Massive Omission of Consent (MOOC): Ethical Research in Educational Big Data Studies

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Abstract
Ethical reviews of research plans function as a cornerstone of good research practice in order that no harm should come to participants. Ethical concerns have taken on a new salience in a digital world where data can be generated at scale. Big data research has grown rapidly, raising increased ethical concerns. Several intersecting areas of big data research exist within educational research, such as learning analytics, artificial intelligence (AI), and Massive Open Online Courses (MOOCs). In the current study, an investigation was made of peer-reviewed papers on MOOC teaching and learning to determine if they explicitly refer to (a) ethical considerations in their studies, and (b) obtaining formal ethical approval for their research. This investigation was accomplished through a review of MOOC-related, English-language papers available in Scopus database, over the course of a year. The review produced a total of 1,249 articles, of which, 826 articles related to empirical studies involving human participants where full text of the articles could be obtained. The string "ethic" was searched for within these articles, and resulting articles analyzed, which found that a small fraction, 42 articles (5.08%), mention ethics in relation to the study presented in the article, and only 13 articles (1.57%) explicitly mention obtaining formal ethical approval for the research. The findings show a lack of transparency in reporting on and/or engagement with ethical considerations in MOOC teaching and learning research. These findings indicate the need for further stakeholder engagement and sectoral dialogue in relation to ethics education and training for researchers; consideration of ethics in big data studies in education; and norms/policies in academic publishing for authors to report how ethical issues have been considered.

Keywords: Massive Open Online Courses (MOOCs), research ethics, informed consent, big data

In academia and industry contexts, big data research has grown steadily. With that growth has come increased ethical concerns around this type of research and the gap that can exist between researcher training and experience and the big data research in which they are engaged (Zook et al., 2017). There are several intersecting areas of big data research within educational research such as learning analytics, artificial intelligence (AI), and Massive Open Online Courses (MOOCs), which are the focus in this paper. MOOCs continue to play an important role in education, with the COVID-19 pandemic causing a surge in enrollments (Impey & Formanek, 2021). However, although MOOCs are posited as platforms for learners and to expand education, MOOC providers' data practices have been described as undermining "the values and ends of an educational context [...] through the chilling, conforming, and credentialing effects of constant surveillance, data maximization, embedded assessment, and record retention" (Zeide & Nissenbaum, 2018, p. 301). The critique of these data practices raises questions about possible ethical issues in MOOC teaching and learning research.

The current study has the reporting of ethical practices in research on MOOC teaching and learning as its focus, due to the ongoing importance of this type of research to the field of education. To examine the degree to which those conducting this research engaged in consideration of ethical issues or obtained formal ethical approval, we can use published, peer-reviewed, scholarly papers as the site of our investigation. The current study takes inspiration from studies of research on learning analytics (Ferguson & Chow, 2017; Lane & Costello, 2019) and AI in Education (AIED), which highlight lack of discussion of ethics in published papers and applies this question to MOOC research where a gap exists around what researchers are saying about the ethics of their research in their published work.

In this article, we first present a review of the related literature before discussing the theoretical framework for the study. The article will then present the study's methodology in sufficient detail for others to interrogate and replicate our work. The methodology section is followed by the results section and a discussion of our findings. Finally, we detail our recommendations and conclusions, which include a warm invitation to sectoral colleagues to engage in dialogue around our findings in order that we might collaboratively establish as a community how to design and report on ethics in research on MOOCs.

Review of the Literature

Ethical research practice guidelines and protocols have been developed since the Nuremberg 1947 Code (Shuster, 1997), which provided a framework of new written principles for research on people that focused on the rights of the human participant. Other, key research ethics codes of conduct followed, such as the Belmont report (The National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research., n.d.), which outlines the key requirements of respect for persons, beneficence, and justice. The World Medical Association's Declaration of Helsinki, first adopted in 1964, (World Medical Association, 2013) and the Singapore Statement on Research Integrity (Resnik & Shamoo, 2011) built on these earlier codes of conduct, such that ethical codes now legally underpin contemporary scientific research. For example, the European Code of Conduct for Research Integrity (ALLEA, 2017) is recognized as the reference document for research integrity for all EU-funded research projects, and as a model for organizations and researchers across Europe by the European Commission.

