JLD Journal of Learning Design

Sociocultural affordances of online peer engagement

Jill Willis
Queensland University of Technology
Brisbane, Australia.
jill.willis@qut.edu.au

Kate Davis
Queensland University of Technology
Brisbane, Australia.
k3.davis@qut.edu.au

Sally Chaplin
Queensland University of Technology
Brisbane, Australia.
sally.chaplin@qut.edu.au

Abstract

University learning increasingly includes online learning experiences embedded within teaching with the dual policy intentions of increasing flexibility and learner engagement. In this research project, three university lecturers from different teaching contexts selected technologies for online learning to enhance learner engagement by encouraging peer learning. A sociocultural view of learning was used to conceptualise the technological and social affordances that might enable student peer participation and engagement. The research explored the question: "What are the benefits and barriers experienced by students engaging in online peer collaboration?" Students reported benefits including a sense of belonging that enhanced motivation, and professional identity. This article also reports on some of the challenges for students and University academics when engaging in online learning communities.

Keywords

Learner engagement, peer learning, online learning, affordances

Introduction

Online learning technologies can invite students to participate with peers in a community of practice and to develop identities as knowledge creators. This assumption inspired a cooperative inquiry by three university lecturers as they sought to design engaging learning experiences and respond to university policy pressures to enhance flexibility through online learning experiences. As the higher education sector becomes more competitive, universities are seeking new ways to build communities amongst increasingly diverse student populations (La Trobe University, 2009b). Student engagement within university learning environments is a strategic policy focus for learning as well as providing economic return (Bowen, 2005). Online learning is promoted as a strategy that can promote this flexibility and engagement.

Learner engagement is a multidimensional concept that, according to Munns and Woodward (2006), occurs when students are simultaneously reflectively involved in deep understanding and expertise (high cognition), genuinely valuing what they are doing (high emotion), and actively participating in learning activities (high participation). More than an individual model of learning where the brain is regarded as an information processing system, this definition of engagement reflects a situated or sociocultural approach to learning where the "mind is an aspect of [the] person-environment interaction itself" (Bredo, 1994, p. 24). Through participation in a community of practice, Wenger (1998) proposed that learners experience a sense of belonging as they negotiate identities of becoming more expert (Figure 1).

Figure 1. Components of a social theory of learning (Wenger, 1998. p. 5)

In a community of practice, engagement occurs through participation in a shared repertoire as "our enterprises are defined as worth pursuing and our participation is recognised as competence" (Wenger 1998, p. 5). Online learning environments can provide structure and opportunity for the interaction necessary to enact this view of learning, particularly through peer interactions.

Peer engagement

Peer interactions can promote both the sense of belonging, and the emerging sense of identity of becoming more expert (Wenger, 1998) as peers contribute to learning activities or discussions, and observe one another's participation. Through mutual engagement and through joint enterprise with peers in learning activities, learners move towards expertise by "both absorbing and being absorbed in" the culture of a community of practice (Lave & Wenger, 1991. p. 95). Cultural and social values, and cultural tools used in interactions shape how peers participate, with learning occurring both through observation of how peers participate and contribute as well as hands-on involvement in an activity with peers (Rogoff, 1995). Drawing from Munns and Woodward's (2006) definition of engagement, it can be seen that peer interactions that promote a sense of belonging create the necessary high emotion and high participation leading to engagement.

Peer interactions can also promote the third element of engagement, that of high cognition. Through continuously evolving and renewing relationships, learning information can circulate between peers rapidly and effectively (Lave & Wenger, 1991, p. 93). Learners construct new meanings through collaboration and the integration of multiple perspectives through interaction and negotiation with their peers (Hung, et al., 2006). This type of learning can lead to a "paradigm shift" or a change in perception (Taylor, 2008) and is said to be more powerful because it is mediated on a personal level (Bowen, 2005). Online learning appears to be an opportunity to promote, or afford this sense of connection and growth.

