

Exploring the social aspects of student collaboration in online learning

Shahed Kamal, Margaret Bearman, Joanna Tai, Brandi Fox

Deakin University

Social interaction is seen as a key tenet of constructivist approaches to learning. There is a significant body of literature looking into online collaboration for learning, however less is known about how students experience collaboration more broadly. Understanding student experience may help to understand ways of ensuring online collaboration is successful.

This student-led study aimed to explore what can be learnt from student perspectives of online collaboration.

This study is embedded in a larger research program surrounding a 2019 course renewal project. Ten undergraduate law students were interviewed as part of the overall study but with additional semi-structured questions regarding collaboration. Participants were enrolled in a mix of online and blended units. Interviews were audio-recorded, transcribed and thematically analysed. Four themes were interpreted: 1) pre-existing social relationships facilitate online collaboration; 2) social media platforms enable interpersonal interaction and, as a result, online collaboration; 3) university-provided platforms lacked social elements of collaboration; and 4) face-to-face collaboration appears frictionless compared to online only collaboration.

This study indicates the value of exploring collaboration as a broad social phenomenon rather than one purely focussed on educational designs that promote collaboration. Results suggest a considerable interaction between the interpersonal (friend focus) and study (learning focus). In the online space, collaboration was mediated by pre-existing embodied relationships and social media forums. There was a sense that social media activity would be difficult to mandate. This raises challenges, including how to manage equity issues around access to informal platforms; and how to incorporate into learning environments technologies that are experienced as ‘frictionless’ (i.e., easy and achievable without thought) and which appear to promote collaboration.

Introduction

Collaboration is poorly defined in the online learning literature (Cherney et al., 2018). At the same time, social interaction is seen as a key tenet of constructivist approaches to learning. To this end, computer supported collaborative learning (CSCL) has been established as a pedagogical approach (Feyzi Behnagh & Yasrebi, 2020). However, relative to face-to-face contexts, learners are more isolated in online spaces and therefore more likely to attrit (George et al., 2021). This is not simply a matter of who elects to study at distance as in the shift to online learning during the 2020 pandemic, students have described “feelings of disconnectedness and isolation from the group” (Hill & Fitzgerald, 2020, p. 3). While methods for assessing CSCL, including learning mediated by student interactions, have been long proposed (Strijbos, 2011), online collaboration may take place beyond the environments that educators set up and have access to. It is unclear how students experience collaboration online across both university-designed and student-established digital spaces. Understanding these perspectives of online collaboration may help to understand how we can better support collaboration in online learning, reduce isolation and prompt students to develop skills in collaborative work.

Social Interaction in Constructivist Approaches to Learning

It is now generally accepted that learning – whether it be of knowledge, skills, attitudes, or capabilities – is not something we can ‘do to’ or ‘deposit’ to learners in a transactional way (Freire, 1970). Constructivist approaches to learning hold that knowledge is something that the individual has to construct for themselves and can also occur as co-construction between people within social settings. A commonly cited social learning concept is the Zone of Proximal Development (ZPD) (Vygotsky, 1978). While the ZPD was initially derived from observations of children, the concept that individuals might be helped to extend their capability within a

ZPD due to the scaffolding and intervention of able peers (of similar but differing enough ability) has been extended to many learning situations. Thus, providing learners with opportunities to discuss concepts and construct their knowledge is important generally from a constructivist perspective; when viewed through a Vygotskian lens, these opportunities expand to involve peers and near-peers. These conceptions of learning can provide a rationale for the implementation of collaborative learning (Feyzi Behnagh & Yasrebi, 2020).

The Challenge of Defining Collaboration

Student collaboration in higher education is a common aspiration underpinned by a complex range of concepts. Collaboration, and/or teamwork, is a key graduate capability, promoted by many universities and expected by employers (Business Council of Australia, 2017; Wilson & Wilson, 2019). Students also cite the social aspects of collaboration as important for their lifelong learning (Peters & Romero, 2019). “Collaborative learning” can also be considered as “a learning phenomenon where individuals in a social constellation (e.g., group, team, or community) within a physical and/or virtual environment, interact on the same or different aspects of a shared task to accomplish implicit or explicit shared and individual learning goals...” (Strijbos, 2016, p. 203). Thus, the focus in collaboration might be on the skill of collaborating itself, or from the learning that is generated through the collaboration.

