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Editorial: Artificial Intelligence is Awesome, but Good Teaching Should Always Come First.

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Editorial: Artificial Intelligence is Awesome, but Good Teaching Should Always Come First.

Abstract

The explosion of generative artificial intelligence into the mainstream of society some twelve months ago has seriously challenged learning and teaching practice. Since then, AI companies such as OpenAI are constantly improving their language models and releasing new features to make them more capable and useful. So, given there have been many disruptors in the past and emerging disruptions in the present, what can we learn in this situation, where Generative AI stands poised to challenge the purpose and relevance of assessment models? From our examples, disruptive technologies only have a major impact when they positively transform practice and are informed by pedagogic models and learning theory. GenAI as a disruptor is only likely to have this positive impact when it informs quality learning and teaching practice. We should be focused on the opportunities that GenAI now presents to higher education. It is argued here and elsewhere that the relative weakness of GenAI is that it creates poor quality output, delivering uninformed, incorrect, biased and bland responses. In itself, this offers opportunities for 'teachable moments' (Newell et al, 2023) and gives us room to support students with their capabilities in an AI informed world. Historically, these opportunities enable higher education to grow and progress. What we have learned so far would appears to be that for research to contribute to the literature, they needed to be informed by it. Likewise, need to ensure that pedagogy, andragogy, and heutagogy come first. We also need to remember that people processes happen, artificial intelligence happens around them, and that artificial intelligence comes after human intelligence.

Practitioner Notes

1. For AI research to contribute to the literature, it needs to be informed by it.
2. Scholars need to ensure that pedagogy, andragogy, and heutagogy come before artificial intelligence.
3. People processes happen, artificial intelligence happens around them, and that artificial intelligence comes after human intelligence.
4. Artificial Intelligence comes after human intelligence

Keywords

ChatGPT, Bard, Andragogy, AIED, large language model, higher education

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Introduction

The explosion of generative artificial intelligence into the mainstream of society some twelve months ago has seriously challenged learning and teaching practice. Since then, AI companies such as OpenAI are constantly improving their language models and releasing new features to make them more capable and useful. Already, we can see incredible value in what has emerged in human development, society, education, and the pursuit of knowledge (Rudolph et al., 2023). We are also seeing positive impacts in educational settings, for example, the integration and embedding of artificial intelligence supports such as chatbots to support student learning which are moving beyond early adoption stages.

In a short period of time, the fictions by Nobel Laureate Kazuo Ishiguro of *Klara* the solar-powered artificial friend seem much more plausible. The introduction of GPT, PaLM 2, and similar, have emerged at a time when higher education remains in flux about best ways to engage with AI and large language models effectively. There are examples of various implementations across the sector, from supporting students to reference better to training in idea generation for rubrics or assessments (e.g., Eager & Brunton, 2023). The abundance of tools in this domain underscores the versatility of AI applications. This predictive capacity of machine learning allows educators to identify students who may need more help and has been well documented by the learning analytics community.AI can make personal recommendations for learning resources based on user preferences and interaction patterns, much like Spotify or Netflix, extending beyond mere quizzes with automated grading. Chatbots can facilitate interactive conversations with educational content. AI techniques can also be used to provide feedback on writing performance (Knight et al., 2020). Concerns regarding academic integrity and the use of AI support tools persist a in discussions about what is quality higher education (Perkins, 2023). Indeed, the problem is not confined to higher education and perhaps the reasons for academic concern are evident through recent examples such as the submission to the Australian Government's review on the big four consultancy firms that used Google's Bard AI, which led to factually incorrect information in the formal submission (Belot, 2023).

Additionally, AI models can also perpetuate bias through Stochastic parroting (Boussen et al., 2023), and educators and students must learn to critically question datasets and assumptions or decision-making based upon them. There are already cautionary examples of the potential biases and errors inherent in algorithms in higher education internationally. In 2020, the University of Texas discontinued the use of a machine learning program for evaluating applicants to its PhD program (Texas Standard, 2020). The program's algorithm relied on a database incorporating past admission decisions, resulting in unfair outcomes for students from diverse backgrounds historically underrepresented in PhD admissions due to inherent biases in the dataset. Researchers have also explored other ways in which education can benefit from AI by addressing ethical concerns with human-centred approaches (Yang et al., 2021). Key to enabling AI for 'good', is making decision-making processes transparent, so biases are more easily identified and rectified.

