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BOOK REVIEW

Inquiry-Based Learning for Faculty and Institutional Development: A Conceptual and Practical Resource for Educators

Suha R. Tamim (University of South Carolina)

Blessinger, P., & Carfora, J. M. (Eds.). (2014). *Inquiry-based learning for faculty and institutional development: A conceptual and practical resource for educators*. Bingley, UK: Emerald Group Publishing Limited. 300 pp. ISBN 978-1-78441-235-7. \$75.00 (hardcover).

In *Inquiry-Based Learning for Faculty and Institutional Development: A Conceptual and Practical Resource for Educators*, editors Blessinger and Carfora (2014) present to readers a collection of case studies, empirical research, and perspectives on inquiry-based learning (IBL). Through a variety of research methods, the empirical evidence presented in the book not only supports IBL quantitatively, but also allows readers to take a holistic look at the dynamics that take place in IBL environments. Furthermore, the models and course design suggestions discussed in several chapters bring IBL insights regarding the inquiry process, collaboration, assessment, and authentic interdisciplinary experiences. Another important aspect of the book is the discussion of IBL implementation in a wide spectrum of settings. Readers can explore possibilities and challenges of integrating IBL in K–12 schools, higher education, and teachers' professional development (PD) within formal and informal settings. As such, this book is a valuable resource for educators in their roles as teachers, administrators, or researchers. It provides them with IBL strategies to explore, adapt, adopt, and investigate.

The book is divided in two parts: "Part I: Concepts and Principles" and "Part II: Practices and Strategies." Part I contains an introductory chapter by the editors, two chapters proposing models for collaboration in IBL, and a literature review chapter on inquiry in International Baccalaureate (IB) programs. Part II contains sixteen chapters on IBL practices and strategies in different learning environments. A brief summary of each chapter is presented below.

Part I: Concepts and Principles

In their introductory chapter, "Innovative Approaches in Teaching and Learning; An Introduction to Inquiry-Based Learning for Faculty and Institutional Development," Blessinger and Carfora discuss the benefits of IBL and portray its practices as enhancing a culture of learning-centered teaching and student-centered learning as well as transforming instructors into "instructional leader[s] and learning architect[s]" (p. 8). They dedicate a section of their introduction to frame IBL in the "constructivist-based educational philosophy" (p. 11).

In chapter 2, "A Theoretical Model of Collaborative Inquiry-Based Group Development Process," Wong-Mingji and Wong analyze reflections generated from a group of educators collaborating on integrating technology innovations in the classroom. Using grounded theory, they propose a theoretical model for the development process of collaborative inquiry-based groups to strengthen their success and sustainability. Specifically, they describe a model consisting of three interactive components: (1) generative social capital, which enhances the sense of community; (2) relational learning, which develops feedback, support, and reflective practices; and (3) sustainability of collaboration, which creates meaningful professional development and pedagogical paradigm shifts. The authors conclude that teachers asked to transform their teaching to a student-centered approach would benefit from professional development within a group of diverse professional peers.

In chapter 3, “Strategies for Transforming and Extending Inquiry-Based Teaching and Learning: Placers—A New Model for Transformative Engagement and Educator Collaboration,” Greene-Clemons and Daniels suggest another model for interdisciplinary collaboration of teaching and learning, PLACERS: plan the experience, create the motivation, engage in the work, reflect on the work, and share and celebrate the work. They use Kolb’s Theory of Experiential Learning (1984) to contextualize IBL in interdisciplinary service learning, transforming the role of learners and placing them in the forefront of the learning process. The authors argue that using PLACERS with collaborative service-learning projects reinforces development of content knowledge and skills and supports transformational learning, as is evident from students’ reflective journals.

In chapter 4, “The International Baccalaureate: Contributing to the Use of Inquiry in Higher Education,” Chichekian and Shore conduct a review of the literature aimed at reflecting the scarcity of research on inquiry in the International Baccalaureate (IB) programs. They categorize their findings according to the three cycles of inquiry described by Shore, Chichekian, Syer, Aulls, and Frederikson (2012): planning, enactment, and reflection. Accordingly, they report that IB research primarily covers subjects associated with planning, with less emphasis given to enactment and reflection. On planning, they find a great deal of variability in the perceptions of inquiry tasks for both students and teachers, in addition to concerns about student performance on IB examinations. On enactment, they find students needing better teacher and peer support, and on reflection, they note that the time dedicated was short. The authors conclude that more research is needed on the three components of inquiry-based instruction and state that the IB objective of inquiry is challenged by the emphasis on academic achievement and validation of teacher effectiveness.

