CONSTRUCTIVISM, CREATIVITY, AND PROJECT BASED LEARNING

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Introduction

Instructors in the 21st Century, especially those with younger audiences, are being forced to fight to remain relevant. In Behaviorism, learning has occurred when a correct response (c) is given after the presentation of a stimulus (a+b) (Ertmer & Newby, 1993). This does not work for a large percentage of learners in the 21st century. Many other theories in practice share the same problem – The answer is finite, and is readily available on Google and other Internet search engines. There is too much information available to learners at any given moment, leading them to expect the information to be delivered in sum nearly instantly, without much effort on their part. The problem, as nearly any instructor would tell you, is that there is no transfer; Learners are receiving information, but not processing it. They are dependent on the technology that provides the intel, but not the method from which the information was gained.

How then should instructors make learning meaningful and relevant for their learners? How can instructors engage the learners in the content, and inspire them to want to learn it? The revised edition of Bloom's Taxonomy of the Cognitive Domain lists Analysis (breaking material into different parts and determining how they relate to one another in structure and purpose through differentiation, organization, and attribution), Evaluation (making judgments on criteria and standards through checking and critiquing), and Creativity (designing and developing materials into a coherent and original product by generating, planning, and producing) as the top levels, in that order, of higher-level thinking (Krathwohl, 2002). If the ultimate goal is to promote and inspire creativity in learners, instructors must change their approach.

Literature Review

Constructivism

Constructivism is an educational learning theory, stating that learning is a *process* that occurs when knowledge and meaning are actively constructed from the learner's current and previous experience. "Humans *create* meaning as opposed to *acquiring* it" (Ertmer & Newby, 1993, p. 62). Learners interact with the environment, think for themselves, and act on their knowledge accordingly. In advanced levels of constructivist learning, the learners are able to distinguish correct and incorrect constructs in their mind, and discard if necessary. Instructors can then motivate students by piquing their curiosity, interesting the learners in exploring a topic more, enticing them to investigate and to learn for themselves, pulling their own learning together from multiple sources and different concepts, and encouraging the learners to make "meaning out of what they encounter" (Wilson, 2012, p. 45). In this way, the learning is more authentic, the process is more interesting, and the knowledge is more practical.

Driscoll (2005) details five learning conditions of Constructivism that are likely to bring about the goals of problem solving, reasoning, critical thinking, and the active and reflective use of knowledge. These are:

1. *Complex and relevant learning environments.* Learners have the opportunity to see or practice their skills in an authentic way, or in a real-world environment. While this can be extraordinarily challenging, it also adds an authenticity, a relevance, to their pursuit of a learning goal.
2. *Social negotiation.* Collaboration, or even depending on another learner for content outside ones own expertise/assignment, allows for the contribution of ideas that

may not have been discovered without a group's combined mental prowess. Social negotiation also allows for dissenting opinions to be aired, and individual perspectives to be challenged.

3. *Multiple perspectives and modes of learning.* While social negotiation can provide multiple perspectives, it can also be developed within a single learner. Viewing the same material in a different way/context is essential for advanced learning. One must be able to use the right lens to see the right answer. The ability to change focus and/or mode, can allow various aspects of learning to stand out.
4. *Ownership in learning.* The learners become agents of their own learning, and in-charge of their reception of knowledge (Gomez, 2010). The learner drives their research and progress with enthusiasm, motivation, and curiosity, propelling them toward their own definition of a goal of acceptable quality. Learners are not just listeners in a lecture, they become autonomous learners that are actively involved in the lessons. Web search engines become a tool for learning, rather than the provider of an answer.
5. *Self-Awareness of knowledge construction.* Students become aware of what they know, what they do not know, and what they need to know to accomplish a goal. When the learners understand how things affect what they understand to be true, they are able to explore various alternatives (Scientific Method: Hypothesize, Predict, Test, Analyze, and Interpret).

Constructivism allows for authenticity, comprehension, critical thinking, flexibility, ownership, reasoning, relevance, self-awareness, and creativity. In my opinion, these

skills all lead directly into Project Based Learning as an application of the Constructivist theory.

Project Based Learning

Project-Based Learning (PjBL, or sometimes PBL – though it gets confused with the similar Problem-Based Learning), in addition to being a hot topic and trend in the current education scene, is an authentic, motivational, and enjoyable tool for learners to use in the construction of knowledge where the purpose/goal guides the process (Roessingh and Chambers, 2011). By definition, a product is required as the end result of this style of learning. This product can be of any type, style, size, shape, or form, so long as the learners create it using their own ingenuity, knowledge, research, and trial/error. Learners can work on complex tasks by themselves, or in groups. The learning is nearly entirely self-directed, and the instructors serve as a facilitator of learning, like a coach (Gomez, 2010).

