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Cultivating Sustained Creative Work with Ideas

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Abstract: This article is a theoretical exploration of how Knowledge Building theory in conjunction with ubiquitous mobile devices can cultivate the necessary abilities in students to sustain creative work with ideas. In recent years, creativity and innovation has become a highly discussed and sought-after skill, especially in relation to the employability, personal and social development of students.

Introduction

The need to work creatively with knowledge has rapidly become a dominant, integral and ubiquitous part of our daily lives. Through knowledge advances many industries such as business, finance, technology and education have been fundamentally altered, and those able to work with knowledge in its many forms tend to be elevated in status as they take the lead in producing, gathering, and effectively applying knowledge (OECD, 1996). These *knowledge workers* are thus the prime differentiator amongst competing parties as they are generally highly educated and command a firm grasp of many higher-order thinking skills (OECD, 2001). The Conference Board of Canada (2000) has also highlighted the need for higher-order thinking skills or employability skills, which have been a focus of education in Canada for a number of years. More recently there has been a call by global organizations such as the Organization for Economic Co-operative Development (OECD) to emphasize the fostering of creativity, creative thinking and innovation in students (2018). This translates into greater employability for creative individuals, but what is perhaps more important, is that creativity enhances a student's personal and social development (Lucas, Claxton & Spencer, 2013).

To gain more of these individuals, it becomes a necessity to shift education policy, curriculum, and pedagogies to focus on the development of skills, abilities and mindsets in schools. Knowledge Building theory, pedagogy, and technology are designed for sustained creative idea work that drives community knowledge forward (Bereiter & Scardamalia, 2014; Scardamalia & Bereiter, 2006). Further to developing creative work with ideas through Knowledge Building, one needs to accommodate the change in which knowledge is accessed, communicated, and created; that is through ubiquitous mobile devices. The affordances of which is the reduction of spatial and temporal barriers allow students to communicate readily, offering the potential for situated knowledge artifacts and pervasiveness in discourse that can further enhance learning (Baloian & Zurita, 2012).

Literature Review

With the OECD's recent shift (2018) in focus on creativity and innovation fostering and assessment one needs to question whether students are only measured on their creative output or does personal, meaningful and internal creativity towards the improvement of community knowledge play a part? In this section I will review the relevant literature surround definitions of creativity, Knowledge Building as an enabler of creative work with ideas and innovation, and how mobile technology may further sustain creative idea work and development in students.

Different Definitions of Creativity

Traditional definitions and thoughts around creativity often equates artistic talent and tangible output as markers of a person's level of creative abilities. Furthermore, if we think about how we judge creative thinking it is often centered around novelty and impact over time. For example, the creation of Facebook®, which at the time was a novel platform that drove the notion of *social media*. It also undoubtedly has had a lasting impact on many aspects of our daily lives, ranging from the personal to international. Another example is the invention of the iPhone®, an innovative device that arguably started the smartphone revolution, which has become ubiquitous to our daily life. Although both cases illustrate creativity and innovation they are on a large scale with wide-ranging implications for human society which we generally think about when discussing creativity and innovation or "Big-C" (Kaufman &

Beghetto, 2009). What is missing however, is the personal day-to-day creativity we exhibit and even the personal internally meaningful creative expressions that is not shared.

Further to notions of creativity with societal impact we think of creativity being an innate ability rather than something that can be cultivated. We often see examples of this when children are in art class and a child's painting ability becomes a reflection of the creative abilities they were born with. Robert Weisberg (1999) considers this to be a fallacy, and believes that creativity or creative thinking abilities can be taught to individuals as long as they have the prerequisite knowledge. He states that before becoming world-renowned musicians the Beatles were formally trained in music and spent many years perfecting their craft in order to exhibit heightened levels of creativity (1999). This presents the notion that creativity, although often linked to personal talent, still requires a solid foundation of knowledge to draw upon and a substantial investment of time to fully realize the creative potential of a person.

The dichotomy of internal and external creativity has been defined by researchers within the field of creativity as "mini-c" (Beghetto and Kaufman, 2007) and "little-c" (Runco and Jaeger 2012). Mini-c can be considered the meaningful personal experiences and events that rearrange your own foundation of knowledge (Beghetto and Kaufman, 2007). Little-c is considered personal creativity that occurs in our daily lives, such as reducing the numbers steps in particularly long accounting workflow (Runco and Jaeger 2012). Although these types of creative activities are not normally considered they are much more common than Big-C activities, which are fewer and far between. Considering personal creative activities is important as it broadens our notions of the concept of creative thinking and even how we problem solve. With a broader concept, we are more likely to consider a larger variety of activities exhibited by students as creative or innovative. This further expands our notion of how we may use different pedagogical models, theories, or technology to cultivate sustained creative work with ideas by students. This is particularly important as one of the most common methods of assessing creativity, the Torrance Test of Creative Thinking (TTCT) focuses primarily on the number of novel ideas generated and how complex those novel ideas are (Collard & Looney, 2014). Many critics (Cattel & Butcher, 1968; Collard & Looney, 2014; Runco, 2001) believe this does not account for all facets of creativity, nor does it even consider that there may not be a visible output to creativity or creative thinking. Furthermore, the number of ideas that are generated is not indicative of their value towards a given solution or its applicability to everyday life.