Part II: Practices and Strategies

As noted earlier, Part II consists of sixteen chapters that discuss IBL practices and strategies in different learning environments. A brief summary of each chapter is presented below.

In chapter 5, “Reframing Relationships Between Teachers, Students, and Curriculum—The Phenomenon of ‘Hybridization’ in IBL,” Leat, Thomas, and Reid argue that when the pressure imposed on schools to perform well on standardized tests hinders teachers from integrating IBL to its fullest, integrating partial characteristics of it can be beneficial. Describing three schools’ projects in England using these “hybrid” forms of IBL” (p. 103), they report development of students’ self-regulation skills, fostering relationships with

each other and with members of the community, and positive changes in the identities and roles of both students and teachers with some confusion caused by the role changes. They conclude by advocating support for teachers and schools on such initiatives.

In chapter 6, “Ways of Inquiry: The Distinctiveness of the Oxford College General Education Program,” Oxford College professors Galle, Harmon, DeNicola, and Bridgette focus on assessment as they share the IBL approach they use in their courses. Their approach is part of an initiative at Oxford College called “Ways of Inquiry,” defined as “attention to disciplinary ways of knowing, active questioning, and experiential learning techniques that ask the student to dialectically engage in the learning process” (p. 122). The authors describe in detail the inquiry process as well as the outcomes assessed. From presenting chemistry experiment results in scientific paper formats, to interpreting short stories, conducting anthropological research, and writing responses to visual clues with service-learning components, these professors are able to assess acquisition of content, critical thinking skills, complexity of question-making skills, ability to use theories to analyze life experiences, and development of metacognitive skills. They all report positive findings such as proficiency in reasoning, ability to create divergent “multivariable” (p. 132) research questions, high levels of learning, and student empowerment. Interestingly, these professors report benefiting from their IBL approach through reflecting on their own teaching practices, and modeling and using IBL “habits of the mind” (p. 123). This suggests that IBL may be a way to support the enhancement of teaching as well as learning.

In chapter 7, “Targeting Students’ Epistemologies: Instructional and Assessment Challenges to Inquiry-Based Science Education,” Renken, Carrion, and Litoski look at students’ skills in IBL from a different angle. Arguing that learners’ epistemologies should also be targeted and assessed in IBL environments, they collect post-intervention assessment data on the understanding of the nature of science from a middle school IBL case. Contrary to their expectations, the data does not show significant results between students participating in the IBL activity and a comparison group. They explain that factors such as inadequate scaffolding and the students’ limited abilities and motivation could be behind the lack of the development of a sophisticated learner epistemology. Consequently, they recommend exposing students to explicit instruction on epistemology and collecting pretest data to measure change.

In chapter 8, “Strategies for Embedding Inquiry-Based Teaching and Learning in Botanic Gardens: Evidence From the INQUIRE Project,” Reagan and colleagues share the results of a qualitative evaluation of the INQUIRE Project, a

3-year project consisting of professional development courses for teachers, which introduced them to the integration of inquiry-based science education (ISBE) in formal and informal settings. Combining teaching, self-study, development of ISBE activities, and production of portfolios, the training exposed teachers to the nature of investigative work with hands-on experiments in botanical gardens (the informal learning setting). Teachers showed positive reactions to the PD course and an increase in their science knowledge and ISBE practice, and viewed the potential of botanical gardens as learning sites. Interestingly, the botanic gardens also instituted changes to better accommodate educational programs. The authors argue that their findings support the case of ISBE outside classroom settings, specifically botanic gardens.