A further challenge in defining collaboration is the contexts in which it occurs. Firstly, learning might exist on a spectrum from formal (e.g., teacher-guided classroom activity) to informal (e.g., students organising their own study group outside of class settings) (Wilson & Wilson, 2019). Secondly, learning activities might occur in face-to-face settings (e.g., use of computers within the same classroom to collaborate), in a blended format (such as in a flipped classroom model, where collaboration occurs both during preparatory activities and within the classroom), or entirely at a distance (e.g., students enrolled in online, distance courses) (Wang, 2010; Zaka et al., 2019). Thirdly, there is a wide array of technology and platforms which can be drawn upon to facilitate learning. Thus, student collaboration might occur in many combinations across these three sets of variables. Some combinations occur sufficiently frequently for systematic literature reviews to have already been undertaken.

Technology in Collaborative Learning

A literature review of features & trends of technology supporting collaborative learning in informal learning settings, in the period 2017-2018, included 70 papers across the education continuum (primary school to higher education) (Zheng et al., 2019). The review sought to categorise and typify the field of collaborative and informal learning and found that 39% of studies reported on technology mediated interaction, 31% on blended, and 18% on face to face interactions. 36% used an online learning platform/website. The authors suggested that learning outcomes beyond cognition should be considered in the study of collaborative learning – e.g., motivation, emotion, behaviour, engagement, attitude, higher order skills. While they described the types of studies which have occurred, little information was included about the experiences of students across the studies. Furthermore, learning outcome categories were necessarily abstracted into achievements, engagement, behaviours, satisfaction, self-learning, mixed, resulting in insufficient information to understand collaborative informal learning might be fostered within online learning.

The literature about online course student collaboration was also reviewed (Cherney et al., 2018), focussing on group formation and interaction processes. The authors found that empirical information on the effectiveness of practices was limited to case studies, content analysis of collaboration artefacts, and interview data. They found that many studies focussed on the affective rather than cognitive outcomes of group work and did not articulate a clear theoretical departure point. They suggested there is a need to understand how typical undergraduate students participate, especially those who do not have any instruction about the domain of interest (i.e., there is a need to conduct research with more than just education technology students in masters degrees).

The literature on the use of mobile devices to enhance collaborative and cooperative learning within small groups has also been reviewed (Sung et al., 2017). 48 journal articles/doctoral dissertations over a 16 year period (2000-2015) were included; 35% of papers focussed on the college level. Overall, mobile computer supported collaborative learning was found to improve collaborative learning, with a mean effect size of 0.516. Across included studies, peer interaction was the least studied outcome variable. The authors argued that the design of CSCL is more important than the delivering devices themselves, suggesting that future work could focus more on the experience of learning rather than the tools used.

These three review studies suggest that there is insufficient research done both on cognitive and affective outcomes of collaboration, but more importantly, the student experience of collaboration that occurs in the context of online learning must be further explored.

Particular Technologies for Collaboration

Studies of students' experiences of collaborative learning have been technology and platform oriented, focussing on the affordances, utility, and frequency of use of particular tools. Online forums, a function of many learning management systems, have been compared to wikis for information exchange (Biasutti, 2017). Wikis have been explored as a resource repository for off-campus students but had few possibilities for more social interaction (Weaver et al., 2010). Google Sites have also been developed as a place for sharing, exchanging, and organising resources amongst students (Deng & Tavares, 2015).

