Visible Learning: Pedagogical Documentation in the Makerspace

by

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Part 1 - Introduction to Pedagogical Documentation

We often treat children as if they're not very competent to do anything on their own. So we make them stop learning in a natural way -- by exploring.
(Papert, 1999)

Overview

As the world changes, so must models of learning. In the twenty first century it is not enough to fill our students with knowledge; we need to prepare them for what they can *do* with knowledge in our ever increasingly networked, technology-rich, digital world. As such, there is a widening gap between the learning done outside and within school environments. The use of technology is changing society and how we communicate at an accelerating pace (Papert & Markowsky, 2013). The educational system is often caught in the lurch; unable to adapt and/or implement new pedagogies and digital tools to purposefully engage and motivate learners. As a result, many students are resistant to learn in school because they do not see the point of traditional methods of teaching as relevant to their lives (Papert & Markowsky, 2013). Fullan (2013) describes this phenomenon as a "push-pull" dynamic; students are being *pulled* to learn by exploding new technologies, but are being *pushed* from school because of their boredom and/or inability to identify with or pursue topics and tools of personal interest. Indeed, intellectual engagement in Canadian schools has proven to significantly decrease beginning in grade five and only further decreases for students in grades six through twelve (Canadian Education Association, 2011). Schools need to reclaim their position as places that view learners as capable and competent, encouraging the pursuit of personal interests and passions for inquiry, exploration and discovery. In the words of Martinez and Stager (2013), "we [need] … to liberate learners from their dependency of being taught" (Chapter 2, paragraph 6).

To re-enable engagement and a motivation for learning in schools, Fullan and Langworthy (2014) call for new models of learning partnerships to be employed amongst teachers and students. Partnerships need to be established in order to "activate, and cultivate the deep learning potential in all of us" (Fullan & Langworthy, 2014, p. ii) and allow for a focused innovation on the 6Cs: collaboration, critical thinking, communication, creativity and innovation, character education and citizenship (Fullan, 2013). They further illustrate that teaching practices need to shift from:

> ...focusing on covering all required content to focusing on the learning process, developing students' ability to lead their own learning and to do things with their learning. Teachers are partners with students in deep learning tasks characterised by exploration, connectedness and broader, real-world purposes. (Fullan & Langworthy, 2014, p. 7)

The Ontario Ministry of Education acknowledges this need for educational reform and is making key commitments, adopting changes to curriculum design, pedagogical

beliefs and partnering practices. Beginning in the early years, the ministry recognizes that children are:

> ...competent, capable of complex thinking, curious and rich in potential. When we recognize children as capable and curious, we are more likely to deliver programs and services that value and build on their strengths and abilities. (Ontario Ministry of Education, 2014, p. 6)

A renewed vision for education in Ontario schools pledges to define and measure 21st century competencies (Ontario Ministry of Education, 2016), affirming that by:

> By 2025 . . . Ontario will be a world leader in higher-order skills, such as critical thinking and problem solving, which will allow Ontario to thrive in the increasingly competitive global marketplace". (Sousa, 2014, p. 9)

Updated curriculum documents now embed the 6Cs in their expectations (2013). Monographs on pedagogical documentation (Ontario Ministry of Education, 2012; Ontario Ministry of Education, 2015) encourage educators to explore effective practices and strategies that facilitate new partnerships and place the student's role and voice in the forefront of learning.

Makerspace environments in classrooms and library learning commons provide opportunities to foster deep learning and to build new learning partnerships in constructive, innovative, and inventive curriculums. Learning experiences within this space are designed to be "student-centred and problem-based, ... [to] utilize the best available resources, technologies, strategies" (Together for Learning, 2010, p. 14) in order to equip learners to solve real world problems independently and collaboratively, locally and globally. These spaces can house the technological tools and resources students need to take ownership of their learning, explore interests, and develop 21st century competencies (Martinez & Stager, 2013). The layered practice of using pedagogical documentation in this space affords teachers opportunities to make learning visible through multiple lenses, to deepen, extend and orchestrate learning experiences that are more relevant, purposeful and engaging for all stakeholders involved (Flores, 2015; Stockman, 2016). The combination of both these educational pedagogies serves to provide the impetus for this project, which is to explore how the documentation of student experiences in the makerspace might inform, facilitate, guide and invite dialogue about the assessment and development of continued innovative and relevant learning in our schools.

Previous Literature

Quite early on in the research process it became evident that there were gaps in research in the examination and study of a) pedagogical documentation beyond the early year classrooms and b) the use of pedagogical documentation as a pedagogy to drive teaching and learning practices in makerspace environments. While abundant peer reviewed literature exists to support the philosophies, beliefs, uses, and benefits of pedagogical documentation in schools, most, with the exception of the book *Visible*

Learners; Promoting Reggio-Inspired Approaches in all Schools (Krechevsky, Mardell, Rivard & Wilson, 2013), focus on early learning contexts and not in the broad kindergarten to grade eight context in which this study was based.