Affordances

Affordance is a term used by Day and Lloyd (2007) to describe how various technologies provide opportunities to learn, providing structures and possibilities for participation. Selecting technologies purposefully for the learning experience will depend on the type of learning envisaged, as well as the possibilities for action that the online learning can provide. For example, Lloyd (2010) discussed how forums and wikis afford teacher and learner collaboration in creating new knowledge and further afford reflective learning, "because of the capacity to record online interactions allow a revisiting of the experience which, in turn, enhances reflection. The human faculty being amplified is memory" (p. 6). The type of peer engagement will therefore vary depending on the technology and the type of interactions that are afforded.

While a direct correlation between online interaction has been identified with increased course satisfaction and performance (Durrington, Berryhill & Swaffor, 2006), not all interactions appear to enhance a sense of engagement through peer learning. For example, in exploring the differences between students' experiences of virtual and online design studios, Saghafi, Franz and Crowther (2012) noted how the online technology afforded self-managed learning and insightful feedback. It did not, however, afford a sense of community and peer learning in the online design studio.

Further, in a recent literature review of online student interaction in university courses, Ravenna, Foster and Bishop (2012) concluded that social interaction, promoted through peer interaction, created a sense of belonging. It did not, however, necessarily lead to higher levels of cognition, a key dimension of learner engagement. Affordance of technology can therefore enable one or more of the three dimensions of learner engagement by encouraging participation, a sense of belonging and enhanced cognition, enabling all dimensions of engagement at once appears to be challenging.

To make the most of the technological affordances, there also needs to be attention paid to the sociocultural affordances, that is, the social structures and patterns of participation within the community of practice that create opportunities to learn. In reporting on research in face-to-face collaborative learning, Jarvela and Jarvenoja (2011) highlighted that both cognitive and social affordances work together so that "individual group members represent interdependent self-regulating agents (cognitive angle) who at the same time constitute a social entity that creates affordances and constraints for group and individual engagement (situative angle)" (p. 351). It is through collaboration that individual and shared understandings can be created.

Research design

This study was designed to explore the impact of particular affordances for online peer collaboration across three university subjects (or units). Consideration of how to afford online collaborative social and cognitive patterns of participation depended on the context of the three university subjects and the technological expertise of the lecturers. The collaborative research design was chosen because it allowed each of the lecturers to explore the impact of both their own learning design and that of their co-researchers' on peer engagement. This allowed the researchers to determine if different affordances would result in similar or different outcomes.

The three teaching contexts of this study were one-semester units in the areas of Education, Accountancy and Library and Information Studies. Opportunities for online peer learning in each unit were designed to reflect the learning goals, the teaching context, and the size of the student group. These are explored below in Table 1.

Table 1
Goals of online peer engagement in three University units

Teaching context	Level (# students)	Intention behind learner engagement	Delivery mode	Affordances for online peer collaboration
Accountancy	First year undergraduate course (*n*=800)	Confidence in completing practical accountancy exercises and assessments.	Face to face on campus lectures and tutorials.	Discussion board forum giving peer advice about resolving practical accountancy problems
Education	Post graduate (*n*=45)	Reflective discussion of teaching practice and opportunity to learn from peers to construct emerging teacher identity.	External online	Weekly synchronous online tutorials. Discussion board forums for peer review of student authored responses to case studies.
Library and Information Studies	Masters (*n*=35)	Develop identity as knowledge creator using Web 2.0 tools, opportunity for peer review, development of and engagement with a personal learning network.	External online with two weekend face to face workshops (recorded for students unable to attend)	Asynchronous blog postings and peer review of user created web-content. Weekly online synchronous discussions.