I would argue that the inclusion of mini-c activities is one of the most important considerations educators and students need to consider. Since the focus is on internal personally meaningful creative reconciliation of information (Runco and Jaeger 2012), students in particular can use it to further develop creativity without being judged in traditional measures. This accomplishes two goals, the first being students have greater freedom to diversify idea generation, secondly, they begin using creative thinking as a tool that allows them to be more adaptable to changing situations. From an educator's perspective, if mini-c takes greater precedence over output-oriented creativity, there is greater freedom in engaging students creatively across subjects to allow for deeper understanding and more flexible, interdisciplinary application of knowledge. Lastly, looking deeper into the examples provided above regarding social media, innovative devices, and renowned musicians, there is a common thread linking them together, sustained creativity with ideas. Being able to sustain creative work with ideas results in greater contributions to a public knowledge for a community. It also offers ample opportunity for the creators themselves to constantly iterate, deepen their understanding in a given field, and push the boundaries of knowledge. To conclude, creativity can be thought of and looked at with many different lenses, moving from macro to micro and external to internal. As such, a working definition of creativity is the application of accumulated knowledge and experiences that aids in solving a problem in a novel manner (Weisberg, 1999) that has a meaningful impact toward society, daily life, or a person's internal development (Beghetto and Kaufman, 2007; Runco and Jaeger, 2012).

Knowledge Building and Creativity

With the present and future challenge of educating students so they have the necessary competencies for a knowledge age, making them employable, adaptable and competitive in society, it is crucial for changes to be made in education. Knowledge Building, "attempts to refashion education in a fundamental way, so that it becomes a coherent effort to initiate students into a knowledge creating culture" (Scardamalia & Bereiter, 2006, p. 98). This shift places the focus on collaborative student efforts that advance community's understanding rather than individual performance, "taking collective responsibility for improving their ideas rather than leaving this as a task for the teacher" (Scardamalia & Bereiter, 2006; Bereiter & Scardamalia 2014, p.36). The application of KB thus changes the dynamics of dominant means of teaching and learning, which is largely focused on individual performance and teacher-led classes with little student agency. KB thus emphasizes collective improvement with student's taking greater agency in moving ideas forward in a continuous cycle of iteration changes the role of teachers as knowledge builders in their own right. Through this type of engagement with ideas students actively shape how they learn and

how their epistemologies can be used in different situations to develop solutions, allowing them to nurture their creative thinking in an applied and conceptual manner. There is a symbiotic relationship between creativity and KB as the former is nurtured by the latter through sustained work in design mode, as elaborated above; they become indistinguishable in the act of building or creating new knowledge.

Bereiter and Scardamalia (2014) states that “education must give serious thought to issues of epistemic agency, to the gradual transfer to students of the kinds of epistemic responsibilities traditionally reserved for the teacher” (p. 39). For this transfer to occur, the social structure of the classroom needs to be one of opportunistic collaboration. Zhang et. al quote Sawyer saying that “creativity emerges from an interactional process that involves a social group of individuals engaged in complex, unpredictable interactions” (2009, p. 13). Without a fixed structure, students are able to form groups surrounding a specific problem rather than based on time or other goals set forth by the teacher. After solving one problem, students can form other groups that build on previous idea, generate new ideas, or solve additional problems as the need arises. Not only do students get the space to take charge of their learning, they are able to work with a variety of students with different epistemologies, increasing both the collective knowledge of the group and their individual knowledge as well.

Knowledge building when applied to classrooms increases the agency of students, fostering greater collective responsibilities in iterative idea improvement of public knowledge. This increased responsibility leads to deeper learning as a group and as individuals within a community committed to idea improvement and solving real problems. Students who are given greater agency exhibit more creativity both in how they develop ideas and how they interact with others in the class. Similarly, competencies such as reading, writing and mathematics the more practice, the more proficient; creative engagement with ideas is no different.