As guidelines have evolved there has been a recognition of the challenges to working in the digital arena, particularly, as we will later see, in big data applications such as MOOCs. However, there are also many key aspects throughout all of these codes that have remained

unchanged (Favaretto et al., 2020), such as ethical approval of studies by a body that is separate to and independent of the research team and securing the informed consent of research participants. This ethical approval for research is necessary as it allows for oversight of potentially unethical practices. Norms around seeking and obtaining such formal ethical approval, and reporting of same in associated publications, differ by discipline. For example, one study found 35% of forensic science papers analyzed mentioned obtaining ethical approval (Bonsu et al., 2021) whereas this figure was 93.7% in a study of clinical nursing papers (Wu et al., 2019).

This institutional review board/committee approval is often a mandated requirement of funded research (Resnik & Shamoo, 2011; Grady, 2015). It allows professional standards to be applied, supports researchers in knowing what is ethical and what is not, and gives researchers unbiased advice and support. Ethical approval should be thought of as being part of the support mechanisms and research infrastructure available to researchers (Barrow et al., 2021). It protects them from doing harm and potentially breaking the law in addition to protecting participants. Moreover, ethical approval allows for audits of research. If a breach of ethical principles is perceived to have occurred, a participant or a whistle-blower can contact an ethics approval board or committee to ascertain if either the researchers did not do what they promised they would, or alternatively if they were allowed to engage in research that involved a level of risk to participants. Moreover, the ethical approval mechanism or process should examine a range of issues such as securing informed consent of research participants, and handling of their data including data anonymization and de-identification. That is, ethical approval is an umbrella that can encompass, or be indirect evidence for, other good ethical practices. For these reasons, we consider ethical approval to be fundamental to research and as such there is an onus and shared responsibility on a research team, research funders—and as we highlight in this paper, research publishers—to ensure that ethical approval is sought and obtained for research.

We next turn our attention to these ethical principles in large online learning environments. MOOCs remain attractive to researchers as innovation platforms that can expand what is possible and realize new opportunities because of their scale and their less formal nature (Impey & Formanek, 2021; Schuwer et al., 2015). However, such environments may "fashion themselves as education providers while shaking off the normative and regulatory constraints of traditional educational institutions" (Zeide & Nissenbaum, 2018, p. 280). The maxim, "if you are not paying you are the product," may be relevant (Hirsch, 2013). Ethical norms for students taking multi-year programs and paying large fees may seem less relevant with more casual learners in MOOCs (Costello et al., 2019). Studies of attitudes to consent, and the benefits they feel may accrue from allowing their data to be used, indicate that students have concerns about privacy and surveillance but in large part they place trust in their university to use their data ethically and appropriately (Slade et al., 2019; Tsai et al., 2021). However, in the case of MOOCs, researchers have pointed out the complexities of the long and legalistic terms and conditions to which participants sign up (Khalil et al., 2018). Learning analytics and MOOC researchers have developed various checklists, frameworks, and evaluation methodologies for engaging in trusted and ethical research and development, but how these are adhered to by practitioners is unclear (Kitto & Knight, 2019). For example, a recent review of 11 learning analytics data ecology frameworks found that only 3 moved beyond student "data as resource" and used student data to modify aspects of learning design and facilitation. Most did not emphasize ways in which the data interests of students could be considered and protected and

instead portrayed students more as data subjects who it should be assumed would automatically benefit from the analyses of their data (Prinsloo et al., 2023, p. 6).

The research on AI and Education (AIED)—which has many intersections with MOOC research—indicates that research from computer scientists may have given more space to the development and evaluation of technologies (Zook et al., 2017; Holmes & Tuomi, 2022) than care for participants (Prinsloo & Slade, 2017). One AIED in Higher Education review found ethics to be conspicuous by its absence, as only 2 of 146 studies (1.4%) contained any ethical consideration, prompting the authors to reflect that "a stunning result of this review is the dramatic lack of critical reflection of the pedagogical and ethical implications as well as risks of implementing AI applications in higher education" (Zawacki-Richter et al., 2017, p. 11).