In each unit, the technology afforded structured peer collaboration designed to suit the learning aims. The synchronous online tutorials that were suited to a student group of 45 mature aged students in Education who were developing confidence through discussing case studies would have created frustration for first year Accountancy students in a class of 800 peers. Instead for the large group of first year trainee Accountants, an asynchronous discussion forum was created to facilitate peer collaboration for an assessment that required entering the operating transactions of a sole proprietor business for one month into an Excel spreadsheet. A significant aim of the Library and Information Studies unit was to assist students to learn how to be knowledge creators and facilitate learning through Web 2.0 technologies, and become eCommunicators, eCollaborators and eInvestigators (Macdonald, 2008). Their online interactions were designed to enable the students to author content using a range of Web 2.0 technologies, and offer user critiques to peers. While the technology in each unit was designed to afford engagement, without the peer participation, the learning could not occur. Understanding what enabled effective peer participation, in particular the barriers and benefits, from the perspective of students who participated in these online learning experiences was the intention of this research. The findings would then inform the researchers how to improve future online learning experiences for their students.

This research was structured as a cooperative action research inquiry with four stages (Reason 2003). Firstly, propositional knowing involved the co-researchers drawing from their existing experiences and insights from literature to agree on the focus and procedures. The research investigated the key question "*What are the benefits and barriers experienced by students engaging in online peer collaboration?"* Secondly, practical knowing involving experiencing the process and researcher observations of nuances, followed by experiential knowing with full immersion in action. Data was gathered through analysing patterns of student online contributions and through semi structured interviews with students. The final stage involved a critical return to propositional knowing, analysing the data through a process of inductive coding (Charmaz, 2008) and drawing on literature to reflect on and amend propositions.

Table 2

Data sources for analysing student engagement in online peer learning

Teaching context (unit)	Data source	*n*
Accountancy	Asynchronous Discussion board forum	16,128 hits accessing the discussion board with 166 messages posted by 59 students.
Education	Student interviews	2
	Recordings of synchronous discussions	9 x 1 hour recordings
Library and Information Studies	Student interviews	4
		Postings on Web 2 course site

Interviews were conducted towards the completion of the teaching period. Students were interviewed either face-to-face, phone or by *Skype*®, drawing on the following questions:

- In unit [code], the following opportunities were available for online peer collaboration. [List peer collaboration learning experience for relevant unit] Can you please rate your level of participation for each experience (5 = highly engaged, 3 = moderately engaged, 0 = did not participate in this experience)
- What were some of your reasons or motivations for participating (or not participating)?
- What are some of the benefits you have experienced through your participation?
- What were some of the difficulties that you experienced?
- What might have helped address these difficulties?
- Were there any other circumstances that limited your participation?
- What recommendations could you make to a future student about participating in these activities?
- What recommendations could you make for the development of peer collaboration as a learning opportunity in this course?

As part of the critical return to propositional knowing, each lecturer reflected on and evaluated the success of the learning innovation from her own observations, before data was coded for conceptual themes across units. It was through the analysis across the three units that important findings about the sociocultural affordances of the online learning environment emerged.

Analysis was informed by a conceptual framework that draws on the themes from Munns and Woodward's (2006) three dimensions of engagement and Wenger's (1998) social theory of learning. This framework assisted in both the design of the online learning experiences and the analysis.

Figure 2. Conceptual framework combining a social theory of learning (Wenger, 1998. p. 5) and dimensions of engagement (Munns and Woodward, 2006)

Findings

Student experiences in each of the three units were analysed separately by the lecturers and then together to look for conceptual resonance. The majority of students reported on the positive benefits of engaging in online peer learning. Opportunities to engage with peers online challenged their identities as learners, and the importance of how a sense of belonging contributed to engagement clearly emerged. Students also identified barriers to their participation. The following findings inform an understanding of sociocultural affordances for successful online peer engagement, drawing on the conceptual framework provided in Figure 2.

While these findings are reported in discrete categories, there is significant overlap. For example, existing technological skills and confidence levels impacted on how students participated in the learning, yet also impacted on their identity, and how they perceived themselves as learners in these units. It is hoped that insights into the experiences of the learning of students, and also the lecturers may inform future teaching experiences, and the learning of peers.