In chapter 9, "Representation Construction: A Directed Inquiry Pedagogy for Science Education," Hubber discusses a theoretically grounded, inquiry-based learning approach to science called representation construction, consisting of "sequences of representational challenges which involve students constructing representations to actively explore and make claims about phenomena" (p. 203). Studying middle school science teachers' practices and students' activities and discussions in relation to representation construction, the research team identified key enablers to facilitate professional development of teachers in this regard. Accordingly, the PD program had teachers play the role of learners in representation construction, followed by discussions on the efficacy of such an approach and collaboration and sharing of classroom practices. Teachers reported a change in their classroom practices and appreciation of the collaborative nature of the PD. Hubber affirms that "the [representation construction] approach maps well with the creative processes in which scientists explore nature and construct new knowledge" (p. 217), emphasizing the need to shift science teaching from teaching content to a more active involvement in learning.

In chapter 10, "The Graduation Project: A Cross-Disciplinary Inquiry-Based Capstone in Arts," Funston and Lee discuss the benefits of designing inquiry-based capstone projects to prepare students for real-life work environments. They describe the activities of the Graduating Project, a two-semester course required by the Bachelor of Arts students at the Victoria University in Australia. Using the IBL framework, the course aims at enhancing collaborative work and producing high quality outcomes, while also developing disciplinary knowledge and skills, students' independence, and confidence. The curriculum starts with a guided inquiry process evolving into a less formal environment of self and team management. Assessment is based on students' thinking process, documentation, justification of decision making, and products. Students have shown 100% satisfaction with the

learning experience, 90% successful completion rate, personal growth, and an appreciation for their own capabilities. The authors conclude that designing the capstone project through IBL allows students "to manage their own learning" (p. 238) and to develop "a personal and professional identity" (p. 239).

In chapter 11, "Creating an 'Emporium of Wonder' at Manchester University," Munro and Chalk argue that museums provide informal learning environments that support multiple opportunities for constructivist inquiry-based learning. They describe the refurbishing of one floor of Manchester Museum located in the University of Manchester South Campus, a floor named "The Study" and designated for harnessing individual research potentials. A content development team was tasked with integrating IBL principles into a "physical learning space that may be un-facilitated for large parts of the day" (p. 256). The team first identified a set of values for learning: "personalized, multisensory, exploratory, collaborative, imaginative, and dialogic" (p. 256). Second, it identified themes that structure the visitor's experience: wonder, discover, feel, make, share, and connect. Third, the team determined that research could fall within a spectrum ranging from formal to informal. With content development of values, themes, and research, the vision for the study was established where "visitors... become researchers" (p. 265) and inquiry-based learning extends to public spaces.

In chapter 12, "Engaging Students in Scientific Inquiry: Success and Challenges of Engaging Non-Science Majors in Scientific Inquiry," Patchen, DeBay, Barnett, and Strauss describe their experience in trying to "engage students in a large, introductory science course for non-majors in a scientific, inquiry-based process" (p. 273). They argue that in such courses students lack motivation and inquiry skills, especially with the little time given for the investigative process. Surveys, classroom observations, and a review of student laboratory notebooks were analyzed for two laboratories, one following a guided inquiry approach and the other an open-ended inquiry approach. The authors found that students were more comfortable with the guided inquiry and were concerned about answering questions correctly more than engaging in the uncertainty of scientific inquiry. Subsequently, they recommend that inquiry-based learning necessitate scaffolding and guidance all semester long for non-science major students in addition to longer engagement to help students carry out deep inquiry.

In chapter 13, "Might Negatrons and Collective Knitting: Academic Educators' Experience of Collaborative Inquiry-Based Learning," Prowse uses a reflective storytelling method to describe the perceptions of participants in a collaborative inquiry staff development program in a university in north-west England. The program aimed at helping staff improve the design of IBL activities for their classes. Prowse focuses

on the affective aspect, observing tensions around assessment. Group dynamics is another focus of her reflections. Specifically, she observes an appreciation of the social aspect of group work, although groups with a clear focus on task and process enjoy more positive experiences. Overall, all participants reported positive experiences and were willing to implement IBL in their classes. Prowse does not neglect to add her own reflections on her role as the IBL facilitator, noting the ambiguity that comes with the position. By focusing on the affective aspect, Prowse is able to document the interplay between the implementation and practice of IBL and the emotional journey that goes with it.