The ethical gaps in the overlapping areas of MOOCs, learning analytics, and AI in Education is concerning, as the potential for harm of learners can be great but is also not always clear or obvious. For example, research has shown that de-identification of data is complex and that bad actors can potentially reverse engineer and combine data to reveal the identity of participants despite anonymization or privacy efforts (El Emam et al., 2011; Zheleva & Getoor, 2009). This has also been shown in learning analytics datasets, where researchers showed how data that identifies student data can be revealed (Yacobson et al., 2021). This gives different impetus to the notion of informed consent—that is, it should cause researchers to be careful in assuming they do not need consent just because participants' data appears anonymous. One significant review that highlighted the dangers of downstream data linkage to individual identification recommended expanding the role and involvement of ethical review boards/committees and their composition to add big data expertise (Ienca et al., 2018).

Despite the centrality of ethical approval, as a requirement, for example, of almost all funded research with participants, there is very little research on the inclusion of declarations of ethical approval in published research studies on MOOCs. One related notable, small-scale study searched for ethical treatment in learning analytics research (Ferguson & Chow, 2017). Using the search stem "ethic-" this study analyzed 22 articles from the Higher Education section of the LACE Evidence Hub finding that only 3 had explicitly mentioned ethics. Lane & Costello (2019) followed a similar methodology by conducting a literature review on 104 papers over two years that reported on empirical studies in learning analytics across a range of journals and conference proceedings in the field. They sought to determine if published studies reported on receiving ethical review board approval, anonymization of data, and whether they had received informed consent from the learners who were being studied. They reported low levels of reporting on ethics in the published studies around approval, consent, and data handling.

In this study we drew inspiration from this line of research in ethics and learning analytics and applied it to MOOCs where such research is lacking. Our overarching research objective was to determine what information, if any, is given about ethical approaches taken by research teams, in a selection of empirical, published research on MOOCs. Specifically, we sought to determine if identified empirical studies contained any references to research ethics in the context of the research conducted. Within this overarching aim our research questions were:

RQ1: Did studies report having received approval from an identified, formal ethical review board/committee?

RQ2: Did studies explicitly describe obtaining informed consent from those whose data is analyzed?

RQ3: Did studies explicitly discuss how they treated data of participants with regard to de-identification and anonymization?

RQ4: Did studies reference utilizing any other ethical guidelines or frameworks other than ethical review board/committee approval?

Methods

We adopted a scoping review for this research, which is appropriate as do not wish to use our results to answer a question of significance about a specific educational intervention or practice but are more interested in "identification of certain characteristics/concepts in papers or studies, and in the mapping, reporting or discussion of these characteristics/concepts" (Munn et al., 2019, p.3). We followed general guidelines in educational technology research on reviews (Bedenlier et al., 2020) but also specific reviews of ethics in publications (Coates, 2019; Wu et al., 2019; Bonsu et al., 2021; Astaneh & Khani, 2019). Following the approach utilized by Ferguson & Chow (2017) and Lane and Costello (2019) discussed above, this study utilized a defined literature search strategy within an identified database (Scopus) using defined inclusion and exclusion criteria. We next discuss our search strategy which is detailed in Figure 1 below.