Facebook, a predominantly social platform, has been studied in several academic contexts. While some have suggested that students primarily do not use it for academic purposes (Wise et al., 2011), the evolving functions of Facebook have led to it being studied as an educational tool for promoting collaboration (Chugh & Ruhi, 2018). Since it is already well integrated into many students' lives, the possibilities for communication and collaboration with other students are significant and George, McEwan and Tarr (2021) describe how a university developed Facebook site valuably supported some online students. However, student collaboration on Facebook might not be universally acceptable. Mature-age students may be disadvantaged if they do not use Facebook so frequently (Chugh & Ruhi, 2018), and students may have privacy concerns (Choi, 2013; Deng & Tavares, 2015). Therefore, staff and students would need to agree on appropriate use and consider where other platforms might be more suitable (Chugh & Ruhi, 2018).

Experiences of Collaboration

While there is a wealth of work on collaborative learning technologies, what students do with them, and learning outcomes, authors have also suggested that the student experience is also important in understanding how collaborative learning might be successful. However, less is known about what students themselves experience as collaboration. This may be due to the multifarious definitions as outlined above, but also because much of the literature focuses on how collaboration can improve learning. Studies are often underpinned by an assumption that collaboration is a means to an end; students on the other hand experience collaboration as a phenomenon in and of itself, not simply as a mediator of learning. Epistemic network analysis & social network analysis (Gašević et al., 2019) has been proposed as one way to research these interactive dimensions of collaborative learning within specific online platforms. Indeed, social network analysis has been used in combination with student approaches to learning to identify collaborative patterns (Ellis & Han, 2020). However, collaboration experiences may span different media, platforms, and purposes, and therefore may first require qualitative exploration to determine the scope and focus of students' collaborative learning experiences, prior to quantitative methods being employed.

In this paper we explore the merit of researching online collaboration using qualitative methods to understand student experiences. The research question we sought to answer was, 'how do students undertaking online learning describe collaboration?'

Methods

Study Context

The lead author (SK) undertook this research as part of a selective within a Bachelor of Medicine and Surgery, focussing on his long standing interest in educational technology.

As a student-led study, the focus on online collaboration was embedded in a broader research program related to a large course renewal project at Deakin University, which provided innovative online unit redesign. This included six law units, redesigned by a centrally located team of academics, learning designers and digital resource developers. The law units were redesigned from a wholly face-to-face model of delivery to 'blended' online and face-to-face model of delivery or online only models of delivery. The blended model involved more online resources available for the students and online activities, as well as online videos and podcasts in lieu of face-to-face lectures. Seminars were still held on campus in the blended model units, however there were less

face-to-face contact hours than a wholly on campus law unit. While there was collaboration designed into these online units through discussion boards and shared tasks, it was not a particular focus and varied from unit to unit.

Ethical approval for the research was granted by Deakin University Arts & Ed HEAG, Ref 19-127.

Participant Profile

Participants in this study were first-year undergraduate Law students (n=10) enrolled in at least one of six redesigned law units, who responded to an open call for interviews. Five students were enrolled part-time and five reported they were enrolled online only. However, we noted, within their interviews students recounted attendance practices which did not necessarily match with their enrolment status: some on-campus students reported participating only online, whilst some online-only students said they chose to attend classes on-campus.

Data Collection

The lead author conducted semi-structured qualitative interviews both face-to-face (n=4) and over the phone or using Skype (n=6) from 23 August to 18 September 2019 while students were enrolled and currently undertaking at least one redesign unit. The interviews were between 15 to 30 minutes long and were audio recorded and transcribed. The interview schedule included the same items for the broader study in regard to the redesigned units they were currently undertaking. In addition to these items, participants were asked about their experiences of collaboration with peers, including if they collaborate, how they collaborate, who they collaborate with and the platforms they use. The data informing this study is from the students' answers to these questions. See Figure 1 below for the collaboration questions asked to students during the interview.

Figure 1. Interview questions on collaboration

- | |
|--|
| <p>Tells us an experience where you collaborated with your peers?</p> <ul style="list-style-type: none">• How often do you collaborate?• What forum is used to collaborate? How often do you engage with the group?• Is this different than you would collaborate with peers in other online units?• Is this different to how you would collaborate in offline units? |
|--|

Data Analysis

The lead author (SK) conducted a thematic analysis (Fereday & Muir-Cochrane, 2006; Tai & Ajjawi, 2016) under the supervision of more experienced researchers (BF, JT). Inductive coding of the transcripts in Microsoft Word by three of the research team members (SK, BF, JT) generated a set of initial themes that were reviewed and condensed into higher order categories (SK) then cross-checked against all transcripts and adjusted by the whole research team.