Participation and learning as doing

Across all three units, students had to learn how to act in the new environment. For many of the students, the online learning environments were new learning contexts and it took a little while for them to find their voice, to overcome their shyness, or to see where and how they could contribute. Students who had existing technology skills that were useful in the learning environment, or, more importantly, had a sense of self-efficacy in terms of valuing their own skills level, found it easier to adapt to the new environments. Structures and activities that encouraged students to develop skills in the new online environment enabled students to begin to participate and learn by doing. As they developed skills, their motivations for participation became more personal.

Structures encouraged initial participation

In Education and Library and Information Studies, the lecturers structured routines such as weekly activities and helped students learn the new skills of the online community. As conversations began to be posted in the online forums, peers could observe and mimic the norms, at the same time as they created the social norms of the learning. Replies from the lecturers affirmed and shaped the discussion, providing feedback for future contributions. In the Accountancy and Library and Information Studies units, linking participation to the activities of assessment encouraged the initial participation. In the Accountancy unit, the online discussion board was promoted as the way to seek assistance and advice about the practice tasks that were directly related to the Assessment tasks. Assessing how often students participated, and the quality of online contributions encouraged students in the Library and Information Studies unit to get involved:

> *I think to be honest, like, even though it's a pain to be assessed on the participation I think that that really needs to be there as a motivator. Because it's one of those things where everyone has to get involved because, you know, one person doing it, they're not going to get anything out of it. So I think to continue assessing participation is necessary as a motivator (Library and Information Studies student).*

However, while assessment may have contributed to encouraging students to begin participation, students also reported that their motivations changed over time.

Personal motivations

A strong motivator for some participants was a desire to master new skills, rather than simply to perform well in the unit, indicated by comments like, "my motivation is I just wanted to get as much out of it as I possibly could" (Library and Information Studies student). Highly participative students reported undertaking in-depth learning and undertaking extra work, beyond the requirements of learning activities. Those students desiring to increase knowledge, competence and an appreciation of a subject, tend to be more engaged with content and are motivated from within themselves (Clayton, Blumberg et al. 2010). Dweck (2000) identified that students who engage with challenge, seek strategies and experiment with their learning outperform students who have a fixed identity as a learner. While some students brought existing personal motivations to their learning, others developed greater motivation through participating. Students learned how to participate by engaging in the learning structures and thereby developing a sense of community and belonging.

Emotion and learning as belonging

A positive sense of belonging enabled students to experience the second dimension of engagement, that of emotional connection that occurred both with peers and the lecturers. Interacting with peers and having comments made on their work was consistently reported as an enjoyable experience for students while also contributing to their learning. Getting involved in the participative opportunities from the outset helped develop a sense of collegiality and made students feel invested in the sharing process. Students felt they were able to develop relationships, saying "it was like a little family that we'd meet each week" (Education student). The literature suggests that students in the online environment may find it difficult to get to know their fellow students (Hannon & D'Netto, 2007) and that digital communication can be shallow and superficial (LaPointe & Reisetter, 2008). In this case, however, the data attests to the fact that interactive, flexible learning environments can help build a sense of community because they encourage peer-to-peer learning and the development of relationships between students and teachers.

Students reported that social accountability helped them feel like they were "forced" or "obliged" to participate. The obligation to participate was about fulfilling their role in the "team" and playing their part in the learning community. The interactivity of synchronous online peer discussions was valued by students who appreciated being able to "interact and ask questions and make comments … as the response is immediate" (Education student). Interactive, participative elements also helped students stay organised throughout the semester, as preparation for online peer interactions "forced me to do the work, to be prepared" (Education student). However, this social obligation may have meant that more peripheral students who may have started later or not kept up with activities may have felt it difficult to join in the existing conversations.