Despite the potential disruption, artificial intelligence tools are likely to support higher education to deliver

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contemporary education. Over the past 12 months, we have published through the *Journal of University Teaching and Learning Practice* a series of articles that discuss how artificial intelligence is used, or misused, in higher education learning and teaching practice. Indeed, we articulated early, a clear justification for the types of authorship arrangements we accepted with regards to artificial intelligence (Crawford et al., 2023), and we were not the only ones (e.g., Lodge et al., 2023; Thorp, 2023). What we have seen is that, generally, the rules of authorship have been upheld, as far as can be detected. In the growing volume of artificial intelligence-related manuscripts, however, we see a consistent preferencing of the systems and technologies over informed and considered approaches to teaching adult learners. That is, a focus on training or use of Prompt Engineering over a foundational understanding of learning and teaching practice (see Eager & Brunton, 2023). In these styles of submissions, we tend to reject without further consideration, as theoretical framing is needed ahead of deployment of a new educational technology. In this Editorial, we discuss some of the implications, and learn from other disruptive technologies in providing advice to prospective authors and our readers alike.

This is Not the First Technology to Disrupt

Prior to the rapid insurgence of artificial intelligence into learning and teaching, there have been several technologies that have enabled a change to practice, and adaption of learning and teaching methodologies towards new ways of doing, and of learning. In this section, we consider four recent technological disruptions, as they play an important role in supporting learner centred learning and teaching and mark key millstones in technology adoption in higher education globally

Web 2.0 transformed traditional classrooms

Whereas most learning was conducted in face-to-face contexts, the invention of the personal computer in the 1970s began to signal a change in the places and times that learning could exist. The chalkboard-driven and paper-submission classrooms began to see their demise (Saettler, 2004). From the late 1990s, Web 2.0 had a drastic effect on learning and teaching. The inclusion of asynchronous communication outside of letter correspondence may have offered an acceleration of the timelines of education, with blogs, early course tool learning management systems (e.g., WebCT or Blackboard) and popular social media platforms (e.g., Six Degrees in 1997) changed how students could connect with peers, share information, and access knowledge (Choi-Lundberg et al., 2022). The classroom became porous, and instead of its role as the only place for synchronous learning, the lecture theatre and workshops spaces became anchors for learning, and not the only place where formal learning could take place. From an educational technology perspective, this change also enabled changes to practice. Although the term flipped learning was only popularised around 2011 (Abeysekera & Dawson, 2015), the emergence of Web 2.0 sat alongside the foundational emergence of the ‘classroom flip’ from 1998 (Baker, 2016). The alignment of the classroom flip was nested in two emerging trends. The first trend related to changes in how learning and teaching was done, and *second* was the innovation in information technology (Baker, 2000).

iPhones Connected Learners (mLearning)

The availability of Web 2.0 applications on these mobile phones signalled significant opportunities for new ways of engaging in learning, known as m-learning. As learning management systems

went mobile (e.g., Blackboard Learn in 2009), once again, the classroom had a lesser priority as an anchor, and perhaps more so as a critical check-in location. This change was disruptive particularly to equitable access to learning because it enabled learners to engage in self-directed digital learning, while connected to the internet. In their systematic review on mLearning from 2010-2016, Crompton & Burke (2018) found that research on mLearning focused on student achievement (31%), student perceptions (29%), and pedagogy (20%), rather than the device or the application (5%). So, while iPhones and later Android competitors in their early inception offered more entrances into the learning environment, their introduction and their evaluation were based on the learning and teaching methods that were now possible through the use of these tools, and not the technology. Later, societal embeddedness of mobile phones arguably had a different effect on learning, particularly from perspectives of distraction and mere-presence effects; although we focus on technology introduction here.