Findings

Four final thematic categories were interpreted from the data:

- Pre-existing social relationships facilitate online collaboration
- Social platforms enable social interaction and as a result online collaboration
- University provided platforms lack social elements of collaboration
- Face-to-face collaboration appears 'frictionless'

In our discussion of the themes, the term 'friction' and 'frictionless' recurred. These are common terms in the user experience language, which can be traced to Zuckerberg's description of Facebook's affordances in 2011 (Campanelli, 2014). Friction refers to those situations when something in the design slows the user down or makes it hard for them to accomplish their task. ("Friction in UX Design Can Be Beneficial, Seamgen Blog", 2021). We use the metaphor here to represent the time and energy expended by the student: the more friction, the more effort required.

Pre-existing social relationships facilitate online collaboration

When we asked students what collaboration is, they often responded by discussing the people they collaborated with. The first step of collaboration appeared to be establishing a relationship which is often purely social. In a setting where students did not have prior relationships with their peers, they had to start by introducing themselves, exchanging contact details to remain in touch outside classrooms and thereby establishing a relationship prior to commencing on working on tasks together. Hence the first step to start collaboration was getting to know their peers and build a relationship.

I don't really know anyone to work with yet. I'm hoping to find someone to study with, because it'd be a lot easier to get through the content. - SL1

There was a sense that if students did not have prior relationships with their peers outside the classroom, it was difficult to start collaborating. e.g., That is, establishing a collaboration is a form of 'friction' and takes time and energy. If given the choice, students report choosing to collaborate with friends or peers with whom they already had a social relationship.

My study groups I find tend to be like my friends, so I tend to hang out with them a fair bit. - SL3
I have a bit of a study group that I catch up with before class. And then for 117 I have a couple of friends that I can also catch up with if I need to and we collaborate in class as well. - SL3

Therefore, the overall experience of collaboration depended on whether they had friends or acquaintances in the group.

Social platforms enable social interaction and as a result online collaboration

In alignment with participants' reports that social relationships strongly influenced collaboration, social platforms such as Facebook were reported as the preferred choice of collaboration tool. While they were platforms students used to collaborate outside classrooms, they were not university supported ones. For example, participants described setting up Facebook groups or creating a messenger group for instantaneous discussions. As predominantly social platforms with familiar functionality that facilitated interpersonal interactions, they appeared to reduce the friction of establishing a social relationship. Hence, collaborating on academic work becomes easier.

We have been good at forming some Facebook groups, pretty quickly. And in the first trimester of the course, I'm in the second trimester now but in the first trimester we had a group assignment, so I was able to meet some people that way. We stayed in touch since, so we are still in contact even though we don't have any group assignments. There were three of us and so I met one of them through the Facebook group, in trimester one. So, we've always stayed in contact, we have a little messenger chat group that we had for the group assignment and we just continued to chat. So, we met that way and stayed in contact that way. - SL8

It was easier to continue connections with a peer on these familiar social platforms:

I just reached out to some people, just replied back to them on there and said, then we got together, and then started messaging, and we got on Facebook, because it was just easier to constantly chat, rather than email or something. - SL6

University provided platforms lack social elements of collaboration

The learning management discussion board was the only university-provided collaboration technology mentioned by students. A number of concerns were raised; it was difficult to navigate, unfamiliar, not instantaneous and not mobile friendly. We interpret that this type of tool was not focussed on building interpersonal relationships but more on goal-oriented learning interactions. Therefore, students perceived that they do not provide a social space for interactions. Therefore, while possible, it appeared to be much more effortful to initiate and establish a social relationship, which then led to collaboration.

