Technology-enabled undergraduate and postgraduate research supervision

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In this special issue of the Australasian Journal of Educational Technology, we have focused on how technology is utilised in undergraduate and postgraduate supervision practices to enhance the learning of research students. The views of supervisors and research students are taken into account, especially in terms of the ways in which technological tools are used to engage supervisors and students to work with each other, often when they are located in different parts of the world. In this editorial, we consider various examples of technology in association with strategies and processes of supervision that are supervisor-driven or student-driven. Not only have the authors of the articles in this special issue considered in-house established technologies such as learning management systems and online thesis management systems, they have also explored artificial intelligence and tailor-made online professional development programmes to manage and facilitate research supervision.

Keywords: research supervision, technology-enabled support, undergraduate research, postgraduate research, higher education

Introduction

Information and communication technologies (ICTs) have long been important in supporting undergraduate and postgraduate research processes. But although ICTs are prominent in educational practices at most levels of formal learning, there is relatively little known about the skills and understandings that underlie their effective and efficient use in research supervision.

Earlier studies (Sim et al., 2020; Sim & Stein, 2019) revealed tensions and debates where ICTs in doctoral research processes are concerned. Depending on the perceptions held about ICTs and the relationship between ICTs and the person in the context of the task and its goals, ICTs tend to be seen variously as a challenge, a change or an opportunity. Following the insights of Castañeda and Selwyn (2018), we do not approach these encounters with staff and student experiences based on the assumption that ICTs are the natural and needed solution to improving and facilitating effective learning, teaching and research. Rather, we take a more neutral stance, wishing to explore the experiences of those involved through discussion about their practices and views of ICT use, specifically focusing on doctoral study and supervision.

Context

The theme of this special issue is “Technology-enabled Support for Undergraduate and Postgraduate Research Supervision”. We believe the theme is significant because it enhances the pedagogical use of digital technologies in undergraduate and postgraduate research supervision practices. Writing on this theme also allows authors to provide adequate support of the digital technologies use for both undergraduate and postgraduate research supervisors as well as students. In the past, few authors have aligned the in-person and virtual undergraduate and postgraduate research supervision experiences for both supervisors and students. Together, we anticipate the articles in this special issue will develop a shared understanding of the conception and roles of digital technologies in undergraduate and

postgraduate research supervision. In addition, this theme offers an opportunity to contribute in an under-researched but increasingly an essential area in higher education across Australasia.
This is particularly important when both undergraduate and postgraduate researchers need to develop lifelong career skills, as well as integrate their working into the technical demands of their discipline and institutions; often there is little individualised guidance available from supervisors, especially when the ICT landscape has moved on dramatically since their own experience of research journey (Alhashem et al., 2022).

A lot of the current literature presents the idea of the pedagogy of supervision (Bruce et al., 2009; Grant, 2005; Green & Lee, 1999; Harrison & Grant, 2015; Kreber, 2023; Qureshi & Vazir, 2016; Sinclair, 2004; Zeegers & Barron, 2012). As supervisors, we are aware that some of the common main issues in both undergraduate and postgraduate supervision are related to the clarification of expectations. Supervisors also need to be aware of how to guide students to complete research and to develop as autonomous researchers to the extent that they may use their research skills in their careers.

This special issue emphasises the conception and the roles of digital technology in undergraduate and postgraduate research supervision; effective and efficient use of digital technologies in undergraduate and postgraduate research supervision; digital technologies support for undergraduate and postgraduate research supervisors and students; digital technologies that facilitate pedagogies of research supervision; and online learning community of undergraduate and postgraduate research students. Therefore, it is unsurprising that all the authors focused on the technology-enabled undergraduate and postgraduate research supervision. The authors' areas of focus have been grouped into four categories. The first category is about the roles of ICTs entailing supervisor-student relationships and roles. In a supervision context, the roles of ICTs can be either student-driven or supervisor-led. This echoes the report suggesting "association between ICT support and ICT use was positively significant, that teachers' attitude towards ICT acceptance and use predicts actual use, and that perceived usefulness and perceived ease of use are kind of positive partial mediators to ICT support and ICT use" (Eze et al., 2021, p. 17). The second category is focused on the embedded informal and formal support mechanisms using ICTs. Factors such as organisational culture and peer influence seem to determine the support mechanisms using ICTs in both undergraduate and postgraduate research supervision. This resonates with Carton et al. (2013), who also recommended, for example, an institutional-wide approach to professional learning opportunities for supervisors, and Porter et al. (2014), who advocated for an institution-wide support system for university teachers adopting technologies associated with blended learning approaches. The third category is related to the purpose of using ICTs. There are also articles redefining the dynamic of ICTs use if ICTs are there to enrich or to change the dynamic of research supervision. For example, ICTs could be a means to an end (i.e., to produce a dissertation or thesis) or as a strategy for growth and development among undergraduate and postgraduate students: "The results show that graduate students make traditional use of ICT—both for searching for information and using digital resources for teaching" (Pérez-Navío et al., 2021, p. 1). The last category addresses the idea that the use of ICTs is not in isolation but on a continuum. It appears that the notion of 'the use of ICTs is subjective as the use varies depending on the contexts and circumstances. For instance, one of the results "demonstrated that participants' hometown location made a big difference in their perception of online and distance classes' quality" (Upadhayaya et al., 2021, p. 236).