Figure 1
Identification, Screening, and Inclusion of Studies
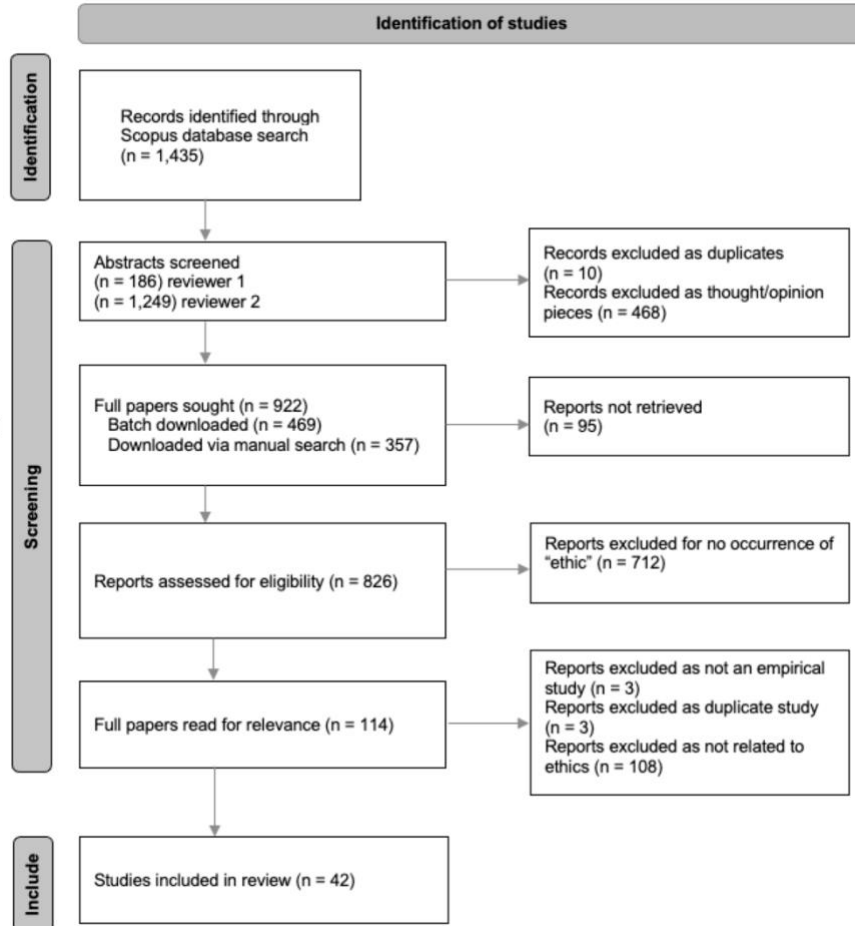
We selected the Scopus bibliometric database as the main search tool, as members of the research team have an institutional subscription to both it and a very large proportion of the sources that it indexes. Scopus returns better metadata, in a more structured format, than scholarly search engines such as Google Scholar and is selective in its coverage, as indexed journals and publications must meet several research quality criteria for inclusion (Colledge et al., 2010). It indexes IEEE, ACM, Springer Notes in Computer Science proceedings and the main journals in the field, hence providing good coverage of the main publication outputs of MOOC research.

First, we conducted a search on Scopus for articles which had the string "MOOC" in either the title, abstract or meta data keywords.

We used the following inclusion criteria:
- A. The papers had to be written in English
- B. The papers had to be published in journals or peer-reviewed conference proceedings
- C. The papers had to be published between January 2016 and January 2017, inclusive
- D. The papers had to be electronically available in Scopus.

The full search-string used was:

TITLE-ABS-KEY ("MOOC") AND (DOCTYPE (cp) OR DOCTYPE (ar) OR PUBSTAGE (aip)) AND (LIMIT-TO (pub-date AFT 20160131) AND LIMIT-TO (pub-date BEF 20170131)) AND (LIMIT-TO (LANGUAGE , "English"))

This returned a total of 1,435 papers. Following Bujang and Baharum (Bujang & Baharum, 2017), we sought to determine a sample size suitable to conduct inter-rater reliability of two evaluators for a subset of the articles. The N.cohen.kappa function of the R irr package (alpha of 0.05, power of 95). returned a value of 186. Next, two researchers read 186 article abstracts from the dataset independently recording which studies they believed to be collecting data from human participants. The results of these evaluations made in separate spreadsheets were then compared via Cohen's Kappa, which gave a value of 0.89 indicating "almost perfect" inter-rater reliability i.e > 0.81. At this point, the evaluators discussed discordant items before reaching consensus on them. Finally, one researcher then proceeded to evaluate the next 1,249 article abstracts from the dataset.