Everyone agreed that it was so much easier and more immediate to then make a Facebook group and chat there. And I think also because some people don't even know how to navigate that area of Cloud, so they wouldn't even look. Whereas when your phone buzzes you pick it up and you look straight away. Yeah. - SL2

Face-to-Face Collaboration Feels Frictionless

By contrast, face-to-face collaboration where a group of students can be in a room, get to know each other and discuss ideas to work together is perceived as supporting easy collaboration.

In a classroom you can have a break and you can say, 'Oh, I didn't really catch that. Can you explain that to me?' To the person sitting next to you. Obviously, you don't get that online and I mean, I think I really benefit from that because I find that. - SL2

I think in comparison to if you do it on-campus, you book a room like this, you all sit there and do it together and go through it together. It just worked a lot better than online where we didn't have time. We were all sending it at different times. There was no one time where we were all like, 'All right, let's all read it now, edit it now.' That kind of thing. - SL5

Being in the same time and space affords certain opportunities to initiate and maintain collaboration that are not the same as those found online.

Discussion & Conclusion

Social interaction within study contributes to the fabric of the university experience and broadly enables collaboration and collaborative learning. The importance of relationships for learning in higher education is only now being explored (Gravett & Winstone, 2020). This small-scale research shows that there is merit in considering students' experiences of collaborative learning in a qualitative manner, and that this type of research can contribute to understanding ways of supporting successful collaboration in online learning. Specifically, this study suggests that building interpersonal relationships is key to supporting collaboration, and that building these relationships is often most easily achieved in face-to-face settings. Indeed, these face-to-face relationships are often transported into online collaborations. However, technology introduces 'friction' – or at the very least, the act of co-location removes friction – from building and maintaining interpersonal relationships. Furthermore, while the term 'interpersonal' is frequently used to describe the interactions in collaboration, this study suggests that there are also social elements to collaborations, more closely aligned with acquaintance or friendships.

This study has considerable implications for both blended and online learning contexts. It reinforces the need for social interaction and, as the pandemic has shown, sharing a time and place affords an ease of interpersonal connection that does not have an online equivalent. This does not mean of course that interpersonal connections cannot or should not be fostered online, and many learning management systems do provide such functionalities (Delgado et al., 2020). However, this study raises some considerations around how formal and informal online relationships intersect.

The first and most surprising implication stems from the finding that a prior embodied relationship provides a very important touchstone for online relationships. This points to the value of having introductory, embodied, social encounters in some courses and also underlines the need to ensure that those students who cannot attend face-to-face classes are included in a significant and meaningful way. Whilst some students may not be motivated to form social relationships within the context of learning, online community building may be fruitful where collaboration is an aim (Croft et al., 2010). We also suggest that a facsimile of the types of informal social interaction that would occur in face-to-face settings is insufficient, because the technology simply does not work in the same way. Additionally, if efforts are not made to ensure opportunities for collaboration across the board, those students with strong pre-existing social networks may benefit more than those who are new to the online space, such as students from non-traditional backgrounds, who already find online higher education an isolating experience (Canty et al., 2020).

Reducing the 'friction' of technology – to ensure that students can build a sense of interpersonal connection – therefore becomes more important. The students in this study used their own social media channels to connect and collaborate. The familiar online social spaces, with their already available integration into students' personal

lives, were significant in facilitating collaboration. This may not be a matter of particular technological features or affordances, but the fact that these are already present and familiar media, and thus are already integrated into student lives. This was something we noted more in contemporary literature about Facebook (e.g., (Tai et al., 2019; Wilson & Wilson, 2019), which was not as common in earlier work evaluating Facebook for learning (e.g., (Wise et al., 2011)). In our study, we also noticed that different tools can provide different arrangements and possibilities for collaboration. For example, the discussion board provided a focus on subject/assessment; video conferencing technologies were valued for real-time discussion; and social platforms were coordinating group devices. There was a sense that there was collaboration in support of learning but also collaboration that was simply about building social connection; while these two were interlinked they by no means were one and the same.

