén (2016) collected "documents related to the courses, such as course syllabi and course web pages" (p. 4). Ricoy and Feliz (2016) collected the final reports of the students. These reports included students' reflections on their own experiences throughout the course, and as such could double as a form of ethnographic participant diaries. Hemmi et al. (2009) collected student work in the form of blog posts and wikis. Such teacher and student generated objects may be valuable for researchers, because assignments and other outputs are often at the centre of the behaviours, worries, struggles, and attention of online students. In Browne (2002) and Devkota (2021), the digital objects were primarily publicly available information, such as news reports, policy documents, and academic reports, that were included and analyzed as secondary data.

In eight papers, the authors mention the use of field notes for documenting observations during fieldwork. For Kongmee et al. (2011), these observations included non-mediated observations of students at their computers playing a computer game. Most other studies only did digital fieldwork. The taking of field notes were primarily a reflexive process, but in some cases also used as a way to convert multimedia recordings into textual data (e.g. Emad et al., 2013). de Gagne et al. (2021) point out that field notes made it possible for members of the research team to compare their understandings allowing for a more collaborative analysis. Two papers describe the use of *shared field diaries* (Feliz et al., 2013; Ricoy & Feliz, 2016).

Strengths and weaknesses of observational data collection methods The data collected in the studies were rich and appropriate for the creation of detailed accounts, but despite this, most studies did not harness the full potential of the ethnographic approach. Unobtrusive methods for data collection were favoured, and only a few used participatory modes of data collection. This is in line with Jeffrey et al. (2010), who note that digital ethnographers tend to use more lurking than participant observation. Hemmi et al. (2009) did participant observation but followed a *discrete* approach "because the research site was the actual teaching and learning space for the students, and overactive involvement could have been potentially disturbing to students' learning" (p. 20).

The permanency of many digital records, in which online interactions can be observed long after they took place, blurs the line between non-participatory observation and simply the collection of digital objects. In de Gagne et al. (2021), the online discussion forum interactions, which formed the core of their dataset, were collected after the courses had finished. Although it is not specified in most studies, we suspect that this is a common practice. Unlike participant observation, this means that lurking researchers are not only losing insights that grow from participation, but also the insights related to observing the community unfold over time. Future digital ethnographies would benefit from including participant observation. While the advantages of unobtrusive data collection are apparent, participant observation is at the core of how ethnography differs from other approaches. In the context of higher education, it is also important to avoid participating as an instructor if the research focuses on experiences of students, not least to avoid ethical dilemmas. Participating in an online course from the perspective of a student can provide access to emotions, experiences, and interactions that a lurking researcher may not understand. Especially in digital spaces, where mediating technologies intimately shape the experiences and interactions of community members, using these technologies as an insider is crucial to understand *how* they influence culture, behaviour and learning.

Few papers included real-world observations, and none included observational data from outside the immediate teaching–learning situation. This seems in line with most digital education research, which limits the scope of the study to a single course or module, and relies heavily on data from within the digital learning environment. For students and teachers, however, the teaching–learning situation is not an isolated event but embedded in their lives, and many teaching–learning phenomena may benefit from being investigated from a more holistic perspective that recognizes that context matters, and the context of a digital space is also a physical, embodied reality. This entanglement of digital and non-digital practices and experiences is also highlighted by Hine (2015). She argues that technology has become "an unremarkable component of everyday life" (Hine, 2015, p. 50), and consequently digital ethnography should not be confined to a certain digital space, but

rather seek to follow the study participants through the interconnected digital and non-digital spaces they inhabit.

Research-elicited data collection

In eleven papers, researchers conducted interviews with students, teachers, or other higher education professionals. In most cases, the interviews were done at an unspecified time during the fieldwork. In a few cases, they were purposefully done prior to observations, e.g. as a help to "attaining an overall understanding of the course" (Bolldén, 2016, p. 4) or even to elicit information to help develop a questionnaire (Browne, 2003). The majority of papers did not describe *how* interviews were done, but the digital nature of the research leads us to infer that interviewer and interviewee were remote from each other. Hemmi et al. (2009) used different technologies to do the interviews, and point out that "the quality and quantity of the data collection from different interview instruments were very uneven. In some cases, interviews using Messenger and Second Life had to be terminated because of technical instability/difficulties or simply time inefficiency and they were switched to telephone interviews for completion" (p. 21). Some authors specify that interviews were short or informal (e.g. Barbas et al., 2014; Kongmee et al., 2011), while others refer to them as in-depth and over an hour long (e.g. Bolldén, 2016; Browne, 2003). Barbas et al. (2014), Hemmi et al. (2009), and Devkota (2021) used a combination of individual and focus group interviews.

