Annotated Bibliography

Melissa Mullis

Vancouver Island University

OLTD 501

Professor: Mary O'Neill

October 21, 2018

OLTD 501 Annotated Bibliography

Critical Challenge Question: *How can an inquiry-based learning model be incorporated into online learning environments?*

Rationale

Creating an online course that focuses primarily on factual content knowledge and procedural knowledge seems fairly straightforward. In my work, I have often worried that these elements take up too much space within our online courses, thereby not reflecting the shift in our new BC curriculum toward competency-based education and personalization of learning. I would like to know how I can best revise or recreate the online component of my blended learning program using an inquiry-based learning model to better support the development of both curricular competencies as well as the overarching core competencies and support the personalization of learning in a way that is realistically manageable as a teacher.

Annotated Bibliography

Doss, K. K. (n.d.). Providing Opportunities for Flow Experiences and Creative Problem-Solving Through Inquiry-based Instruction, 15.

This article outlines the findings of an action research project in which the student perceptions and responses to an inquiry project were evaluated by instructors over the course of thirteen weeks in an eighth-grade honours language arts class. The literature review component of this paper outlines the tenets of inquiry-based instruction and similar formats such as problem-based and project-based learning, pointing to these methods as strategies for creating authentic learning environments in which students develop research skills, problem-solving skills, creative thinking and decision-making skills, and providing differentiation for students. When utilizing an inquiry-based

approach, students can connect with their teachers and obtain feedback through the use of individual conferences, emails, and students self-assessments, and instruction may be provided using whole group mini-lessons developed in response to the students' needs throughout the inquiry process. The four stages of the creative process noted by Wallas (1926); preparation, incubation, illumination and verification; are described as a reference for teachers when facilitating inquiry-based learning experiences. A key potential in a well-designed learning environment is for the students to become intrinsically motivated. Through ongoing interviews during the course of this study, students involved in the inquiry-based learning projects described being highly engaged through opportunities for choice and room for creativity in their learning. Overall, this study supports the inclusion of inquiry-based instruction to support students in the development of problem-solving skills. The conclusions could also be used to support inquiry-based instruction as a means to support students in the development of the core competencies outlined in the revised BC curriculum, including critical thinking, creative thinking, communication, personal and cultural identity, personal awareness and responsibility, and social responsibility. While this particular study took place within a bricks and mortar classroom setting, the strategies used may also provide some sense of direction and support for the application of an inquiry-based model in online classes.

Kam, R., & Hoop, B. (2013). Facilitating Inquiry-Based Science Learning Online in a Virtual University. *Higher Learning Research Communications*, *3*(2), 79. https://doi.org/10.18870/hlrc.v3i2.100

The authors of this paper provide an overview of an online graduate-level course for practicing teachers enrolled in a Master of Science in Education degree program that

followed a guided-inquiry approach that they facilitated. Based upon their own research, the authors promote authentic practices through activity, thinking and doing, and social interaction. During the course students conducted hands-on science investigations, designed and delivered a sample lesson, and participated in online discussion forums, facilitated by the instructors, to discuss the significance of their findings. To promote what they call "interaction-engagement", the instructors' role was to "scaffold the participants' learning by posing questions, probing, prompting, highlighting discrepancies and stimulating further thinking" (Kam & Hoop, 2013). The authors found that the active participation of the students in the facilitated discussion board conversations demonstrated effective collaboration and provided evidence of the pedagogical merit of their guided, hands-on inquiry-based approach. The findings of this paper are limited in scope, and a more thorough investigation with broader evidence base would be needed to substantiate the claims.

Miller, K. W. (2008). Teaching Science Methods Online: Myths about Inquiry-based Online Learning, *17*(2), 7.

The authors of this article are working from the perspective that an emphasis on inquiry-based learning, problem-solving and knowledge application is considered the pedagogical goal in order to meet the national and state standards for science. This study investigates the issue of maintaining pedagogical integrity of science instruction in an online delivery platform by addressing six myths about inquiry-based online science delivery. In addressing six myths, the authors find that online instruction requires instructors to re-think the methods that may be used in a face to face format and consider ePedagogy, including the need for the online instruction to be well-planned out in advance and

reflective. Online courses are not the same as traditional correspondence courses, but they can be designed to simulate inquiry approaches and constructivist teaching methods. Online courses designed in this manner would include more in-depth instructor feedback and peer-to-peer discussions and feedback. The increased time required by the instructor to support such a feedback loop necessitates a limit be placed on the number of students in a given course. The authors also state that constructivist inquiry teaching strategies can be modeled online. One method is to use a combination of video segments breaking down the inquiry steps and then having students respond in online discussion forums as a strategy to support concept development, followed up by a student assignment to apply the knowledge. Use of online discussions can create strong interactions and collaboration, particularly when valued and reflected in the course grading. Field experiences can also be integrated to expand the community of learners and strengthen learning outcomes. This article focuses on online course delivery to promote the development of National and State standards for science instruction in pre-service teachers, however some of the findings are still relevant in terms of strategies to implement inquiry-based learning in online K-12 settings as well.