Social Media Created New Forms of Learning Connections

The inclusion of social media into education was argued as aligned to learner-centricity, and creating educational practice aligned to centring the learner inside expertise and knowledge networks (Friesen & Lowe, 2011). The learning approaches applied to teaching through social media focused on connection, collaboration, and meaning generation through learning. Social media technologies like Myspace, Facebook, Twitter, Instagram, and more recently TikTok have different methods of engagement available and accessible for learners. In one review, Davis III et al., 2015, p. 409) make the case that higher education institutions should “exploit social media’s features” for educational achievement. And, there is evidence that student-student and student-teacher interactions increased because of social media usage (Chugh & Ruhi, 2017; Tess, 2013). In Tess’ (2013) review, the discussion saw a good deal of studies focusing on the technology over the pedagogy or adult learning methods that previously informed effective learning and teaching. For example, Sadaf et al. (2012) surveyed staff for adoption intentions of social media and other Web 2.0 technologies using theory of planned behaviour. Yet, the study spoke little to the underlying educational reasons beyond sentiments relating to the ever-present concept of student engagement. As Purvis and Beckingham (2024) discuss, there is a genuine need for a greater focus on social media pedagogy, learning community literature, digital capability literature, and practices of computer mediated communication in decisions to deploy social media in a higher education classroom context.

And Then There Was Learning Analytics

Interpreting the ‘big data’ generated by students, their interactions in online learning environments such as learning management systems (LMS) and their academic histories to intervene and assist students has long been a learner analytic goal (Reimann, 2016).Leveraging data to inform and enhance learning and teaching through evidence-based decisions requires different approaches to practice but there is evidence that it can improve professional teaching practice and ultimately student learning outcomes (Jones & Fitzgerald, 2023). Additionally, analytics enables personalised student learning that can facilitate and automate targeted educational support according to students’ individual strengths and weaknesses based on their online behaviours (Ifenthaler & Yau, 2020). AI technology can enable this goal by efficiently analysing vast datasets, providing actionable insights, and supporting timely interventions to guide learning. In skills-based

disciplines such as mathematics, personal tutoring programs offer adaptive opportunities for practice from an endlessly patient system, which could offer the most positive disruption to learning and teaching yet.

Prioritising Teaching Methods

So, given there have been many disruptors in the past and emerging disruptions in the present, what can we learn in this situation, where Generative AI stands poised to challenge the purpose and relevance of assessment models? From our examples, disruptive technologies only have a major impact when they positively transform practice and are informed by pedagogic models and learning theory (Sankey et al, 2023). GenAI as a disruptor is only likely to have this positive impact when it informs quality learning and teaching practice. We should be focused on the opportunities that GenAI now presents to higher education. It is argued here and elsewhere that the relative weakness of GenAI is that it creates poor quality output, delivering uninformed, incorrect, biased and bland responses. In itself, this offers opportunities for 'teachable moments' (Newell et al, 2023) and gives us room to support students with their capabilities in an AI informed world.

Historically, these opportunities enable Higher Education to grow and progress. What we have learned so far would appears to be that for research to contribute to the literature, they needed to be informed by it. In an illustrative example from the assessment and review of manuscripts submitted on COVID-19 emergency remote teaching experiences, Crawford (2023) highlights the similarities between the Black Death of 1347-1351, where staff and students from the University of Oxford are documented as having taken textbooks to the countryside, in self-isolation, while the virus subsided. While documentation was much lower in the 1300s, there was much to learn from the existing literature about remote learning, distance education, and computer-mediated learning and teaching prior to 2020.

Yet, a vast proportion of the manuscripts received treated pandemic education as a new concept requiring never-before-seen approaches to learning and teaching. Instead, it was more likely that COVID-19 emergency remote teaching was just a rapid deployment of existing approaches to teaching. In the 'pivot' to emergency remote teaching, some curriculum was digitized and delivered through Learning Management Systems, rather than grounded in sound pedagogical principles (Cowling et al., 2022). Rather than repeat this situation with Generative AI, we offer the following section as advice, drawn from the COVID-19 approach as well as those previous examples, as to a way forward that allows us to prioritise teaching methods, regardless of the technology (or social) disruption that is occurring.

Pedagogy, Andragogy, and Heutagogy First

Our first assertion is that pedagogy, andragogy, and heutagogy must inform decisions around educational technology in higher education. This is not an argument for a simple, linear implementation with artificial intelligence following in second or third place. Rather we advocate for centring students as bringing their own unique experiences and knowledge to an active rather than passive learning experience (Knowles, 2013), even if sometimes students enjoy it less because of the increased cognitive effort required during active learning (Deslauriers et al., 2019). This familiar concept of teaching and learning, well supported by decades of education research, nevertheless bears repeating, and some elaboration. After all, educators have long recognised

that web and emerging technologies offer affordances for self-directed and hauntological learning, supporting students' independent skill development for a complex workplace (Blaschke, 2012).