There may also be a question of how the labour required to establish relationships is perceived. In face-to-face settings, efforts such as the commute to campus, being present in a seminar, and considering others' comments in that seminar may not be perceived as part of relationship building, rather, part of the broader project of learning at university. However, in online learning, calculating time zone differences, navigating online spaces (including remembering passwords, and working out which software is being used for a particular synchronous session), preparing one's physical environment for video and audio participation, and attending to pixelated expressions and of peers might all be considered as efforts specifically relating to collaboration.

In our view, social media use for collaboration will necessarily have informal aspects, in the same way that a particular form of campus social life cannot be mandated. While there are privacy concerns around third party platforms (Chugh & Ruhi, 2018) and ethical implications where some students may not wish to install additional platforms, at the same time it may be important to encourage students to take advantage of these opportunities and to encourage inclusive, low-cost technologies. In the same way that staff might recommend informal study groups, which are facilitated but not mandated, asking students to seek out online connection may be useful in the orientation to study at university. We suspect that student representative associations may have already considered and enacted such online orientations in light of the COVID-19 pandemic and social distancing restrictions, and thus we should seek to learn from what has already occurred.

There are some limitations to this research. It was an initial foray into the student experience of collaboration, to explore if there was value to this avenue of investigation for productive collaborative learning. The findings, from one profession, within one university, suggest there is merit to investigation in this area. However, they are not generalisable, and student experiences of collaboration in other professions, other disciplines, and at other universities, may differ greatly. Pursuing this further is, of course, recommended. Our discussion focussed on pragmatic implications for consideration, given the relative difficulty of abstracting theoretical implications from such a small dataset. Joining research in this area to bodies of related literature and their attendant theoretical frames may be helpful to advance understanding. Given the social aspects of collaboration, and the potentially isolating nature of online learning (Rush, 2018), marrying research on collaborative learning with work on student voice, belonging, and relational framings of higher education may be fruitful. This may help to address issues such as the relatively higher rates of attrition of online students, since the presence of support networks within the university and developing a sense of belonging has been linked with student retention (Masika & Jones, 2015; Walker-Gibbs et al., 2019). Furthermore, work on belonging, connection and identity may also help us understand the importance of collaboration within courses.

Overall, this study suggests that there is no one straightforward recipe for productive online collaboration. Not all students will have the same experience of online collaboration, and educators wishing to employ collaboration in their online courses must remember collaboration is not a level playing field. Though we cannot force relationships for collaboration, we can look to reduce the 'friction' of effortful interpersonal connection. At the same time, we caution that easy connections may not necessarily be the best ones to have or the best for learning, since as transformative learning theory suggests, being disoriented or unsettled may be required to profoundly shift views (Mezirow, 1997). The student experience of collaboration may be important not just for learning, but for belonging and success at university, and therefore, we urge further work to be done in this area.

References

- Ali, A., & Smith, D. T. (2015). comparing social isolation effects on students attrition in online versus face-to-face courses in computer literacy. *Issues in Informing Science and Information Technology*, 12, 011-020. <https://doi.org/10.28945/2258>