Four papers used questionnaires to collect data (Browne, 2002, 2003; Caruso et al., 2014; Rambe & Mkono, 2019). Of these, only Rambe and Mkono (2019) included the questionnaire text in their paper. The questionnaires were only distributed to those study participants that were also otherwise being observed or interviewed.

Strengths and weaknesses of research-elicited data collection methods None of the papers in the review elicited data from study participants in the form of diaries with texts, photos, drawings, voice memos, or other media. That is surprising, as this is otherwise a frequent way for ethnographers to collect data about study participants' experiences and reflections (Hall, 2006). Numerous digital technologies exist, to facilitate this, and the potentially longitudinal nature of such data makes it possible to catch developments that are invisible in single interviews or questionnaires. Such methods also allow the researcher to go beyond the scope of the teaching–learning situation and include a more holistic perspective on the experiences of study participants. Especially for studies that consider classroom-external factors, the inclusion of diary data can be a core strength of the ethnographic approach.

Synthesis of approaches to rigour

With a few exceptions, the papers did not devote much attention to describing their approaches to rigour. In many cases, it was unclear if this reflected an absence of methodological or analytical rigour, or if it was simply a matter of insufficient reporting. It was often not clear to the reader what had been done, what data was collected and how, and what had been the steps of the analysis. Such underreporting is unfortunate and may hold back the successful adoption of digital ethnographic strategies, because it makes it harder for researchers to learn from each other. Superficial reporting may partly reflect the fact

that ethnographic methods and accounts require more space than is available in many academic journals.

The following is a summary and discussion of the various strategies that the studies employ to increase the quality and trustworthiness or their analyses.

Reflexivity

Only five papers included any discussion of researcher reflexivity. Kolbaek and Snis (2019) and Rambe and Mkono (2019) have the most significant discussions of how their own dual roles as teachers and researchers require attention. For both papers, most reflexivity discussion was preoccupied with the handling of biases. According to Kolbaek and Snis (2019), such biases may be caused by the researcher's interest and engagement in the problem area. To mitigate this, they deliberately base their research focus on a review of previous literature, as opposed to something the researchers have personally identified. Rambe and Mkono (2019) and de Gagne et al. (2021) use bracketing, in order to *contain* the teacher-researcher's *preconceptions*. In de Gagne et al. (2021), preconceptions are explored in an appendix where all nine researchers present their reflective notes. Rambe and Mkono (2019), whose dataset primarily consists of WhatsApp-based thesis supervision between one of the authors and several supervisees, define their study as *autobiographical*, and highlight that the uneven power-relation between supervisor and supervisee may have influenced their interactions. However, in both Rambe and Mkono (2019) and Kolbaek and Snis (2019), the insider-view of teacher-researchers is generally seen as an advantage, because it provides access to study participants and familiarity with the educational context that is being investigated. Kolbaek and Snis (2019) argue that their mixed insider–outsider research team was optimal for providing access and insider knowledge, while still including an outsider-researcher, who could challenge the insider's assumptions.

The lack of reflections on what the researchers bring to the analysis, especially for the many studies conducted by teacher-researchers, is puzzling and cannot be fully explained by limitations related to the publication format. A focus on reflexivity is urgently required to lift the general standard of digital ethnography within higher education.

Explicit theoretical stance

Eleven of the studies were based on explicit theoretical or conceptual frameworks. Generally, their ontological and epistemological positions were little discussed, but these could often be deduced from discussions of the theories that informed the projects. Some examples include sociomateriality and practice theory (Bolldén, 2016), cultural-historical activity theory (Kolbaek & Snis, 2019; Tarisayi & Munyaradzi, 2021), and sociocultural theory (Caruso et al., 2014; Mørch et al., 2015). As would be expected in a pool of ethnographic papers, these theories are well aligned with constructivist and interpretive research paradigms.

Triangulation and member checks

Nine of the studies employed some form of data triangulation, as a part of their analysis. Comparing different data types is by far the most common form of triangulation in the studies, for example Emad et al. (2013) triangulate visual and written data, Rambe and Mkono (2019) triangulate chat log and interview/questionnaire data, and O'Reilly et al.

(2007) triangulate discussion forum posts and background data. Almost no details were given about the actual process of triangulation.

Six of the studies used researcher triangulation. In O'Reilly et al. (2007) and Rambe and Mkono (2019), each researcher did their own tentative open coding of the dataset, followed by comparison and discussion of disagreements between authors. In Emad et al. (2013), the researcher triangulation was part of a *control phase* that allowed for a cross-researcher check of all results by every member of the research team. In de Gagne et al. (2021), researcher triangulation is achieved by involving "a large team of researchers with diverse cultural backgrounds and different levels of teaching experience in the analysis and interpretation to ensure a multiplicity of perspectives" (p. 9).

O'Reilly et al. (2007) was the only paper that used member checks. Inclusion of study participants in the process of data analysis is an untapped resource in the current literature.