Additionally, literature and books written by founders of the maker movement in education do exist that expound the pedagogy, benefits and uses of making and makerspaces in schools (Daugherty, 2016; Fleming, 2015; Graves & Graves, 2016; Martinez & Stager, 2013) but little is peer reviewed. Emergent empirical research on the maker movement and the impact on education is only just surfacing (Papavlasopoulou, Giannakos, & Jaccheri, 2017) and most of what currently exists takes a largely qualitative approach to studying teaching and learning in the context of making (Sheridan et al., 2014; Sheridan & Halverson, 2014,Vossoughi & Bevan, 2014). Almost all current research into the maker movement in education explores the trends and possibilities within this environment, rather than the nature of the learning experienced by the users themselves. A closer examination of how students learn through making is required to fully understand what the maker movement can mean to teaching and learning practices and *why* (Chu, Angello, Saenz, & Quek, 2017; Cohen, Jones, Smith, & Calanadra, 2016; Gutwill, Hido & Sindorf, 2015; Papavlasopoulou, Giannakos, & Jaccheri, 2017; Sheridan et al., 2014; Sheridan & Halverson, 2014; Vossoughi & Bevan, 2014).

With the exception of Martinez & Stager's (2013) work defining the role and the importance of the teacher as documentarian in the constructionist classroom to study, discuss, and interpret learning in order to prepare for the next stage in students' development, there is little to no evidence that examines the use of pedagogical documentation in makerspaces as a tool for assessment for and as learning. In many cases, the use of pedagogical documentation is only referenced to as "documentation". Gutwill, Hido, and Sindorf (2015) address how documentation informed their practices for making and their professional development through shared dialogue. Flores (2015), Rudzitis (2015), and Oliver (2016) address how students and teachers can use documentation to assess learning in the makerspace. No current peer reviewed literature explains how pedagogical documentation can be used as a method or as a catalyst to inform, guide, and facilitate future learning opportunities in the makerspace.

Two key educators' blogs were found, however, that directly address how documentation could be used effectively beyond the early years. Silvia Tolisano's (2014) blog acknowledges the lack of research in this field for junior, elementary, and senior students, affirming that, indeed, a Google search on pedagogical documentation returns many hits on the Reggio Emilia teaching approach in early childhood. However, there are very few results when searching for information about the documentation "for learning with older students (K-16) and adult learners as part of their professional development" (Tolisano, 2014, np). Tolisano has since written a series of blog posts on the topic of sharing and the documentation of, for and as learning, curating her resources to publish a book in 2017. She has garnered a worldwide audience and interest in the topic of documentation, encouraging educators to learn from and share their stories through the Twitter and Instagram hashtag #document4learning.

Angela Stockman (2016) takes blogging about pedagogical documentation one step further - not only writing her own series about how to document learning in general, but also devoting one blog post specifically to outlining how she used documentation as a coaching tool to learn more about and bolster student learning experiences in the makerspace environment. Her book *Make Writing* (2016) credits Tolisano's work in the field and highlights the importance of documentation practices in her writers' makerspace.

The research aims of this study look to find the commonalities in existing literature regarding the underlying principles and frameworks that define each approach: 1) the maker movement; and 2) pedagogical documentation, in order to explore how they can implemented in action research to assess teaching and learning practices in our school makerspace. Through investigation, this study strives to affirm what Tolisano and Stockman have already surmised -- that documentation of learning in a makerspace, or any environment for that matter, can be used to make student thinking visible and engage everyone in discussion about not only the "what" is happening in the environment, but the 'how" and "why", to produce the inevitable next question: "where do we go next?".

Personal Foundation of Study

It is undeniable that the maker movement is spreading like wildfire in the educational system. Many educators, like myself, question the quick implementation of such spaces, wondering if we are all just caught up in the same fad, or just looking for another way to place a band-aid on the problems and challenges we already face in our school systems (Halverson & Sheridan, 2014). Are we replacing pencils and paper with computers and flashy gadgets in schools without fundamentally changing our practices, or in the words of Papert, using a "jet engine to improve transportation by attaching it to a stage coach?" (Papert & Markowsky, 2013, p. 33). Are we developing meaningful relationships with our students to learn what motivates them to drive the learning in this space? Are we acting as partners and facilitators in order to develop 21st century thinking and competencies? How do we know if we are succeeding? Are students learning? What are they learning? How are we assessing and documenting? Are we assessing and documenting to help drive future instruction based on student strengths, skills and needs? How is this knowledge being shared and communicated - if it is indeed, being shared at all? How much *do we really know* about the content and processes of learning in makerspaces (Sheridan et al, 2014)? How can we move beyond the hype of making to consider what making actually is and how it might be both a "pedagogical orientation and a domain of study?" (Crichton & Childs, 2016, p. 146).

Therefore, in light of these questions this study aims to uncover and unmask the "what" and "how" of student learning and make it *visible* in our school makerspaces. We need to ensure that experiences in our makerspace honour our students' capabilities and voices in learning. We need to ensure that making is meaningful and relevant to our students and will contribute to their success in the 21st century. Most importantly, we

need this knowledge to be shared, to be visible, to be seen as valuable in order to create a culture and excitement for learning in our schools. By exploring the purpose, relevance and history of pedagogical documentation, this project aims to implement and reflect on documentation practices in the makerspace. Embedding documentation in the day-to-day making in our space will give us the insight in order to reflect and assess the strengths, needs and abilities of our students (Niemu, Kumpulainen & Lipponen, 2015). It is my aspiration that the documentation of student learning will not only serve to deepen understanding of how our children learn, but also serve as a reflective tool to inform and direct professional development, resulting in new teaching and learning opportunities in the makerspace. A website to serve as a framework and guide through the stages of documentation was established to help myself and others to understand the process of pedagogical documentation and reflect on the purpose of using the documentation in the makerspace. It is hoped that this website will continue to prompt discussion and dialogue between myself and my colleagues, to inform our collective teaching and learning practices, and continue to facilitate new learning and making opportunities across the curriculum and school.