Murray, J., Lachowsky, N. J., & Green, N. (2017). Enquiry-Based Learning Online: Course Development and Student Experience of a First-Year Enquiry-Based Learning Seminar. *Collected Essays on Learning and Teaching*, *10*, 129. https://doi.org/10.22329/celt.v10i0.4738

This article shares a reflective conversation between two developers and a student participant of an online first-year university student seminar, which, for the developers, was a pedagogical experiment to apply their enquiry-based pedagogy within an online

format. A challenge of developing an online course using enquiry-based learning (EBL) was how to best structure the course given that enquiry-based learning does not fit with ordered units of contents or a set number of assignments, and in order to reinforce the role of the instructor as a non-hierarchical, integrated member of the learning groups. The course creators developed a diagram mapping out the process of EBL: analyze, group processing, research, present, integrate, ask, group processing. These elements are shown to be part of a cyclical process. This model and a video demonstrating the application of this process in a face-to-face scenario became the supporting tools for the course creation, and also used to inform the learners of the EBL process at the beginning of the online program. Technology tools were then selected to support the EBL pedagogy and that were thought to be supportive of high-level interaction amongst the instructor and the students. A learning management system, Desire2Learn, was selected to create a space for asynchronous discussion, while a wiki, Wikispaces, was also selected to provide a more flexible framework for more synchronous interaction. Attention was paid at the beginning of the course to use a discussion forum to help build group rapport and support increased engagement in the ongoing discussions. The seminar followed a process-oriented approach in which the students focused on developing analysis, research and integration skills. Overall, the authors believe that the online course format was successful in achieving an enquiry-based learning model and led to student success. The process of developing the course as a team allowed for the creators to view and accommodate different perspectives and utilize different expertise. The descriptive, qualitative nature of this article makes it of use in my inquiry as it presents some of the thought processes behind the development of

an enquiry-based online course and makes clear connections to the pedagogy of inquiry-based learning in a more traditional format.

Ng, W., & Angstmann, E. (2017). Promoting Physics Literacy through Enquiry-based Learning Online. *Journal of Education in Science, Environment and Health*, 183–183. https://doi.org/10.21891/jeseh.326750

This article presents research on an online, undergraduate University level inquiry-based Physics course and its impact on student's learning experiences. Online introductory Physics courses are an opportunity to reach out to a greater number of students, and the author is researching the design implications for a course that provides both rigour and motivation for student completion. An online introductory Physics course created and implemented using a social-constructivist learning design, and based on inquiry-based theories of learning, with each element described and supported by research within this article. This body of research will be a resource worth deeper investigation to gain further insights into elements to be considered when developing an inquiry-based online learning program. Questions based on the Physics concepts to be studied, and within familiar, everyday contexts, were posed, instructional videos were used, consisting of three components: lecture, demonstrations, and quantitative examples, and synchronous discussions were included as a method of collaborative learning. Research was then undertaken to investigate the impact of this course design on students' learning by way of a student questionnaire. The results found indicate that this pedagogical structure was effective for students. Students found the instructional format useful, and the online discussion postings helpful for their learning. The students also indicated that they were able to be actively learning within this course format. Motivating features of the course

design were shown to be relevance, a challenge, the ability to be self-directed, and opportunities to collaborate.

Conclusion

There are some similar themes that have emerged from these five articles, indicating some key elements to be considered when incorporating an inquiry-based instructional model into an online learning environment. Communication and collaboration were discussed in each article. It is clear that developing a system for ongoing feedback and communication among the teacher and learners, as well as among the learners themselves, is a key strategy to focus on. The instructor's role is illustrated as a facilitator of communication and collaboration, and as a guide through the learning process. The need to carefully consider the best technology tools also emerged from these readings. Multiple technologies may be needed in order to provide for both an asynchronous discussion environment as well as instructional components based on content and demonstrating the learning process for students, and for synchronous environments to support student collaboration. Authentic, activity-based assignments or projects were also discussed to support the development of research skills, problem solving skills, and creative thinking. While most of these articles focused on university level courses, the core components of the inquiry-based learning process remain similar, which will allow for the findings to be generalized for use across a broader range of grade levels. The grade level of the students however would have some additional implications for the structure and delivery methods of the online course.

This first foray into research on this topic has demonstrated the need for me to more deeply investigate inquiry-based learning in order to develop a better conceptual understanding of this pedagogical model and use these findings as an anchor when further researching how to

then implement inquiry-based learning in an online environment. This will help to provide me with additional specific search terms that may support more comprehensive findings.