

Problem Based Learning and Authentic Assessment in Digital Pedagogy: Embracing the Role of Collaborative Communities

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Abstract: The purpose of this paper is to qualitatively examine the relationship between problem based learning, authentic assessment and the role of community in fostering learning in digital contexts. The authors used “Digital Moments” to create a meaningful learning environment and build the online class community. They then collaboratively developed assessment strategies and tools with students following problem-based learning methodologies. Given that the pace of information is rapid and changing, the authors argue that online learning must occur in a context that embraces these three concepts: 1. Students must be empowered through PBL to choose real world tasks to demonstrate their knowledge, 2. Students are allowed to choose the modality to represent that knowledge and participate in designing the tools for assessing that knowledge and 3. They do so in a supportive online community built through the sharing of Digital Moments. The paper chronicles the interconnection between problem based learning, authentic real world assessment tasks and a supportive online community. This resulted in developing learner autonomy, improving student engagement and motivation, greater use of meaningful self and peer assessments and shared development of collective knowledge. Further to this, it builds a foundation from which authentic assessment, student ownership of learning and peer support can occur in an ongoing way as learners make the important shifts in power to owning their learning and becoming problem-based inquirers in future courses. As a result, in order to fully embrace the online learning environment, we cannot limit ourselves to simple text based measures of student achievement. Stepping into this brave new world requires innovation, creativity and tenacity, and the courage to accept that as the nature of knowledge has evolved in the digital landscape, so must our means of assessing it.

Keywords: Authentic assessment, problem-based-learning, digital communities

1. Introduction

This paper is grounded in the theoretical framework of several authors who identify the parameters for three key components of this paper: 1. problem based learning, 2. authentic assessment tasks and 3. productive and meaningful online communities. This work will contextualize these elements with reference to particular synchronous online environments. (Reeves, Herrington & Oliver, 2002; McCarthy, 2013; Rosemartin, 2013; Herrington & Herrington, 1998; Bozalek, Gachago, Alexander, Watters, Wood, Ivala & Herrington, 2013).

Savin-Baden (2007), Watts (1991) and others discuss the important key features of a problem based learning environment. Savin Baden reveals that there are significant advantages and some disadvantages to PBL. In this framework, there is no rote learning of facts and figures, students brainstorm problems, arrange possible solutions, decide collectively on their learning objectives, do individual work to seek out necessary information, then report back to synthesize and apply their new knowledge collectively to the problem at hand. These features parallel the important factors that are necessary for authentic learning environments and for creating authentic real world tasks used in assessment. Watts concurs that “learning is active, not passive, learning is about ownership of skills, learning is for life. While perhaps too many can remember dull and boring lessons in school, the central theme here is that effective learning is active learning” (Watts, 1991, p. 5).

Literature reveals a general consensus about some of the key elements of an authentic learning environment. These include

authentic context, authentic tasks, access to expert thinking and modelling of process, provision of multiple roles and perspectives, collaborative construction of knowledge, reflection, articulation to enable tacit knowledge to be made explicit, coaching and scaffolding, and authentic assessment of learning within the tasks. (Bozalek, et al, 2013, p. 631)

Reeves et al (2002) add that tasks must have

real world relevance, be ill defined, comprise tasks to be investigated over time, examine the task from different perspectives, provide opportunity to collaborate, reflect, be integrated and applied beyond domain specific outcomes, are seamlessly integrated with assessment, create polished products and allow diversity of outcomes. (p. 564)

The use of Digital Moments is a robust and valid method of creating meaningful communities through recording digital stories that emerge through these authentic contexts. Connelly and Clandinin (1990) refer to the use of narrative inquiry by stating that “the main claim for the use of narrative in educational research is that humans are storytelling organisms who, individually and socially, lead storied lives” (p. 2). Bulloch and Pinnegar (2001) concur that this “may be best expressed in the story form where linearity gives way to a different sense of time, where emotion drives action” (p. 18). Eisner (1997) states that “stories instruct, they reveal, they inform in special ways” (p. 5). Although Digital moments represent an alternative form of data representation and storytelling, they present a new means to do qualitative research in online environments. The validity of such artistic research is supported by Eisner (1997) as he also refers to the importance of paying attention to the aesthetic and artistic elements of qualitative analysis. He states:

Concerns for verification, truth and precision have led us away from an experiential conception of understanding and toward a verificationist conception of knowledge – something that can be tested, packaged, imparted and sent like bricks across the country to build knowledge structures that are said to accumulate. (p. 7)

In later work Eisner refers to the term “educational connoisseurship” (1998, p. 63) to describe a new way of knowing and forming knowledge. This knowledge is considered valid when it demonstrates “structural corroboration” (1998, p. 110) (such as multiple sources of data including videos, words, photos, drawings, social media) and “internal coherence” (1998, p. 113) (such as reflections, peer sharing, peer teaching). This paper reports on the use of Digital Moments not only as a strategy to create a professional learning community, but as a format for students to use problem based learning strategies and to authentically assess their learning. Implementing Digital Moments as a pedagogical tool encourages the development of trust, motivation, creativity and growth in learning. As an instructional strategy, it allows for many of the parameters in authentic learning environments to exist. Students learn in authentic contexts, do tasks of their choosing, collaborate with others, and have access to peers who share expertise in the particular technology they wish to learn. This creates collaborative construction of knowledge, coaching and scaffolding, and embeds assessment within the learning process. The sharing of each student’s and instructor’s Digital Moment creates a natural log of the individual and collective learning process, and the weekly sharing of stories allows verbal articulation of the learning; it enables the tacit knowledge to emerge as explicit. From this foundation, a natural evolution occurs to allow students to develop and design tasks through which they, along with their instructor and colleagues, would use to assess their learning.

Table 1: Common Characteristics of PBL, Authentic Assessment and Digital Communities

Problem Based Learning	Authentic Assessment	Digital Communities
Real world situations	Real world tasks	Real world student narratives
Collaborative Work	Collaborative assessment	Collaboration sharing Digital Moments
Co-constructed solutions	Co-constructed assessment	Community based learning
Multiple outcomes	Multiple products and artefacts	Multiple stories and relationships in community
Digital tools vary	Digital modes of assessment	Digital Moments to narrate learning and share stories

2. Rationale

Problem-based learning has evolved significantly over the past several years. There are many different modalities and there is much diversity in the field. One of the origins of PBL was in the McMaster medical school, which brought leading edge PBL to the forefront of learning environments for medical students. Barrows (1980) had found that students could learn content and skill, but they were not able to apply that knowledge in a new situation. This is also what Schon (1987) refers to as “reflection-in-action”. Bereiter and Scardamalia (1980) also acknowledge this idea of demonstrating new abilities and skills in unique situations as the development of expertise, or “how experts become experts”. The difference between novices at any task and experts is that experts continue to push the edges of their knowledge, and can react and problem solve in new and uncertain situations. Novices merely repeat patterns that they already know, and this is often not enough to deal with new, complex and elaborate situations. Professionals must learn to apply their knowledge in new and varied situations, where the parameters are uncertain and they must combine what they, and their colleagues collectively know in new ways. This is particularly important in a digital world, where individuals can “google” any subject to find out about it. Collective knowledge is built with peers, colleagues and the internet. This final partner, access to the world wide web, demands that we learn how to learn differently, as content is rapidly at our fingertips, yet learning how to critically contextualize that content means we need to assess the problem from all sides. According to Savin-Baden (2007) there are significant characteristics of PBL that include:

- Complex real world situations that have no one ‘right’ answer are the organizing focus for learning.
- Students work in teams to confront the problem, to identify learning gaps, and to develop viable solutions.
- Students gain new information through self-directed learning.
- Staff act as facilitators
- Problems lead to the development of clinical problem-solving capabilities. (Savin-Badin, 2007)

It is clear that learners in the 21C exist in a world that continually redefines itself. The development of new knowledge outpaces our ability to keep up with content, thus many authors have re-defined the essential skills required of the 21C learner. Several authors concur that these skills include the development of creativity, self-motivation, innovation, problem-solving and collaboration skills (McNeill, Gosper & Xu, 2012; Voogt, Erstad, Dede & Mishra, 2013; Kaufman, 2013). These are also skills that are developed by students in a problem based learning context.