A close reading of the abstracts of these 1,249 papers was made. At this stage, some duplicates were also discovered and eliminated (10). 922 papers reported on empirical studies involving human participants. An attempt was made to retrieve the full available texts of those 922 papers from sources legally available to the research team. Via the batch download feature, 469 were automatically retrieved from Scopus, which allows retrieval of 50 articles at a time. A manual search was then made for available copies of the remaining articles; a further 357 were found. This resulted in a final corpus of 826 articles in PDF form (see Figure 1). Further scientometric analysis of this dataset was made at this point to determine the most cited literature and the main themes via machine learning techniques including topic modelling. This research is beyond the scope of the current study and is reported elsewhere (Costello et al., 2022).

We used an open-source tool called "pdfgrep" to perform searches within the corpus of PDF files for the string "ethic" (case insensitive). At this stage of full paper screening, duplicates and studies that were not empirical were excluded that were missed at abstract screening. Lastly, an analysis was then conducted by close reading of the remaining full papers for the treatment of consent, which we next detail in our results.

Results

One hundred and fourteen results were returned from the search for the stem term "ethic". These results were analyzed through reading the relevant sections from the 114 articles and most (108) were revealed to be false positives (i.e., not concerned with ethics in the research). There were also three duplicates and three studies that were not empirical. Forty-two papers, 5.08% of the dataset, were thus selected for inclusion in the full analysis, as they contained evidence of some reported consideration of ethics in the study design and implementation. Of these 42 papers that mentioned ethics, we categorized what was discussed into five dimensions. These are summarized in Table 1 below.

Table 1
Results of Close Reading of the 42 Papers that Mentioned Ethics

Ethics Evidence Dimensions	Number	Percent
Treatment of ethics in relation to the associated study	42	5.08%
Ethical approval for the study	13	1.57%
Learner consent sought	17	2.06%
Learner de-identified from data collected	10	1.21%
Learner fully anonymized in data	11	1.33%
Other ethical consideration mentioned	29	3.51%
Number of studies	*826*	*100%*

We can see that only 13 studies (1.57%) included that they had received ethical approval from an independent committee or institutional review board to conduct their research (Annear et al., 2016; Berman et al., 2017; Frank et al., 2016; Jansen et al., 2017; Kim et al., 2016; Loizzo & Ertmer, 2016; Longstaff, 2017; Rieber, 2017; Salmon et al., 2017; Shapiro et al., 2017; Swinnerton et al., 2017a; Swinnerton et al., 2017b; Wewer et al., 2017). For example, in Frank et al. (2016, p. 122) under the heading "Ethical Approval" the following is stated: "This study obtained ethical approval from the Behavioral Research Ethics Board at the University of British Columbia, UBC BREB number H12-01071, and was executed according to our approved protocols." An example of a claim of ethical approval without a reference number is given in

Rieber (2017, p. 4) "The current study was conducted upon approval from the institutional review board at the author's university."

Seventeen studies (2.06%) discussed seeking the consent of the learner (Flores et al,. 2016; Henderikx et al., 2017; Loizzo et al., 2017; Milligan & Littlejohn, 2017; Mishra et al., 2017; Wang et al., 2017; Zhang et al., 2017; Annear et al., 2016; Berman et al., 2017; Jansen et al., 2017; Loizzo & Ertmer, 2016; Swinnerton et al., 2017b). An example of this is given by (Henderikx et al., 2017, p. 4): "Participation was voluntary, and informed consent was obtained from participants following ethical guidelines of the providing institution."

Ten studies (1.21%) mentioned de-identification of the learner data (Falkner et al. 2016; Frick & Dagli, 2016; Mishra et al., 2017; Veletsianos, 2017; Annear et al., 2016; Berman et al., 2017; Frank et al., 2016; Rieber, 2017; Salmon et al., 2017; Swinnerton et al., 2017b). The Rieber (2017, p. 5) study gives an example of de-identification in a study: "The primary mechanism for protecting participants in the study was the coding and removing of any direct identifiers from their data. Additionally, results are presented across groups of participants. Combined, these measures protect participants from having their individual identities revealed in any manner." Another more detailed example is given in Salmon et al. (2017, p. 6): "All data used in this study was de-identified to ensure the confidentiality and privacy of participants. Interview participants are referred to by pseudonyms throughout this paper. To access the de-identified data used in this study, please email the corresponding author and provide a statement regarding the purposes of your request."