Those students who participated in peer interactions engaged more frequently as the semester went on, contributing suggestions and questions, as they felt like they knew the lecturer and peers from the discussions, commenting "I was motivated because I wanted to please my lecturer" (Education student). This feeling of being supported by the lecturer, empowered students to participate beyond the boundaries of assessable tasks:

> *Like for example [the lecturer] set up a class activity which we could be part of on Flickr and just last week she invited us to join this digital story telling challenge as part of her PLN… I've taken up both of those and that's something that's not mandatory but something that I've wanted to do just for my own development and because it sounded fun. Whereas there aren't those opportunities in the other classes and even if there were I don't know if I'd take them up because I don't feel as though I've got that support that I need to be able to do that sort of thing.*
>
> (Library and Information Studies student)

Emotional support could therefore be seen to lead directly to a greater engagement in the cognitive challenges.

Cognition and learning as making meaning

The learning environment afforded students becoming knowledge generators who were learning as they made meaningful connections. Through participation, students generated their own supplementary unit content that added value to the learning experience of their peers. For example, within the discussion board for Accounting, students were advised that although the site would be monitored regularly, the lecturer would only occasionally make postings to correct calculation misconceptions or errors. The rate of 16,128 hits accessing the discussion board, the 166 messages posted by 59 students, was much greater than the lecturer had anticipated and matched a reduced number of emails asking for individual help. Students reported that they valued the discussion board as it saved frustration when trying to find an error and saved them time when they were not sure of a transaction. The high number of access hits could indicate that students were accessing the site to confirm that their understanding of transactions matched other students in the cohort, and therefore they did not need to ask questions of the lecturer. These opportunities to observe the thinking of peers, and review others' work over time meant that the online peer learning acted as a feedback source, that is a source of information to help students evaluate the standard of their understanding (Hattie & Timperley, 2007). This form of feedback was fast and personal, and afforded by the technology that allowed students to revisit the peer discussions as often as they needed to.

By being contributors, students were also able to achieve a deeper level of learning as they engaged with peers' opinions, and responded by developing and articulating their own opinions through deep analysis of the subject matter. In each of the three units students positioned themselves as experts, taking on a teacher role within the developing learner communities and reporting an emerging sense of identity.

Identity and learning as becoming

Students began to develop a sense of professional identity through opportunities to practice articulating their own opinions in the peer community environment. Students reported that authentic learning experiences allowed them to develop both as learners and as professionals. Across the three units, students began to identify themselves as individual professionals operating within, and belonging to, a peer network that would be a model for their future professional way of working.

While each of the learning designs reflected different levels of complexity, online learning involved taking risks as learners, for both lecturers and students. Lecturers had to learn ways to invite student responses and this included experimenting and adjusting expectations along the way.

> *We experimented in the online tutorials by asking questions in the chat window, inviting students with microphones to be the speakers, using the polling tool, and writing on the white board. I had to learn as I went, and not be overwhelmed when problems with our use of the technology caused disruption to the learning and see that it was part of the learning.*
>
> (Lecturer, Education).

Facilitating a highly interactive Web 2.0 learning environment was a changed workload pattern for the Library and Information Studies lecturer. Finding efficient ways to respond to student online forum postings was a challenge met by directing students to post their questions to the unit forums rather than to email, letting an enquiry sit for 12 hours which allowed another student to answer, with the lecturer adding supplementary information when necessary. As a result, students developed confidence with the technology and with the subject matter:

> *It has been incredibly satisfying to watch students whose level of technology expertise was limited at the beginning of the semester become leaders in the class group, supporting others as they learned. I feel strongly that students would not have become as proficient and confident with the technology if they had not been operating in an environment where they were interacting with their peers.*
>
> (Lecturer, Library and Information Studies).

Students identified that it was helpful to get involved from the beginning, and began to request that future units might include similar opportunities for interactivity and participation.