Within the digital world, we have a myriad of opportunities to invite students to develop these skills, if the instructor has the courage and tenacity to relinquish some authority, and level the playing field. Expertise no longer resides in one individual in a professional learning community, and so the roles of teacher and learner meld. It is in the development of this safe and trusting environment, envisaged here through the creative implementation of Digital Moments as a teaching and learning tool, that growth occurs. This is what Flavin (2012) refers to as “disruptive technologies” (p. 103). He states that “when digital technologies are brought into the classroom setting, the lecturer may have to relinquish some of their authority, thus impacting on the ‘rules’ and ‘division of labour’ nodes in order to enable enhanced learning” (Flavin, 2012, p. 104). This sharing of ownership in the learning environment has been identified by Cochrane (2012) as one of the critical success factors in mobile learning. He states that features of a successful virtual learning environment include

pedagogical integration of technology into the course and assessment, lecturer modelling of the pedagogical use of the tools, creating a supportive learning community, and creating sustained interaction that explicitly scaffolds the development of ontological shifts, that is the reconceptualization of what it means to teach and learn within social constructivist paradigms, both for the lecturers and the students. (Cochrane, 2012, p. 125)

The sustained interaction of the individuals’ Digital Moments within the professional learning community is a foundational element within which problem-based learning and authentic assessment of that learning can emerge. The varied sources of data collected as Digital Moments (youtube, tweets, photos, poems, drawings) tell the story of the class as it evolves. Definitions of online communities vary, but Lin and Lee (2006) state “the online community can be defined as a social relationship aggregation, facilitated by internet-based technology, in which users communicate and build personal relationships”(p. 480) Wenger and Synder (2000) believe that “online communities facilitate virtual collaboration among community members with the

potential of transforming the activities of off-line into an online context” (in Lin & Lee, 2000, p. 480). While this social element of online learning remains a predominant challenge to educators, effective online pedagogy relies on how skilled the instructor is at developing and sustaining a sense of belonging to the digital community. By combining problem based learning, authentic assessment tasks and a strong sense of community, educators can become adept at helping students become independent autonomous learners who are capable of solving the complex problems facing 21C learners.

3. Methodology

This research occurred in three phases and was used to analyse the effectiveness of using the pedagogical documentation strategy of “Digital Moments” as an assessment tool.

Phase 1: This involved using Digital Moments as an opening activity in online synchronous and asynchronous undergraduate courses as a way to create a professional learning community. Students in each phase took a course entitled “Psychological Foundations and Digital Technology” and there were 35 participants from a variety of backgrounds including education, nursing and health care, gaming, and business. The instructor was an Assistant Professor in the Faculty of Education. Classes watched 3 hours of podcasts per week on their own, then met once a week for one hour over a 12 week period in the winter term. The purpose of using “Digital Moments” was to simulate the social and community building network that evolves naturally during the first minutes of a face to face class environment. Each week, 35 pods were created in Adobe connect, and students entered the virtual room ahead of class time to post their Digital Moment. Students were given some exemplars as to what a Digital Moment might look like, (words, phrases, pictures, colours, musical links) but were not limited in their creativity. Anecdotal reflections from students recorded in Blackboard chat rooms, audio recordings of Adobe connect classes and field notes from the professor were collected.