- Biasutti, M. (2017). A comparative analysis of forums and wikis as tools for online collaborative learning. *Computers and Education*, 111, 158-171. <https://doi.org/10.1016/j.compedu.2017.04.006>
- Business Council of Australia. (2017). Future-Proof: Protecting Australians Through Education and Skills (Issue October).
- Campanelli, V. (2014). Frictionless sharing: The rise of automatic criticism. In M. Rasch & R. Kanig (Eds.), *Society of the Query Reader: Reflections on Web Search* (pp. 41-48). Institute of Network Cultures.
- Canty, A. J., Chase, J., Hingston, M., Greenwood, M., Mainsbridge, C. P., & Skalicky, J. (2020). Addressing student attrition within higher education online programs through a collaborative community of practice. *Journal of Applied Learning & Teaching*, 3(Special Issue No 1), 140-152. <https://doi.org/10.37074/jalt.2020.3.s1.3>
- Cherney, M. R., Fetherston, M., & Johnsen, L. J. (2018). Online course student collaboration literature: A Review and Critique. *Small Group Research* 49(1). <https://doi.org/10.1177/1046496417721627>
- Choi, A. (2013). Use of Facebook Group Feature to Promote student collaboration. American Society for Engineering Education (ASEE) *Southeast Section Conference*, 7.
- Chugh, R., & Ruhi, U. (2018). Social media in higher education: A literature review of Facebook. *Education and Information Technologies*, 23(2), 605-616. <https://doi.org/10.1007/s10639-017-9621-2>
- Croft, N., Dalton, A., & Grant, M. (2010). Overcoming isolation in distance learning: Building a learning community through time and space. *Journal for Education in the Built Environment*, 5(1), 27-64. <https://doi.org/10.11120/jebe.2010.05010027>
- Delgado, A., Huaman, E. L., Obispo-Mego, H., & Justo-López, D. (2020). Analysis of web platforms of learning management systems for distance education in the face of social isolation. *International Journal of Advanced Trends in Computer Science and Engineering*, 9(5), 7986-7991. <https://doi.org/10.30534/ijatcse/2020/154952020>
- Deng, L., & Tavares, N. J. (2015). Exploring university students' use of technologies beyond the formal learning context: A tale of two online platforms. *Australasian Journal of Educational Technology*, 31(3), 313-327. <https://doi.org/10.14742/ajet.1505>
- Ellis, R., & Han, F. (2020). Assessing university student collaboration in new ways. *Assessment and Evaluation in Higher Education*, 0(0), 1-16. <https://doi.org/10.1080/02602938.2020.1788504>
- Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, 5(1), 80-92. <https://doi.org/10.1177/160940690600500107>
- Feyzi Behnagh, R., & Yasrebi, S. (2020). An examination of constructivist educational technologies: Key affordances and conditions. *British Journal of Educational Technology*, 51(6), 1907-1919. <https://doi.org/10.1111/bjet.13036>
- Freire, P. (1970). *Pedagogy of the Oppressed*. Continuum International Publishing Group.
- Gašević, D., Joksimović, S., Eagan, B. R., & Shaffer, D. W. (2019). SENS: Network analytics to combine social and cognitive perspectives of collaborative learning. *Computers in Human Behavior*, 92(February 2017), 562-577. <https://doi.org/10.1016/j.chb.2018.07.003>
- George, A.-J., McEwan, A., & Tarr, J.-A. (2021). Accountability in educational dialogue on attrition rates: Understanding external attrition factors and isolation in online law school. *Australasian Journal of Educational Technology*, 37(1), 111-132. <https://doi.org/10.14742/ajet.6175>
- Gravett, K., & Winstone, N. E. (2020). Making connections: authenticity and alienation within students' relationships in higher education. *Higher Education Research & Development*, 1-15. <https://doi.org/10.1080/07294360.2020.1842335>
- Hill, K., & Fitzgerald, R. (2020). Student perspectives of the impact of COVID-19 on learning. *All Ireland Journal of Higher Education*, 12(2), 1-9.
- Masika, R., & Jones, J. (2015). Building student belonging and engagement: insights into higher education students' experiences of participating and learning together. *Teaching in Higher Education*, 2517(February), 1-13. <https://doi.org/10.1080/13562517.2015.1122585>
- Mezirow, J. (1997). Transformative Learning: Theory to Practice. *New Directions for Adult and Continuing Education*, 1997(74), 5-12. <https://doi.org/10.1002/ace.7401>
- Peters, M., & Romero, M. (2019). Lifelong learning ecologies in online higher education: Students' engagement in the continuum between formal and informal learning. *British Journal of Educational Technology*, 50(4), 1729-1743. <https://doi.org/10.1111/bjet.12803>
- Rush, P. (2018). Isolation and Connection: The Experience of Distance Education. *Distances et Médiations Des Savoirs*, 30(23). <https://doi.org/10.4000/dms.2509>
- Strijbos, J.-W. (2011). Assessment of (Computer-Supported) Collaborative Learning. *IEEE Transactions on Learning Technologies*, 4(1), 59-73. <https://doi.org/10.1109/TLT.2010.37>