Common barriers to participation

Across the units, students identified some common barriers to participation. In general, a lack of familiarity (across many areas) was challenging for students. In particular, new structures, new environments and new approaches to assessment meant it took students some time to acquire an understanding of appropriate behaviour. Small learning networks did not work as well as larger networks, particularly in those networks where a number of the participants chose not to engage on a regular basis. A highly engaged internal Education student who contributed to online discussions at the start of the semester commented that when others from her face to face cohort did not contribute as much, she withdrew from contributing, as she did not feel part of the online community. There needed to be a critical mass of participation for students to feel like it was a valued activity and to encourage engagement.

Time was a participative barrier for students. In particular, online and/or part time students who were balancing their studies with jobs and families felt they would have like to have had more time available to them to maximise their participation. Surgery, work commitments, illness and responsibility for small children were the reported barriers to synchronous participation, impacting on the ability of some students to be online at a designated time for synchronous peer learning experiences such as online tutorials. Opportunities for asynchronous participation, such as blogs, discussion boards and recordings of tutorials were valued and helped students feel more connected and encouraged in their learning. The choice of synchronous and asynchronous technology options afforded greater agency, or choice by the learner about how to learn.

Conclusion

As lecturers who each adopted a new technology to encourage peer participation, the authors would recommend that others consider how to structure opportunities for online peer collaboration within teaching. The findings from this study can provide principles to inform the design of engaging learning experiences online. Sociocultural affordances such as structures that encourage initial peer participation, enable peer learning to be visible and confirmatory, and that build relationships through conversations with peers and lecturers were highly valued. As student confidence grew, the online spaces and structures enabled students to be knowledge creators, and emerging professionals who could teach one another. Choosing the technology to best fit the group of learners was also recognised as an important design principle. In this action research project, each of the online innovations reflected a different level of complexity, reflecting the various levels of technical competence and confidence of the lecturers. Yet greater complexity was not directly linked to greater engagement. All of the innovations provided common valuable learning outcomes for students including development of a sense of competence and identity within the content areas.

The cooperative inquiry (Reason, 2003) cycle provided a useful framework for the design and evaluation of teaching and learning innovations in the three units. While the data collected supports the idea that the teaching innovations were largely successful, further data needs to be collected to explore further sociocultural barriers for those students who were minimally engaged. The overall goal was to explore ways to enhance student engagement in learning, and through this collaborative research with peers, we were also able to experience the benefits of peer learning and gain rich experience that will enhance our future teaching.

Acknowledgement

The authors would like to acknowledge the work of Michelle DuBroy who conducted a literature review and interviews with students.

References

Ainley, M. (2004). *What do we know about student motivation and engagement?* Paper presented at the Annual Meeting of the Australian Association for Research in Education, November 29 – December 2, Melbourne, Australia. Retrieved from http://www.aare.edu.au/04pap/ain04760.pdf

Bernard, R., Abrami, P., Borokhovski, E., Wade, C., Tamin. R., Surkes, M., & Bethel, E. (2009). A meta-analysis of three types of interaction treatments in distance education. *Review of Educational Research, 79*(3), 1243 - 1289

Bowen, S. (2005). Engaged learning: Are we all on the same page? (analysis of teaching and learning). *Peer Review, 7*(2), 4-7.

Bredo, E. (1994). Reconstructing educational psychology: Situated cognition and Deweyian pragmatism. *Educational Psychologist, 29*(1), 23 - 35.

Charmaz, K. (2006). *Constructing grounded theory. A practical guide through qualitative analysis*. London: Sage.

Clayton, K., Blumberg, F., & Auld, D. P. (2010). The relationship between motivation, learning strategies and choice of environment whether traditional or including an online component. *British Journal of Educational Technology, 41*, 349–364. doi: 10.1111/j.1467-8535.2009.00993.x

Day, D., & Lloyd, M., (2007). Affordances of online technologies: More than the properties of the technology. *Australian Educational Computing*, *22*(2), 17-21.

Durrington, V., Berryhill, A., A& Swafford, J. (2006). Strategies for enhancing student interactivity in an online environment. *College Teaching, 54*(1), 190-193.