Yet traditional, teacher-centred approaches are easier to render algorithmicallyGenerative AI is proving to be an effective text and multimodal content production tool and web distribution is increasingly abundant and accessible with streaming platforms and social media reaching diverse audiences. For example, synthetic media can be used to generate video lectures and presentations from text and this format allows information to be more efficiently created and updated than traditional recordings (Vallis et al., 2023). Hence, educators must insist on more active learning and teaching approaches that embed technology. Assessment practices can and will change. While research is underway to modify assessment so students may think more critically about AI and engage more deeply with authentic learning tasks (Smolansky et al., 2023), more is clearly needed.

One of the reasons why GenAI has exploded in popularity is that it expands creative possibility. For inspiration, educators can explore, experiment, and create on a plethora of tools. Active engagement with AI technology will help in aligning these technologies effectively with learning outcomes. Teachers and students alike need to work creatively with AI, understanding its limitations and potentials (Bearman & Ajjawi, 2023). Ultimately, GenAI may prompt educators to rethink education and their roles, reaffirming the importance of *personal* support and care as a human-centered practice, alongside a carefully considered *personalised*, automated service (Bozkurt & Sharma, 2023). Moreover, educators might ask themselves before using AI in class: Would I like to be taught in this way? What value does AI add or extend to this activity?

People Processes Happen, Artificial Intelligence Happens Around Them

Typically in Science, Technology, Engineering and Mathemetics (STEM) fields, a vital part of teaching and learning is focused on and delivered through experiments in laboratories. Even though modern technologies have made those experiments more accessible and robust by providing more compact systems and easier access, until now those subject areas still heavily rely on real-world physical interactions for learners to practice the theories learned in the classroom. Recent advances in AR/VR and AI have provided good enhancements to the experiments and sometimes supplements that cannot be closely observed, both in education (e.g., nuclear reactions) and the industry that higher education aims towards (e.g., the Boeing Augmented Reality Kit: Safi et al., 2019); however, these are centred around the education processes that have been established and proven effective in the past centuries.

Not limited to STEM fields, virtually in all subject areas, learners will require human guidance. Established pedagogies such as experiential learning (Kolb, 1984) and motivation scaffolding (Belland et al., 2013) require learning to be designed in an iterative manner, adaptive to learners' reactions, including aspects such as emotional and psychological responses. These are the levels of intelligence that the current AI is not able to offer. In addition to receiving guidance, learning also involves group work and peer-to-peer interaction where different learners may have different roles but all aim towards the same target. Even though ChatGPT is able to help students learn through features such as role play, it does not yet seem to help build social relationships between students. This is typical in computer-related subjects when learners form an agile-style team (Neumann & Baumann (2021), but this is equally applicable whenever

user requirements need to be captured (e.g., healthcare). The complexity of human interaction goes far beyond simply semantic analysis, which is what the most advanced AI tools cannot offer.

Artificial Intelligence Comes After Human Intelligence

A teacher's role in the classroom is analogous to that of a manager in a company, following the planning, organising, leading, and controlling framework (e.g., Dumbu & Chadomoyo, 2012). Effective teaching begins with a deep understanding of pedagogy, an analysis of how technological advancements can support learning and the diverse learning needs of students. However, for large language models, most of the current generative AI tools are based on a deep learning neural network model called transformers (Chen et al., 2023), typically trained using labelled corpora (e.g., Riley et al., 1999). Manually labelling large text samples is a time-consuming process, and as a result, Generative AI models are often not up to date in terms of subject knowledge. A well-known issue in training artificial neural networks is bias, which can lead to poor generalisation for less-represented data classes (Geman et al., 1992). However, it is not fully understood how current GAI tools handle the bias problem, and it is questionable whether they can address diverse learning needs.