Eleven studies (1.33%) mentioned fully anonymizing the learner data (Filimowicz & Tzankova 2017; Luaces et al., 2017; Mishra et al., 2017; Frank et al., 2016; Loizzo & Ertmer, 2016; Rieber, 2017; Salmon et al., 2017; Swinnerton et al., 2017b; Wewer et al., 2017). An example of authors who reported collecting data anonymously is given in Filimowicz and Tzankova (2017, p. 5): "Student feedback was collected anonymously using SFU's web-survey system. The online survey was made available towards the end of the course. Ethics approval regarding the collection of information from students was obtained."

Twenty-nine studies (3.5%) discussed following some other ethical guidelines or having taken some other approach to the consideration of ethical issues (Flores et al., 2016; Henderikx et al., 2017; Mishra et al., 2017; Morgan et al., 2017; Riofrío-Calderón et al., 2016; Wang et al., 2017; Zhang et al., 2017; Berman et al., 2017; Swinnerton et al., 2017; Wewer et al., 2017). Examples here include three studies having approval from the MOOC platform provider itself (Swinnerton et al., 2017b; Zhang et al., 2017; Mishra et al., 2017), "we have an agreement with FutureLearn that we can use anonymous data for research purposes" (Mishra et al., 2017, p. 5). Some papers reported being exempt according to ethical board/committee guidelines, for example: "this study was exempt from review under The University of Adelaide Human Research Ethics Committee guidelines, as the study has no foreseeable risk or harm to participants and as it involved the use of existing collections of data that contain non identifiable data; including the artworks and pre- and post-survey data" (Falkner et al., p. 5 2016); "the research reported here falls outside of the vetting process of research in accordance with the Swedish Ethical review" (Berman et al., 2017, p. 635). This last quote from Berman et al. (2017, p. 635) also mentioned that the study was carried out according to Swedish ethical guidelines. Other papers also reported that the study was carried out in accordance with some national or regional guidelines, for example, "according to guidelines of the British Educational Research Association" (Annabi et al., p. 7, 2016).

Discussion

The findings of this study highlight a fundamentally important gap in published research about teaching and learning in MOOCs. This gap relates to the inclusion, or more specifically the lack thereof, of explicit discussion of ethical considerations, and/or the reporting of ethical approval processes in research publications. This has important implications for researchers, institutional leaders, funding bodies, ethical approval boards/committees, those teaching on topics related to big data and/or data ethics, and for those involved in the publication of empirical research papers, such as journal editors, conference chairs, peer reviewers, etc.

The first key finding is that only 1.6% of studies (18 papers) made explicit reference to obtaining ethical approval for the research related to the published article from an ethics approval board/committee. This finding contrasts with research in other settings. For example, Bonsu et al. (2021) found 35% rates of ethical approval declaration in forensic science papers. Differences are starker when the finding from this study is compared to similar research about medicine; for example, in one review of 1,284 studies over a two-year period in clinical nursing, 93.7% included that such ethical approval had been granted (Wu et al., 2019). Related to this first key finding, 29 studies (3.5%) reported following a set of ethical guidelines or that they had approval to carry out the study from a body other than a formal ethical approval board/committee. Some researchers referred to following guidelines such as those from the British Educational Research Association (Annabi et al., 2016). Some researchers referenced having approval from the MOOC platform itself for research activity, for example having an agreement with FutureLearn to use anonymous data from a MOOC for research purposes (Mishra et al., 2017). It is unclear how meaningful such author statements are given that these approaches cannot be equated with a process of obtaining ethical approval from an ethics approval board/committee, which is a cornerstone of ethical research practice.