Dweck, C. (2000). *Self theories: Their role in motivation, personality and development.* Philadelphia, PA: Taylor & Francis.

Hannon, J., & D'Netto, B. (2007). Cultural diversity online: Student engagement with learning technologies. *International Journal of Educational Management*, 21(5), 418-432.

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research, 77*(1), 81-112.

Hung, D., Tan, S. C., & Koh, T. S. (2006). Engaged learning: making learning an authentic experience. In D. Hung & M. S. Khine (Eds.), *Engaged learning with emerging technologies* (pp. 29-48). Dordrecht, The Netherlands: Springer.

Jarvela, S., & Jarvenoja, H. (2011). Socially constructed self-regulated learning and motivation regulation in collaborative learning group. *Teachers College Record*, *113*(2), 350–374.

Krause, K-L. (2005). *Understanding and promoting student engagement in university learning communities*. Paper presented at the Sharing Scholarship in Learning and Teaching: Engaging Students, September 21-22, Townsville, Australia. Retrieved from http://www.cshe.unimelb.edu.au/pdfs/Stud_eng.pdf

Krause, K-L., & Grimmer, C. (n.d.). Enhancing student engagement in the first year. *Griffith Institute for Higher Education: Good Practice Guide.* Retrieved from http://www.griffith.edu.au/gihe/pdf/gihe_tipsheet_web_ese.pdf

LaPointe, L., & Reisetter, M. (2008). Belonging online: Students' perceptions of the value and efficacy of an online learning community. *International Journal on E-Learning, 7*(4), 641-665.

La Trobe University. (2009a). *Student engagement strategy 2009*. Retrieved from http://www.latrobe.edu.au/students/assets/downloads/Student%20Engagement%20Strategy%2009.pdf

La Trobe University. (2009b). *What is student engagement?* Retrieved from http://www.latrobe.edu.au/students/student-engagement

Lave, J., & Wenger, E. (1991). *Situated learning. Legitimate peripheral participation.* Cambridge, MA: Cambridge University Press.

Lloyd, M. (2010). There, yet not there: Human relationships with technology. *Journal of Learning Design*, *3*(2), 1 –13.

Macdonald, S. (2008). *Blended learning and online tutoring: Planning learner support and activity design*. Burlington, VT: Gower.

Munns, G., & Woodward, H. (2006). Student engagement and student self-assessment: The REAL framework. *Assessment in Education, 13*(2), 193 - 213.

Osterman, K. F. (2000). Students' need for belonging in the school community. *Review of Educational Research, 70*(3), 323-367.

Ravenna, G., Foster, C., & Bishop, C. (2012) Increasing student interaction online: A review of the literature. *Journal of Technology and Teacher Education, 20*(2), 177 – 203.

Reason, P. (2003). Three approaches to participative inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Strategies of qualitative inquiry* (pp. 261 - 283). Thousand Oaks, CA: Sage.

Rogoff, B. (1990). *Apprenticeship in thinking. Cognitive development in social context.* New York: Oxford University Press.

Rogoff, B. (1995). Observing sociocultural activity on three planes: participatory appropriation, guided participation, and apprenticeship. In J. Wertsch, P. Del Rio & A. Alvarez (Eds.), *Sociocultural studies of mind* (pp.139-165). Cambridge, MA: Cambridge University Press.

Saghafi, M. R., Franz, J., & Crowther, P. (2012). Perceptions of physical versus virtual design studio education. *International Journal of Architectural Research, 6*(1), 6-22.

Taylor, E. W. (2008). Transformative learning theory. *New Directions for Adult and Continuing Education, 2008*(119), 5-15.

Wenger, E. (1998). *Communities of practice: Learning, meaning and identity.* Cambridge, MA: Cambridge University Press.

Wertsch, J. (1993). *Voices of the mind: A sociocultural approach to mediated action.* Cambridge, MA: Harvard University Press.