A teacher’s role extends beyond simple subject matter expertise, encompassing the creation of conducive learning environments, management of expectations, and addressing disruptive behaviours when necessary. Empathy and passion are human qualities that AI tools can simulate but not replicate. Moreover, while the AI can provide content, the types of intuitive, empathetic, and personalised guidance that teachers offer may be more difficult to replicate. Our advice therefore is to be explicit with students about how AI can scaffold their learning, and in what ways the teacher and the AI can work together. By making it clear to students where an AI shines, we can ensure that the interaction with the teacher comes first, and that the AI comes second, relegating AI to a support role as the second educator in the room, rather than the primary (Koh et al, 2022). Teachers might also consider how students could use AI to empower their own learning, beyond direct instruction methods. Co-designing, creating, and participating in learning with AI tools may prepare both teachers and learners to navigate future waves of change and uncertainty in higher education and more widely in society and the workplace (Carvalho et al., 2022).

Our Approach to AI Publications

In the *Journal of University Teaching and Learning Practice*, we have aimed to be explicit in our belief that great studies on educational technology in practice are nested in a deep understanding of contemporary educational theory. That is, while including new technologies in class and writing about the ‘increased student experience’ or ‘greater academic achievement’ is interesting, without a strong underlying frame, it likely offers incremental innovation, replication, adaption, or extension to an existing approach (Cowling et al., 2022). And, even when there are new methods of teaching, they are likely informed by historical perspectives of education and development that ought to be acknowledged. In this final section, we draw on a previous editorial (Cowling et al., 2022) in an applied context of artificial intelligence research to provide advice and guidance on our future approach to AI publications.

Theory then technology

At this stage, the rationale for design decisions that emphasize the importance of educational theory first and artificial intelligence second, ought to be clear. Each effective educational technological integration and embedding into higher education learning and teaching stems from considering good teaching practice first. That is, artificial intelligence will certainly afford new ways of learning, and challenge outdated approaches, but using artificial intelligence to simplify learning experiences draws on concepts of flow (Crawford et al., 2023), and using it as a pre-emptive feedback solution draws on approaches of formative feedback and assessment. The aspiration of effective learning theory is to be universal in its ability to present a prototypical approach to how individuals learn across contexts. Our engagement with more nuanced and complex learning approaches remains incredibly important; and we speak to people and context shortly.

Methods still matter

Regardless of the technology involved, the methods by which the research is taking place still matter. Where the AI in 'AI Education' could easily be replaced by any of a slew of other buzz words, the education portion remains, suggesting that methods applied should be fit for purpose in an education and social science context (Cowling et al., 2022). This doesn't mean that there cannot be innovation in the development of the intervention, using tools like ChatGPT, DALL-E, or other future Generative AIs tools, but rather that the underlying method, whether it be Design-Based Research, Action Research, or some other method, remain sound.

People-centred

A key assertion and learning throughout the technology breakthroughs outlined previously is that it was ultimately the people that mattered in the solution. When it comes to writing material on the use of AI in the classroom, this means recognising the role of the teacher as a driver for pedagogy. Whilst Generative AI can drive a change in the way classroom practice happens, it's ultimately the teacher that guides the work in the classroom. Our assertion is that students will welcome the scaffolding and explanation of how AI should be applied to their learning experience, and that if AI use is explicitly explained to them they will take this onboard in their practice, allowing the teacher to remain first. As interventions are developed for research projects, this concept of ensuring that the teacher has a place in the work itself should be maintained, and experimenting with the 'technology for technologies sake' should be discouraged.

Technology purpose

Finally, as in our previous editorial (Cowling et al., 2022), we assert that good work in this space demonstrates a clear purpose for technology. Building on the previous assertion that people should be included, our guidance and advice remains that, even when including new technology in a paper, that the purpose for that technology remains clearly articulated. Further, and perhaps more importantly, that authors themselves when using Generative AI in their own context, make their use of this AI explicit in their explanations, in the same way that we recommend putting this expectation on our students. In being transparent in this way, talking clearly about the purpose of technology (in this case AI) and where it has been used, we ensure that our relationship with AI remains clearly articulated.

Conclusion

This Editorial outlines a way of thinking about educational technology and artificial intelligence research. While our aim is to generate transparency on our approach to assessing manuscripts that use artificial intelligence, it likely also provides a manifesto for perspectives for how AI-based research can be designed, implemented, and evaluated. We seek out work that tries to navigate the intersection between current and future educational practices, theories, and approaches *and* affordances now made available through, and by, artificial intelligence software, hardware, and tools.

Conflict of Interest

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