Prolonged engagement

None of the studies discussed prolonged engagement and consistent observation as strategies for improving rigour. In some cases, fieldwork lasted several semesters (e.g. de Gagne et al., 2021; Hemmi et al., 2009) but observations took place in a variety of online communities, and no study participants were followed for more than the duration of a single course. The relatively short-lived nature of many teaching–learning communities in higher education may be the most consequential methodological limitation when collecting rich data. To fully benefit from the advantages of digital ethnography, studies should move beyond the single course focus and seek to follow the same participants across semesters or even years.

Synthesis of ethical issues

Comprehensive discussions of ethics and its role in digital ethnographic research were mostly absent. Considering the central role of ethics in ethnographic practice, this constitutes a major weakness. Six papers mention confidentiality, but across the entire pool of papers, protecting the identity of participants is the rule, and study participants are universally referred to by pseudonyms or codes. Both Ndlangamandla (2020) and de Gagne et al. (2021) quote directly from online discussion forums, with the consequence that the participants are not anonymous to their peers.

Informed consent was mentioned in six papers. Bolldén (2016), who studied teacher presence, obtained consent from teachers, but not the students of the course. This approach is somewhat different from that of Kolbaek and Snis (2019) and Browne (2002, 2003) who make a point of asking permission from everyone whose online interactions are being observed. After receiving informed consent, Browne (2002) additionally added a post in the online environment "to remind the participants that the researcher was listening in" (p. 180). Surprisingly, no paper addressed the ethical issues related to informed consent from students when the researcher asking for consent is also a teacher on the course in question.

The widespread use of unobtrusive non-participant observation raises important questions in relation to informed consent. In traditional fieldwork, the researcher's presence serves as a continuous reminder that observation is taking place. In digital spaces, the non-participating researcher becomes invisible, and the study participants may forget that they are being observed. When learning takes place in contemporaneous and closed communities, it simplifies the process of consent, because the identities of participants are usually

already known, and they all enter the community at the same time. When fieldwork is done in open digital environments, such as Twitter, the process of consent may become more complicated because unknown persons may join the community at any time. At the same time, using data from open digital environments also poses the risk of inadvertently revealing study participants because any quotes included in publications may be searchable (Dawson, 2014).

The papers included very limited information about how researchers had gained access. The reason for this may be the prevalence of teacher-researchers. The merging of the teacher and researcher roles is a significant characteristic of the included studies. One advantage of this is the ease of negotiating access and the pre-existing detailed contextual knowledge. The flipside of this ease of access is that it may raise ethical issues in relation to consent: the uneven power relation between a professor and their students may mean that students feel obliged to participate in the research. This issue is at the intersection of ethnographic data collection, rigour, and ethics, and should be addressed in a reflexive manner in all studies with teacher-researchers.

Strengths and limitations

Among the strengths of this paper is that it synthesizes our knowledge about the use of digital ethnography in higher education research by reviewing methods and strategies of previous digital ethnographies. This way, we have identified practical reflections and setting-specific opportunities and challenges related to data collection, rigour, and ethics that do not get the same attention in the theoretical literature. A limitation is that the review only includes papers that are declaring themselves as ethnographies. There may be qualitative studies of digital learning in higher education who use similar methods but do not self-identify as digital ethnography. We were surprised by the limited number of papers our search produced. We note, however, a rise in recent years and suggest this may reflect the growing prominence of digital learning within higher education.

Conclusion

Digital learning and educational technologies are gaining increasing prominence in universities across the world, but the dearth of digital ethnographies means that many important questions regarding the experiences of online students and instructors are not being sufficiently addressed. Learning from the previous, albeit limited, work in this space is a good starting point for a wider and improved adoption of digital ethnographic approaches in higher education research.

This methodological review identifies several challenges and opportunities that are salient in the context of digital higher education. Examples include the relatively short life of most higher education digital communities, the easy access to study participants, the inclusion of data from beyond the scope of the teaching–learning situation, and the fact that universities are "close to home" for many educational ethnographers.

This review also identifies several surprising gaps and potentials for improvement, leading us to conclude that higher education research could benefit from a deeper and more rigorous use of digital ethnography. Suggestions include an increased use of participant observation to complement the widespread use of lurking observations; a more reflective

engagement with the practical and ethical issues related to the dual role of teacher-researchers; and the inclusion of more diverse sources of rich data, such as participant diaries, student outputs, and system usage data.

At many higher education institutions, the student body is diversifying, and societal agendas of social justice, access, and inclusion have become intimately connected with often technological efforts to improve educational quality. Digital ethnography—tapping into the ethnographic tradition for rigour, ethics, and rich unstructured datasets—provides a unique and underutilized perspective for exploring this complex development.

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Declarations

Conflict of interest The authors declare no competing interests.

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