Phase 2: Students in this phase began to facilitate others’ use of new technologies in order to submit their assignments in different formats. Having gained confidence and trust, two important elements of a virtual professional learning community, they began to ask the instructor if they could submit their final assignments using alternate means to text-based artefacts. While traditional teaching at the undergraduate level involved a final examination, or submitting text based essays and final papers, students were allowed to fulfil their requirements by using alternative modes (you tube, video, audio, photo journal) as long as the work demonstrated evidence of competence, critical thinking, and was clearly grounded in the literature. Students participated in the development of assessment criteria and along with the assignment they handed in an assessment document that they had negotiated and collaboratively developed with the instructor.

Phase 3: Students began to use a variety of assessment tools they had developed collaboratively by which they were able to assess their own work and the work of others. They were able to provide feedback and comments to each other on how valid and reliable the assessment tools they developed were, and used that feedback to make changes or adjustments. Collectively the group agreed to try each of the tools when assessing their own and their peer’s work. These included rubrics, but also included portfolios of their course work, journals and comments by their peers who had witnessed, and often aided in the learning process. These tools were built in social and constructivist ways to ensure that the learning was both meaningful to the learner and relevant to their own professional contexts.

4. Data Collection

Ethical review was passed and informed consent of participants was obtained. Data were collected via recordings of classes in Adobe connect, including both formal and informal chat rooms for review. Anecdotal information from external professional learning communities created by the students in Linked In and Facebook was obtained. Recordings of classes were kept on a secure server located at the university. Audio and text data were used to analyze how well the strategy worked in terms of students’ perceptions of their online community. Students were asked to maintain weekly comments in Blackboard chat rooms and use this as a journal format to record their observations about their online community. Copies of assessment tools and the links to multi-modal assignments were stored at the university website. It is also worthwhile to note that after the experiment had completed, several of the graduate students, themselves employed as teachers, have

continued to journal with the professor and began to use the “Digital Moments” strategy in their own work environments.

5. Findings and Key Themes

The Process of PBL: It is important to note that these students had graduated from a more traditional educational system wherein the teacher holds the power and students are asked to produce a graded product. Often they had not participated in the decision-making process whereby this product was defined, and almost always they had not participated in collaboratively taking ownership of the assessment process. While some students may have had experience with self and peer assessment, it is critical to acknowledge that these are skills that students must be taught. Learning how to give and receive feedback is an important piece of the PBL environment, and meaningful feedback that stretches beyond “great job” is essential for the process to move forward. This lack of learner experience in having autonomy creates resistance at first, as students want to be fed criteria, rubrics and want exemplars of what constitutes a graded product. Instructors as well, may initially resist PBL as it means that they have to examine how relevant their grading practices actually are, and step outside of what are often institutional or systemic methods of grading students. In addition, instructors need to be able to accept a wide variety of products, understand and be able to explain why they are allowing this lack of “sameness” to superiors in the university and to be comfortable with the fact that they are using fair and accurate assessment practices. This can be a challenge, and might be helped by instructors collaboratively meeting in their own PBL professional development sessions to discuss the process and to learn how others are using PBL, while simultaneously meeting the university requirements.

Student Perceptions of PBL: It is interesting to note that the first course students take using PBL is often a difficult one for them, as they do not exhibit the required independence and autonomy. Most students expect to take an exam at the end of a university course, and this model did not have a summative examination. Two populations of students emerged, those taking the course as an elective and others taking it as part of their undergraduate degree. Students taking the course as their second or third on in a series of PBL courses embraced the concept, after some initial difficulty which was an important part of their “un-learning” what it means to be a student. Students generated lists of what they perceived to be the advantages and disadvantages of PBL as a learning strategy. Among the advantages they listed being the meaning-makers and constructivist learning, less rote learning of facts and content easily found online, more student choice and autonomy, greater flexibility and creativity in the final product, and getting to work collaboratively with peers. Disadvantages were primarily the initial discomfort, struggle and lack of specific criteria given by the instructor as to the end product. They also referenced that PBL might be easier in a digital context as they could use Adobe connect to work with colleagues anywhere in the world in different times and places, which enriched their projects considerably.