- Strijbos, J.-W. (2016). Assessment of Collaborative Learning. In G. T. L. Brown & L. Harris (Eds.), *Handbook of Human and Social Conditions in Assessment*. Routledge. <https://doi.org/10.4324/9781315749136>
- Sung, Y. T., Yang, J. M., & Lee, H. Y. (2017). The Effects of Mobile-Computer-Supported Collaborative Learning: Meta-Analysis and Critical Synthesis. *Review of Educational Research*, 87(4), 768-805. <https://doi.org/10.3102/0034654317704307>
- Tai, J., & Ajjawi, R. (2016). Undertaking and reporting qualitative research. *The Clinical Teacher*, 13(3), 175-182. <https://doi.org/10.1111/tct.12552>
- Tai, J. H. M., Bellingham, R., Lang, J., & Dawson, P. (2019). Student perspectives of engagement in learning in contemporary and digital contexts. *Higher Education Research & Development*, 38(5), 1075-1089. <https://doi.org/10.1080/07294360.2019.1598338>
- Vygotsky, L. S. (1978). *Interaction Between Learning and Development*. In *Mind and Society* (pp. 79-91). Harvard University Press.
- Walker-Gibbs, B., Ajjawi, R., Rowe, E., Skourdoumbis, A., Thomas, M., Bennett, S., Fox, B., Alsen ii, P., Walker-Gibbs, B., Ajjawi, R., Rowe, E., Skourdoumbis, A., Krehl Edward Thomas, M., Bennett, S., Fox, B., Alsen Walker-Gibbs, P. B., Alsen iii, P., & Alsen, P. (2019). Success and Failure in Higher Education on Uneven Playing Fields Acknowledgements.
- Wang, M. J. (2010). Online collaboration and offline interaction between students using asynchronous tools in blended learning. *Australasian Journal of Educational Technology*, 26(6), 830-846. <https://doi.org/10.14742/ajet.1045>
- Weaver, D., Viper, S., Latter, J., & McIntosh, P. C. (2010). Off campus students' experiences collaborating online, using wikis. *Australasian Journal of Educational Technology*, 26(6), 847-860. <https://doi.org/10.14742/ajet.1046>
- Wilson, K. F., & Wilson, K. (2019). 'Collaborate to graduate': what works and why? *Higher Education Research and Development*, 38(7), 1504-1518. <https://doi.org/10.1080/07294360.2019.1660311>
- Wise, L., Skues, J., & Williams, B. (2011). Facebook in higher education promotes social but not academic engagement. *ASCILITE 2011 - The Australasian Society for Computers in Learning in Tertiary Education*, 1332-1342.
- Zaka, P. A., Fox, W. H., & Docherty, P. D. (2019). Student perspectives of independent and collaborative learning in a flipped foundational engineering course. *Australasian Journal of Educational Technology*, 35(5), 79-94. <https://doi.org/10.14742/ajet.3804>
- Zheng, L., Zhang, X., & Gyasi, J. F. (2019). A literature review of features and trends of technology-supported collaborative learning in informal learning settings from 2007 to 2018. *Journal of Computers in Education* 6(4). Springer Berlin Heidelberg. <https://doi.org/10.1007/s40692-019-00148-2>

Kamal, S., Bearman, M., Tai, J., & Fox, B. (2021). Exploring the social aspects of student collaboration in online learning. In Gregory, S., Warburton, S., & Schier, M. (Eds.), *Back to the Future – ASCILITE '21. Proceedings ASCILITE 2021 in Armidale* (pp. 65–73). <https://doi.org/10.14742/ascilite2021.0110>

Note: All published papers are refereed, having undergone a double-blind peer-review process. The author(s) assign a Creative Commons by attribution licence enabling others to distribute, remix, tweak, and build upon their work, even commercially, as long as credit is given to the author(s) for the original creation.

© Kamal, S., Bearman, M., Tai, J., & Fox, B. 2021