Project-Based Learning in the Online Environment

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Abstract

Traditional education models – those that place the instructor at the center of the learning experience – do not allow students to fully develop the types of skills and thinking that they will need to be successful in the post-industrial, digital era (Watson, 2014). Therefore, this literature review examines a different type of teaching method called "project-based learning" (PjBL), which is a student-centered instructional model that promotes essential 21st century learner competencies such as critical thinking, group collaboration, creativity, reflection, and authentic presentation. To better understand PjBL, this literature review explores the work of researchers such as Wellen (2018), Chen and Yang (2019), Tamin and Grant (2013), Yiping and MacGregor (2004), and Ching and Hsu (2013) regarding what differentiates PjBL from other inquiry-based instructional approaches; the advantages and effectiveness of well-developed PjBL learning opportunities; as well as best practices and key considerations for designing and implementing PjBL in an online environment, to support learners' attainment of essential 21st century skills.

Project-Based Learning in the Online Environment

As learners change, so must the methods that instructors employ to convey the requisite skills, knowledge, and competencies students will need to be successful in the 21st century. The traditional model of the teacher at the center of learning is no longer effective at developing the types of skills and competencies required of students in the modern, digital era (Watson, 2014). Whereas, the "sage on the stage" method of teaching may have worked in the past to promote behaviors and knowledge that were desirable in the Industrial Age, as we continue to move through this new and highly technological era – one in which individuals need to be able to solve problems quickly, think critically, collaborate, and exude creativity – instructors will need to adopt more of a "guide on the side" approach in order for students to reach their full potential. This paper examines the findings of multiple researchers to define project-based learning (PjBL), discuss the advantages and effectiveness of the PjBL approach, and make recommendations regarding successful implementation of PjBL in the online environment.

Project-Based Learning: Defined

Project-based learning (PjBL) is founded in the theories of Jean Piaget and Lev Vygotsky (Wellen, 2018), as it utilizes constructivist learning principles. Key components of PjBL include a complex, and ideally real-world, question that drives learning; investigation; collaboration and discussion among peers; individual reflection upon and refinement of ideas; and student presentations of evidence and findings to a specified audience. According to Chen and Yang (2019), the primary difference between PjBL and other inquiry-based approaches is the inclusion of the word *project*, which is "an act of creation over time" (Lenz et al., 2015, as cited in Chen & Yang, 2019, p. 1).

Project-Based Learning: Effectiveness and Advantages

While PjBL was primarily implemented in the United States in site-based high school and college courses related to science and math in the late 20th and early 21st centuries, in more recent years its efficacy has proven beneficial for students of virtually all ages – preschool through university – and across subject areas, with the greatest effects being seen when utilized at least two hours per week for social sciences instruction (Chen & Yang, 2019). Furthermore, research from the previous two decades has demonstrated that project-based learning has several advantages over more traditional, teacher-centered instructional models, including what "Wolk (1994) describes . . . as an 'outlet for every student to experience success'. . . as a result of its potential to foster intrinsic motivation, and develop a range of abilities and skills" (Tamim & Grant, 2013, p. 3). Additionally, when teachers use PjBL, students' attitudes about learning and content improve considerably (Bender, 2012; Thomas, 2000; Tseng et al, 2013, as cited in Chen & Yang, 2019) and learners "develop metacognitive skills . . . such as self-regulation and -monitoring" (Thomas, 1998; Thomas et al., 1999, as cited in Chen & Yang, 2019, p. 2). Given that studies show participation in PjBL positively contributes to the development of the aforementioned key 21st century learning skills and competencies, alongside the fact that the effectiveness of PjBL increases significantly when combined with information technology support (Chen & Yang, 2019), the question becomes how can instructors in the digital age effectively design and implement PjBL in an online learning environment?

Project-Based Learning: Design and Implementation in Online Environments

PjBL Design

The research of Wang, et al. (2001) indicates that students who participate in online PjBL courses not only develop a deeper understanding of the content, but also "higher level problem-solving skills" due to increased opportunities for discussion and solution generation among group members (as cited in Yiping & MacGregor, 2004, pp. 4-5). However, according to Yiping (2004), designing an effective PjBL online course that promotes desired learner outcomes and behaviors is a complex process that requires instructors to consider multiple factors, including "…characteristics of learners, the instructor, the learning content, instructional goals, and the characteristics of the technology" (p. 5). Therefore, in order to account for and appropriately address these factors, a study by Koh, et al. (2010) suggests online educators adhere to four guiding principles when developing PjBL for the online environment: "1) (assign) students a design problem; 2) (structure) project milestones to facilitate knowledge construction; 3) (have) students articulate their learning through the development of learning artifacts; (and) 4) (facilitate) activities toward higher level learning" (as cited in Ching & Hsu, 2013, p. 2). Once learner needs, course content and objectives, acceptable evidence of mastery, and meaningful activities have been determined, instructors must then utilize best practices to effectively develop online PjBL learning opportunities.

PjBL Implementation

The effective online implementation of PjBL, first and foremost, depends on establishing an online learning community for the purpose of facilitating in-depth discussions among learners, furthering the development of a community of collaboration, sharing information, completing group work, creating social connections, and cooperatively resolving problems (Palloff & Pratt, 1999, as cited in Chang, 2009; Chang, 2009). As support for this assertion, Yiping's (2004) research indicates that online group collaboration has "…positive impacts on

group processes, group project performance, individual student learning, and confidence of complex problem solving…" (p. 14). Likewise, other studies have revealed that group collaboration helps "facilitate the social construction of meaning" (Hiltz, Fjermestad, & Lewis, 1999, as cited in Yiping & MacGregor, 2004, p. 5) and encourages "social and intellectual development" (De Simone, Lou, & Schmid, 2001; Rendon, 1994; Tinto, 1998, as cited in Yiping & MacGregor, 2004, p. 5).

Another critical component for fostering knowledge and skill acquisition, as well as maintaining student motivation in online PjBL courses is feedback, which can be provided either by an instructor or peers (Shute, 2008, as cited in Ching & Hsu, 2013; Ching & Hsu, 2013). In fact, "some research findings (have) suggested that feedback may be more important in online learning environments than in face-to-face learning environments" (Lynch, 2002, and Palloff & Pratt, 2001, as cited in Ching & Hsu, 2013, p. 3) and "that a more explicit feedback process is needed in online learning in order to achieve the levels of student learning experiences and the depth of learning similar to those in traditional learning environments" (Rovai, Ponton, Derrick, & Davis, 2006, as cited in Ching & Hsu, 2013, p. 3). Feedback, particularly when provided by classmates, also lends itself to the development of a more collaborative learning environment where students "…construct their knowledge through social exchange…" (Ching & Hsu, 2013, p. 3).

Conclusion

PjBL allows students to build the habits of thinking that are most critical to success in the 21st century. What learners are expected to know and be able to do, and the environments in which they learn those skills, has dramatically shifted. This is why it is incumbent upon educational institutions and instructors, particularly those that develop and deliver online

courses, to take the necessary steps to transform their practices, so students are able to develop

the knowledge and attitudes that will allow them to find purpose and success in the modern era.

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