6. Creativity

Kaufman (2013) reveals that “school is not simply about tests and ‘checking boxes’ of topics and assignments. Rather, schools today should have a mission of developing students as individuals and igniting their creativity” (p. 79). Students in this project began to unleash the bonds of traditional online courses they had taken, and began to flourish in the freedom of creative practice. At the same time, ironically, they began to take more responsibility for their own learning. Being allowed to choose empowered them to discover the intimate bond between real freedom, self-responsibility and creativity. While many stated they had been indoctrinated by a culture of marks and grades, many revelled in the return to a natural state of learning, one that allowed freedom, innovation and a deeper level of responsibility than many had taken in some time. In previous online courses, the keeper of knowledge had been the instructor. It took courage on the parts of both instructor and learners, but once out of their educational cage they embraced the wide open fields of knowledge the digital world provided. One student referred to his favourite quote that “wild elephants walk softly in open fields” as a metaphor for feeling free, calm and in his natural learning environment.

6.1 Extended relationships

The use of Digital Moments began to take on a life of its own beyond the scheduled class time. Some students created their own learning communities on Facebook and LinkedIn in order to stay in touch once the course

had ended. In addition, Twitter feeds were used to follow each other and sustain friendships and learning experiences. These extended connections through technology became a web within which students connected on a personal level, a professional level, both emotionally and digitally. This is evidence that “learners are responding to the new technical and social opportunities with little help from the formal education system” and there is “evidence of deep networking and knowledge building in learners’ informal practices” (Littlejohn, Beetham & McGill, 2012, p. 551). Learning that is situated in digital worlds must also have a social component to be effective. Kearney, Shuck, Burden and Aubusson (2012) concur that learning is a social endeavour. They identify three distinct features of mobile or virtual learning that include “authenticity, collaborations and personalisation” (p. 2). They refer to a socio-cultural model for virtual learning and the importance of “enhanced collaboration, access to information and deeper contextualisation of learning” (2012, p. 2).

6.2 Teacher- Learner-Teacher Role Shifts

During the course, the roles in this professional learning community became almost indecipherable. While still within the university context, the instructor fulfilled the responsibility to assign grades to students. But in the learning environment, the power differential became almost invisible. The students with expertise in particular technologies took on the role of instructor, the teacher became the learner, thus empowering learners with the confidence to take risks, make mistakes, and ask for help. This supports the notion that 21C learners must be able to think critically, be problem-solvers and work collaboratively. In particular, for 21C learners in a virtual classroom, they must be able to go beyond the class and use their digital literacy within the context where they work and live. “It is obvious that not only learners, but also teachers need to acquire 21st century competencies as well as become competent in supporting 21st century learning” (Voogt, Erstad, Dede & Mishra, 2013, p. 408). In order to create authentic learning and assessment tools, teachers need to learn how to design such tasks. McNeill, Gosper and Xu (2012) surveyed academics and found that many continued to target lower order learning outcomes. They state that

universities increasingly value the skills such as problem-solving, critical thinking and creativity, yet the curriculum needs to be designed to support and scaffold development of these skills, and integrating them into assessment strategies has proven a challenge. While new technologies have sometimes been heralded as having the potential to address an apparent gap between the rhetoric of curriculum alignment and assessment practice in universities, academic practice is slow to change, and the uptake of new tools to support the development of higher order skills remains relatively low. (McNeill, Gosper & Xu, 2012, p. 283)

This research argues that if Digital Moments can be used to create learning environments that support academics to learn new skills, then they may create more relevant 21C learning outcomes for their own students. In the digital world, it is imperative that teachers, regardless of academic standing, continually redefine themselves as life-long learners and model this for their students.