The second key findings in this study are that out of a sample of 826 published papers meeting the inclusion criteria only 42 (5%) contained any reference to ethics in the context of the associated study. This contrasts with a finding from an analysis of 500 social science papers by Coates (2019) in which 55% mentioned ethics. The current study found that 17 studies (2.06%) included discussion of obtaining learning consent, 10 studies (1.21%) mentioned de-identification of learner data, and 11 studies (1.33%) referenced fully anonymizing learner data. These findings demonstrate a low engagement with reporting on treatment of these important ethical issues in associated publications, from those researching teaching and learning in MOOCs. For those researchers who did include details of ethical considerations in their published work, this involved straightforward inclusion of details relating to informed consent, de-identification of learner data, and/or full anonymization of learner data. Other authors simply exempted themselves, or were exempted, from the need to obtain ethical approval due to the use of big data in the study (for example, Falkner et al., 2016; Berman et al., 2017). This approach potentially clashes with identified ethical concerns raised in the literature around big data research (Zook et al., 2017).

The question that these findings raise is whether this lack of reporting is due to norms around the requirements to include consideration of ethical issues in publications, i.e., are ethical considerations being made in the research but not elucidated in the associated publications, or has there been an absence of consideration of ethical issues in the research? If it is more the case that ethical considerations are being made but not reported, one can point to the fact that paper authors, journal editors, and paper reviewers are clearly standing over the publication of such papers without the inclusion of details on related ethical considerations. Some journals, for

example those in the SpringerOpen portfolio, have author requirements about declaring that ethical approval has been obtained from an institutional review board or committee (Springer Nature, 2023). Other journals, for example Research in Learning Technology, include guidance to authors on conducting research in line with institutional ethics guidelines and that ethical approval should be obtained from the relevant committee before submitting to the journal, but there is no requirement to confirm compliance with these points in a submitted manuscript (Association for Learning Technology, 2023). If it is the case that papers are published without mention of ethical considerations because there was none, there is a need for researcher education and training in both ethics generally (Atenas et al., 2023) and big data ethics specifically (Metcalf et al., 2023). In this context, the fact that peer-reviewed journal articles are being published without consideration of the ethical issues inherent in big data research, and of the ethical rights of the learners involved, would be concerning. Overall, these findings indicate that there is a need for more dialogue in the sector on: ethics education and training for researchers; consideration of ethics in big data studies in education; and norms/policies in academic publishing for authors to report how ethical issues have been considered.

Based on the findings in the current study, it would seem clear that researchers working in the area of teaching and learning in MOOCs need to be more cognizant of ethical pitfalls, specifically those around informed consent and data handling (anonymization, de-identification, etc.) (Favaretto et al., 2020). Researchers should be working within systems that require ethical education and training, ethical oversight, and ethical approval by an appropriate body (Metcalf et al., 2023; Resnik & Shamoo, 2011; Grady, 2015; Atenas et al., 2023). Where researchers do not properly take ethical considerations into account, participants are being put at undue risk (Barrow et al., 2021).

Researchers should "recognize that they have an ethical obligation to weigh societal benefits against risks inherent in their work" (Resnik & Shamoo, 2011, p. 74). However, we do not know the reasons why the majority of papers reviewed in this study did not include mention of ethics. Absence of evidence is not evidence of absence. Therefore, we would like to warmly invite dialogue from colleagues in the sector on the issues highlighted in this paper, such that we can collaboratively explore, as a community, what lies behind the current lack of reporting on ethics in empirical MOOC teaching and learning papers. If there are identifiable deficits in MOOC teaching and learning research, then we, as a community of researchers, must identify ways in which to tackle these issues for the common good. This call for dialogue acknowledges the complexities that exist in the area of big educational data studies, in particular where research teams may be large, interdisciplinary, and working in areas for which protocols, governance, or even laws may not seem responsive to practices:

> Rather than a bug, the lack of clear-cut solutions and governance protocols should be more appropriately understood as a feature that researchers should embrace within their own work. Discussion and debate of ethical issues is an essential part of professional development. (Zook et al., 2017, p. 5)

Recommendations

Based on the findings of the current study, a set of recommendations is presented below relating to the consideration of ethical issues in empirical MOOC teaching and learning studies, and educational big data studies more broadly, as well as the role of ethical review boards/committees in research and academic publishing:

1. *Increased sectoral dialogue*
   There is a large community of researchers in the sector with interests in MOOC teaching and learning, and other educational big data topics. Given the questions raised by this study, and elsewhere in the literature, the first recommendation is for more dialogue in the sector around ethics, big data research, and academic publishing such that identified issues can be collaboratively addressed as a community.