Sustaining Creative Work with Ideas

In general, mobile devices can be used to support and sustain creativity as they are effective at engaging individuals, enhancing communication and offering a multitude of mediums for expression and consumption. The “proliferation of smart mobile devices...they are now universal and mobile computers carried around by students, most of the time and impact in almost every aspect of their lives” (Cheong et. al, 2012, p. 98). The resulting technology ecosystem in society is one filled with ubiquitous devices connected to ubiquitous networks that offer the flexibility and mobility for students to continue learning, creating and thinking even when not in a traditional learning environment (Mwanza-Simwami, 2016). With the continuous improvement of technology and rapid adoption by students, it becomes necessary for educators to engaged students through the same devices they are already familiar with (Cheong et. al, 2012). Allowing for faster adoption and decreased frustrations related to technology use for education (Echeverria et. al, 2011; Cheong et. al, 2012).

Adoption of mobile devices to use in collaborative learning is natural for students as they “enjoy the connectivity and social interaction which occur from the use of these devices and prefer group-based activities” (Cheong et. al, 2012, 98). As students are more open to social activities, introducing a mobile extension, whether it is dedicated application or responsive site to KB will be beneficial as it offers the flexibility they are used to when accessing and creating new knowledge and maintaining discourse (Cheong et. al, 2012; Looi, Seow, Zhang et al., 2010). Lastly mobile devices support anytime, anywhere, Knowledge Building through various visual, textual and audio metaphors (Baloian and Zurita, 2012; Caballé et. al, 2010). Beyond the technological and user experience advantages that mobile or multi-device access grants, it reduces the overall cognitive load required to sustain creative work with ideas, which can in result in much deeper and consistent building of knowledge by a community.

Situated learning can be facilitated through inclusion of mobile devices (McQuiggan, Kosturko, McQuiggan, & Sabourin, 2015). Caballé (2010) states that situated learning is not only learning knowledge but a process of social participation, emphasizing teachers working alongside their students so they may work on a problem even before the problem is understood. Situated learning also requires that students learn in authentic contexts for increased understanding of the knowledge that is tied to a particular context (Sharples & Pea, 2014; Caballé, 2010; Brown, Collins, & Duguid, 1989). What mobile devices could allow is a vehicle to sustain creative idea work that begins in class and continues at a different location or time, or begins in some context outside school and helps sustain work in school. The pervasiveness afforded by these devices can reframe how knowledge building currently operates in classrooms so that the real problem a community is trying to solve becomes a priority rather than segregated by time within a schedule.

In summary, multimedia learning (Mayer, 2014) allows for ideas to be continuously improved upon in a time sensitive manner with contextually rich notes. Fostering the necessary high-order abilities in creative thinking, problem-solving, idea improvement, knowledge building amongst others, which are paramount for students to learn in order to be successful in our current knowledge focused society. Much like the shift back-and-forth from face-to-

face Knowledge Building to virtual Knowledge Building, being able sustain creative work beyond the here and now is essential. As I have argued above, creative work with ideas should be considered an act of applying the entirety of a person's knowledge in a variety of unpredictable situations, rather solely focusing on external output of artistic expression. Mobile devices offer students greater access to more forms of knowledge anytime and anywhere, providing them opportunities to pervasively sustain creative engagement with ideas.

Conclusion

In this article I discuss the variety of definitions people have regarding creativity, further delineating the different spheres of creativity that activities could fall under, especially *Big-C*, *little-c*, and *mini-c*. Each of these types has an influence on how we think about creativity and how aid students in developing abilities within these areas. In addition, beyond the development of abilities in creativity, and innovation there is a necessity to also sustain creative work with ideas. By concentrating more on the cultivation of *mini-c* and *little-c* activities, it shifts the focus away from the need to assess students simply on creativity and innovation in the colloquial sense. Specifically, when students are encouraged and aided in cultivating abilities in *mini-c*, they begin working towards leveraging more of their knowledge and makes them more resourceful and adaptable to contrasts between what they know and what they are learning.

Second, through the use of Knowledge Building students not only become more adept at creative thinking they also acquire the necessary competencies to make them sought after individuals in our knowledge economy. Furthermore, in combination with a shift toward more personal creative activities, Knowledge Building also aids and introduces sustained creative work with ideas. Unlike habitual social media use which centers around instant gratification; building knowledge, learning in a deeper manner, and creativity, requires sustained work. The better students are able to sustain threads of creative idea work, the more they develop their abilities with creativity and innovation.

Lastly, the more we understand how education can nurture creative work with ideas in students as they progress through school, the more they will have an impact on society as a whole. Creative knowledge work thus benefits society, enabling greater knowledge for public good to address novel, complex problems. Perhaps the greatest implication is the potential shift it could have on the role of students within education, especially in their agency towards solving problems impacting their own lives and the lives of others.

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