6.3 De-valuing and Re-valuing

The implementation and acceptance of arts-based and creative assessment tools meant a significant ‘unlearning’ and ‘revaluing’ what it meant to demonstrate one’s knowledge. It became important to unpack how each learner had developed their values about the importance or lack of importance of marks and grades versus the value of the learning process itself. Students began to see how the development of friendships and simple human qualities like trust, caring and compassion were the real foundation for creating meaningful learning experiences. It also helped them to begin to trust themselves; they began to believe there was an authentic self in each learner who could choose which direction to go, which tasks were personally and professionally relevant, and which were best left to others. The level of passion and interest became more important than the grade, and this represented a significant shift in values. As Kaufman states “development of these skills is purposefully integrated within core content areas in ways that help students find relevancy in their work, a characteristic central to motivation and learning” (2013, p. 79). Contrary to traditional educational frameworks, wherein the power is centred in the instructor or the institution, this model required a re-valuing of where the fundamental responsibility for learning resides - within the learner.

7. Discussion

The three factors of problem based learning, authentic assessment and meaningful community are a powerful combination of tools that online instructors can use to provide students with effective digital pedagogy. Perhaps most significant is its transformational effect on the nature of learning itself, the instructors' role, and on the learner's aptitude towards learning. Far from reforming students, who may then revert to past methods of learning, these three elements combine to shape a student's way of perceiving the learning. Students who had taken several courses in this modality became accustomed to their autonomy and independence. They embraced the flexibility and creativity that came alongside of the greater responsibility for their own learning. From the instructors' perspective, this was a fundamental learning outcome. Students began to exhibit greater competence and confidence in using open source digital resources, needed less direction from the instructor and enjoyed taking the reins of their own learning.

The human story remains at the essence of every great learning experience. Using Digital Moments to tell individual stories and create learning communities proved an invaluable teaching strategy to create meaningful learning experiences for students. This sharing of stories, allows for learners to develop empathy, compassion and deeper understanding of each other. As the 21C learning landscape becomes increasingly impersonal, isolated and digital, it is imperative that we continue to use pedagogical strategies such as Digital Moments to preserve the richness of our online learning environments. As Cousins and Bissar affirm,

What stories can be told about the fast-changing world of higher education, and what can we learn from them? Adapting to new situations, conquering fears and overcoming obstacles are familiar storylines, with particular relevance for university lecturers having to introduce new technologies in their working practices. (2012, p. 1)

Digital Moments are personal, and help us to create connections in a world where being wired to technology 24-7 often makes us feel disconnected from those around us. This is the great paradigm of the digital 21C world. Educators need to find ways to reconnect learning in a very human, empathetic and meaningful way. Without this, we cannot ground our problem-solving in a human context, and we cannot solve the issues we face alone. Rolfe (2012) states the importance of identifying individual pioneers and "understanding the motivations and characteristics of potential users in order to establish strong and sustainable practices" (p. 16).

We know that student engagement in online courses is challenging as instructors face a huge inundation of competition from text, you-tube, Facebook, Twitter and more. Students are wired in, and our instructional strategies need to acknowledge that keeping their attention requires us to use some of the same engagement strategies that are used so successfully by social media, video games and digital environments. Badge, Saunders and Cann (2012) acknowledge that students' online attention is focussed on these other sites with high activity rates, and that "engagement is more than participation, it requires emotion and sense-making as well as activity, these social networks are rapidly moving beyond their original purpose and are inevitably becoming part of the learner experience" (p. 2). Thus, to engage students in authentic learning environments, capture their attention and imagination, we need to use social strategies that appeal to students. Based on this captive audience, we can move them towards authentically assessing their learning, using modalities that are not text-based, but which permeate their world on a moment by moment basis.