2. *Transparency around ethics in educational big data research*
   The second recommendation is that there should be appropriate, explicit treatment of ethical considerations in MOOC teaching and learning research, and other educational big data research, and that researchers should make this information available to others. The information made available should cover, at a minimum, how learner consent has been obtained and how participant data has been handled in terms of de-identification and anonymization. Provision of this information supports transparency of whether and to what degree ethics has been a feature of the research study, as well as allowing for study replication. Transparency can be achieved through including sufficient detail in traditional academic publishing and/or by engaging in open science practices that make information about the treatment of ethics within the study available outside of publications on the study.

3. *Reporting on research ethics as a norm in academic publishing*
   Connected to recommendation two above, the third recommendation relates to establishing a norm in publications on MOOC teaching and learning research, and other educational big data research, whereby detailed information on consideration of ethics issues, and the obtaining of ethical approval from an appropriate review board/committee is provided as a matter of course. It is recommended that all scholarly journal articles should have a mandatory section specifying whether the research was given ethical approval by an independent reviewing body. Such a recommendation is in line with the values and aims of bodies such as The Committee on Publication Ethics (COPE). The provision, in a publication, of an ethical review board/committee identification number would be a strong form of evidence that at least some independent oversight of the study was conducted at the design stage. The identification number could be traced back to a committee/board, who could in certain circumstances validate whether the published study had indeed received approval as claimed. This would provide accountability for researchers.

4. *Provision of education and training in ethics and big data for researchers*
   The final recommendation relates to the need for a holistic approach to education and training in ethics for researchers. Approaches to ethics education and training should be: ongoing during research careers, active and interactive, grounded in group activity rather than individual work, and should focus on the ethics from a broad, societal perspective as well as the more typical focus on specific ethical practices needed to conduct scientific research. The goal is to create a research culture of engagement with ethics, within which ethics is not viewed as a compliance exercise, a complicated area that demands too much time, or an afterthought in the research design process.

What can we do as a research community to improve this situation? Although there are practical actions to pursue, as just suggested, we cannot treat the ethics of research into digital

education as a problem a with a simple fix for it speaks to a set of complicated relations which are social or "ethically relational":

> Adopting relational ethics means that we view our understandings, proposed solutions, and definitions of bias, fairness, and ethics as partially open. This partial openness allows for revision and reiteration in accordance with the dynamic development of such challenges. This also means that this work is never done. (Birhane, 2021, p. 6)

Further work in this area could usefully revolve around approaches to building greater forms of research traceability (like we are used to with our food), where research committees and academic journals work together to create a chain of accountability for researchers. Investigations of stakeholder perceptions of such research traceability systems could be explored, in future work, as such proposals would require dialogue and ground-up co-creation. Otherwise, they could run the risk of becoming another part of top-down compliance culture.

Conclusion

This paper has presented evidence on the practices of researchers around the reporting of ethics in published work. We found that mentioning ethics in research conducted with MOOC learners is a minority activity, and we call for more focus on this issue in published research. As put by the Chief Executive of the European Science Foundation (ESF), Marja Makarow, "there can be no first-class research without integrity, and integrity includes both paying attention to ethical considerations and reporting them clearly in published papers" (New Code of Conduct for Researchers, n.d.). We call on researchers to keep issues of ethical integrity in high regard. We can do this by holding each other to account with clear standards. We believe that this is necessary, but also not in itself sufficient or a simple fix. Hence, we must engage in continued dialogue to revise and develop our standards of practice and continually work towards relational ethics.

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