The special issue

Theme 1: Supervisor-facilitated and managed ICT adoption

This theme demonstrates how ICTs enable the supervisor to support the students (through the various processes of a typical research process such as those outlined in various higher education institutions (e.g., Arena Centre for Research-based Education at University College London, 2019). Research supervisors use varied forms of technology to support their supervision practices, many of which enable the supervisors to enact their responsibilities – for example, facilitating meetings with research candidates, teaching research candidates how to locate relevant research articles, enabling candidates to

recruit research participants and sharing their expertise and research with other researchers. Many such practices could be described as being supervisor-facilitated, supervisor-initiated and supervisor-managed and, in some cases, university-designed or institutionally driven. Although the use of technology at this supervisor or institutional level is often provided to research candidates for their use, some of the authors in this issue consulted the users of these technologies to gather data about their use and effectiveness. We see this theme reflected in a selection of articles in this special issue.

Holt, Aziz, McKenzie, Garivaldis, Gornall, Chung and Mundy, in their article "Evaluating and Expanding the Usability and User Satisfaction of an Online Research Portal", evaluated how an online research portal was designed, developed and implemented by one university to support both research students and supervisors. Similarly, Stein, Sim and Rose, in their article "Person, Context and Judgement: Exploring the Potential of a Theoretical Model describing the Role of Information and Communication Technology (ICT) in the Doctoral Research Process", examined feedback from participant-researchers who engaged in an online professional development programme designed to engage doctoral researchers in the use ICTs in a variety of research settings. Also at the university-wide level, Leite, Lagstedt, Kolog and Tsupari explored the impact of a thesis management system in their article "Contextualizing Thesis Process Digitalisation at a University in Ghana". Lastly, Ducasse, López Ferrero and Mateo Girona, in their article "Technology-enabled Higher Education Academic Writing Feedback: Practices, Needs and Preferences", report on both teachers' and students' experiences of giving and receiving digital feedback about writing tasks with the use of appropriate technological tools. Findings from their study remind us of the role of cultural context and the value of student perceptions in the use of such feedback.

Theme 2: Student-driven ICT use

ICT support could serve as a tool to enhance an effective and efficient relationship between the supervisor and the research students as well as to reflect on their research and learning about how to be a researcher, especially in relation to being a self-directed learner or researcher. This is particularly relevant when artificial intelligence is evolving. Dai, Lai, Lim and Liu, in their article "ChatGPT and its Impacts on Research Supervision: Insights from Australian Postgraduate Research Students", explored the impact of ChatGPT, an advanced AI conversational model, on five dimensions of research supervision – functional, enculturation, critical thinking, emancipation and relationship development – where the findings suggest a shift in the roles and responsibilities of supervisors and students: the former provides strategic direction and high-level guidance, while the latter transits from apprentices to autonomous researchers due to the independence fostered by ChatGPT.

Similarly, Cowling, Crawford, Allen and Wehmeyer, in their article "Using Leadership to Leverage ChatGPT and Artificial Intelligence for Undergraduate and Postgraduate Research Supervision", found that psychological need fulfilment, research student autonomy and relatedness are key outcomes that can be cultivated at the student level with the emerging benefits and limitations of ChatGPT and language learning models in the context of undergraduate and postgraduate research supervision. On the other hand, Fanshawe and Barton, in their article "PhD by LMS: Using a Learning Management System to facilitate Self-directed Learning in a Doctoral Study" showed that the learning management system (LMS) proved to be a useful way to organise, access and store information, had tools to enable motivation, both by the research students and the supervisor, and allowed deep reflection on the PhD progress and provided the necessary motivation to complete the study.

Conclusion

As Castañeda and Selwyn (2018) argued, it is important that we have "an active commitment to 'think otherwise' about how ICTs might be better implemented across higher education settings" (p. 8): attitudes towards ICTs should not be considered as unimportant, and therefore assumptions about them should not be ignored. We should not let them fade into the background as they become normalised, without questioning the interrelationships between ICTs and the person. Research supervision that takes this perspective into account may result in more informed supervisors and research students; informed

about the way ICTs, humans and research practices are embedded and entwined. Concurrently, just as Kandiko and Kinchi (2012) have argued that research supervision cannot be looked at in the absence of the research work that it occurs within, we argue that researchers' understanding and use of ICTs cannot be considered independently of the work that they are involved in; and that work includes their relationships with their project, their supervisors, with the ICTs they do, and could, engage with, all within the context of the institution.

Acknowledgements

We would like to thank the following contributors for guidance in this editorial piece: Dr Sarah Stein (University of Otago). Dr Stein provided input to our analysis of the themes; Dr Mike Rose (University of Bath). Dr Rose offered suggestions regarding the key literature related to this editorial.

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Please cite as: Sim, K. N., Northcote, M., & Lim, C. P. (2023). Technology-enabled undergraduate and postgraduate research supervision. *Australasian Journal of Educational Technology*, *39*(4), 1-5. https://doi.org/10.14742/ajet.9149