8. Conclusion

Our digital stories can be effectively used as a strategy to create authentic online learning environments, and to assess student work authentically. This requires us to revisit several of the themes that emerged in this project. First, we need to celebrate and encourage the development of creativity by allowing students to use original and artistic ways to express knowledge; further, they need to be able to create the means to authentically assess that knowledge and the learning of self and peers. Second, we need to acknowledge that the successful creation of the parent professional learning community is often insufficient, and readily gets supplemented by digital communities of practice developed by students. This is evidence of the power of extended relationships among learners, and it also allows for the shift in power from the university instructor to the real world of the student. Using Digital Moments can be a precursor to this shift. Third, the roles of teacher and learner must be interchangeable and fluid. The degree to which the instructor is willing to empower students, risk making mistakes and put themselves in the context of 'beginner's mind' will parallel

the trust and empathy in the learning environment. If we are to make it safe for students, we must model a certain degree of vulnerability ourselves, relinquish our post as 'expert' despite our academic qualifications, and quite probably re-learn to have fun with the simple process of learning. Finally, there is a significant de-valuing and re-valuing that occurs in authentic learning contexts. 21C learning environments do not require students to leave behind text-based measures of knowledge completely. Rather, they acknowledge that text-based measures of achievement are insufficient to capture or measure things in a digital world.

Ultimately, both learners and instructors must discern what remains 'real' in any authentic learning context. Digital worlds provide us with a plethora of options beyond text; we need to become responsible and free users of these alternative means to demonstrate knowledge. Our assessment methods must catch up to the reality of learning in the 21C. Our tool box must expand to include, but move beyond text to celebrate multi-modal measures of knowledge.

The experience of becoming 'real' online was a journey fraught with highs and lows, like any good adventure. It is clear that digital classrooms can provide uniquely human learning experiences. The gaps that were anticipated in getting to know students, creating relationships between students online and designing a safe environment for taking personal risks in learning were not as scary as previously thought. Prior to teaching in this environment, the authors believed that "authenticity in teaching" would be more difficult online. In some respects, it is, but in our unfolding digital world, perhaps we need to use this venue for reaching out to learners more globally. Technology was a powerful tool, but the humanity in the classroom remained untouched as the real driver of the learning experience. It is important to remember that the teacher-learner relationship cannot be replaced, nor does it need to be replaced by high tech solutions. In order to have successful online pedagogy, we must venture into the connections between problem-based learning, authentic assessment and the importance of community. These three elements are interwoven. Despite our traditional training in wanting to know the "right" answer, we should embrace a variety of solutions and let students take ownership of the problems they wish to study within the context of our courses. Instead of running from difficulty and challenge, we need to embrace our stuckness, trust in the collective nature of knowledge, use our peers, our instructors and our digital tools to find new and creative solutions. As Robert Pirsig stated in his book "Zen and the Art of Motorcycle Maintenance"(1975):

"Stuckness shouldn't be avoided. It's the physic predecessor of all real understanding. Stuckness isn't the worst of all possible solutions, but the best possible situation you could be in. Your mind is empty; you have a hollow-flexible beginner's mind. Consider for a change, that this is a moment to be not feared but cultivated. If your mind is truly and profoundly stuck, then you may be much better off than when it was loaded with ideas. " (1975, p. 257)

The nature of knowledge has shifted; the nature of assessment lags far behind. Problem based learning helps shape students' knowledge, and helps them acquire the key attitudes necessary for success in a digital world. Digital access to knowledge will continue to move faster than we can keep pace. Our job as instructors is not to carefully box our students' knowledge in text based measures, label it securely in a container we feel is safe, and move on. If we limit ourselves to this academic prescription pad, serving our students a traditional dose of only text based assignments, we will remain far behind the digital divide. While not abandoning our history of essays and academic writing, we need to expand this learning and assessment tool box. We need to let students explore problem based learning, in the same way they will experience problems in their future work and careers. They should be assessed authentically to demonstrate their knowledge in a variety of artistic and creative ways that best fit their digital skills and knowledge, and should develop the confidence and competence to participate in meaningful online communities. These are the characteristics required to succeed in an internet-based world. While institutions and systems may balk at this non-traditional approach to learning and assessment, we must move forward and embrace all that the digital world has to offer, relinquish institutional power, and place the reins squarely where they belong, in the hands of our students.

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