According to Blumenfeld, there are two essential parts of a project: There must be a question or a problem that drives and directs the inquiry and the activities of the project, and the activities have to produce a final product that answers the original question. The question/problem cannot be so constrained that there can only be one correct product. This would completely cut off the creativity of the learner in the duration of the project. This creativity is essential because if the instructor is to serve as a facilitator, the students must construct their own knowledge (Blumenfeld, 1991).

John W. Thomas goes a bit further in describing what a project must have in order to be an instance of Project Based Learning. He outlines five criteria:

1. *Centrality* – The projects are central to the curriculum, not exterior to the curriculum (enrichment projects are not considered PjBL).

2. *Driving Question* – The question/problem that the project is focused around must make a connection between the activities and the conceptual knowledge that the instructor/curriculum hopes to nurture.
3. *Constructive Investigations* – Learner's investigations may be through design, decision-making, problem solving, or general discovery, but it must involve inquiry, knowledge building/construction, and resolution of the question/premise.
4. *Autonomy* – The process must be learner centered and largely student driven.
5. *Realism* – The project must be authentic or simulate real-life challenges.

(Thomas, 2000)

PjBL requires that the instructor be competent in the subject at hand, an SME of sorts. Because the process itself is learner centered and flexible, it requires that the instructor be extremely familiar with the topic of interest, but also prepared for the wide variety of ways that the learners may approach and explore the subject. (Roessingh and Chambers, 2011). The instructor needs to create the opportunities for learning, support the learning through scaffolding the modeling/instruction, respond to questions about the vagueness of each project and guide the learners to stay on the right track, encourage them, assess the progress that is being made, provide feedback (along with diagnosing problems), and evaluate the final project (Blumenfeld, 1991).

Authenticity is a major factor in designing a good project idea for PjBL, affecting motivation. Learners will want to have some relevance, some idea of why they should be interested, why they should want to participate and explore this learning. Some key factors in authentic projects are: a real-world context; interaction among the learners; decision making in practical contexts; a value to life outside of school; and cross-curricular complex

questions (Strobel, 2012). Learners will need access to materials that will help them to understand and apply knowledge that is central to the project. They will need to build on previous learning in using skills, tools, and strategies during the project (Blumenfeld, 1991). By providing authentic issues to work through, the learners can access disciplined inquiry, construct their own knowledge, use higher-order thinking skills, explore concepts of interest to themselves, and work towards a goal (Strobel, 2012).

Application and Conclusion

Relevance of PBL

Project-Based Learning, through Constructivism, does what many theories of learning cannot. It allows the learner to take charge of their own learning, creating their own knowledge in a rigorous and relevant way. Projects support or even supplant the curriculum. PjBL has been shown through research to be effective when implemented properly, with student comprehension (not to mention attention, interest, motivation, and behavior) and test scores improving. The difficulty is exactly that though… implementing PjBL *effectively*. As this author can attest, it is extremely difficult, especially if the instructor is one that has been teaching in a different way for a long period of time. A PjBL project cannot be executed haphazardly. Significant time must be spent working on the planning on the project, and more than sufficient time must be allocated for the completion of the project. In my experience, the students will balk at first, seeming to be unsteady on their feet as they experience a new style of teaching and learning, then gradually gain confidence as they acclimate to the new learning style.

Impact on Learning

In my experience, creating a product is the best way to fully measure the learning of an individual. PjBL may encapsulate one's entire curriculum for a period of time, but the learning there is more authentic and happens at a deeper level than traditional teaching/assessment. Because of the learning experience that the participants had in creating their own learning, constructing their own project, investigating the questions that they developed through the work time, they remember every detail. In a project completed in my music classroom, my students may not be able to recite exact dates in a timeline of a composer's life, but they will be able to tell you all about him/her, and recognize and appreciate their music years later. Though PjBL has been around for a long time, the current resurgence of the methodology, along with the support of research/studies and the emphasis on learner-centered instruction, will allow for PjBL to gain more of a foothold.

Creativity

Rand Miller, the cofounder of Cyan, the company that made the popular computer game, *Myst*, was quoted as saying, "When we go through our creative process, we don't go into a white room with a white sheet of paper and close the windows. That's ridiculous. What we do is fill our minds with what other people have done. We put pictures on the walls. We look at magazines. We look at pictures of incredible places. We get inspired – and 'inspired' seems to mean bringing something out of something else, not out of nothing" (Tschang, 2006, p. 281). Inspiration, passion, and curiosity fuel a learner's desire to learn. Learners, whether they are adults or children, want to be challenged. The steps involved in constructing one's own learning, from remembering through creating (think Bloom's

Taxonomy), help to transfer the learning into long-term memory – the goal of all instruction.

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