In chapter 14, “How to Scale Inquiry-Based Teaching and Learning Through Progressive Faculty Development,” Miller discusses how challenges facing both faculty and students affect their readiness toward inquiry-based teaching. She uses the deoxyribonucleic acid (DNA) double helix to exemplify the dichotomy between inquiry-based teaching and student-centered approaches. Miller argues that the shift to inquiry-based teaching happens as teachers become more efficient in designing IBL, which results in students developing better self-directed skills. Furthermore, she emphasizes the importance of formulating the right questions that scaffolds students and moves them from guided to structured and self-directed inquiry.

In chapter 15, “Inquiry-Based Service Learning in a University-Based Educational Leadership Program: Service Leadership and Internship in Principal Fellowship Program,” Reardon proposes effective internships to answer to critiques of ineffective educational leadership programs. He proposes internships that situate learners in service learning and allow them to work side by side with mentors in IBL environments. Findings from six service learning inquiry-based projects developed for the North Carolina Department of Education’s Principal Fellows Program showed that students became proactive, resolved in the face of obstacles, willing to implement change, aware of the importance and utility of data and the complexity of school leadership, and appreciative of the effectiveness of building positive relationships. Reardon concludes that integrating IBL in service learning allows prospective educational leaders to become aware of their own agency and develop an appreciation of their future careers.

In chapter 16, “Confident Voices: How Professional Development for Teachers by Teachers Using Video Promotes Inquiry-Based Practice,” Edgcomb, Morris, and McConaughay assert that inquiry-based learning is not always evident in STEM classroom practices. They argue that pre-service teacher preparation usually hinders the transfer of effective STEM teaching practice. Furthermore, they contend that using videos of effective classroom practices in STEM education and making IBL more visible would be a good

developmental tool in pre-service teacher training. For this purpose, they conducted a qualitative study focused on six K–12 in-service teachers who made videos to exemplify their inquiry-based teaching practices. The findings revealed that video production allowed these teachers to reflect on their practices at a deeper level and encouraged them to play a more active role in their community of practice. They conclude that the video production process is a “powerful agent of change” (p. 372) for the teachers making the videos in addition to providing materials to reinforce IBL training in PD.

In chapter 17, “Tools of Engagement Project (TOEP): Online Professional Development Through Structured Inquiry and Virtual Community,” Sullivan and colleagues describe the experience of 300 faculty and staff who met virtually to identify and master Web 2.0 tools. The TOEP aimed to expose faculty to emerging technologies through an inquiry-based learning approach. Using discovery activities, a Google+ community for sharing and networking, and badges to motivate participants and help them track their progress, the authors found that combining a structured on-demand, IBL model with social networking, peer mentoring, and achievement awards is a promising model for assisting faculty in gaining expertise on the Web 2.0 technologies.

In chapter 18, “Lessons From the Field: Using Inquiry-Based Learning for Study Abroad Programming,” Sindt and Lucas state that study abroad programs present a unique opportunity to equip students with problem-solving skills and intercultural abilities in order to succeed in the global nature of today’s work environment. However, they argue for the need to design study abroad programs that incorporate experiential and inquiry-based learning. They also note, however, that faculty and students need to adjust to this paradigm shift and develop an understanding of roles and expectations. They propose three key elements to engage students in the learning process and to help them develop problem-solving, creative, and critical thinking skills: students’ reflection, assignments aligned with learning outcomes, and faculty development. Sindt and Lucas argue that such changes create learning and teaching environments that meet students’ needs and prepare them for the “global workplace and life beyond academe” (p. 415).

In chapter 19, “Understanding the Use of Technology for Facilitating Inquiry-Based Learning,” Hoffman and Leafstedt present four case studies that exemplify how technology integration in online and face-to-face courses provides “natural linkages to inquiry-based learning” (p. 421). The technology integration strategies embedded in these case studies had students find, understand, and apply information. Students collaborated on presentations through Google presentations; researched and applied their knowledge to virtual discussions boards, Google documents, or

VoiceThread presentations; and curated searches through Scoop.It! The use of technology enabled students to reflect on their work through the time and space provided. As a result, the students gained a stronger understanding of the materials, and acquired media literacy, critical thinking, research, and evaluative skills. In complementing the earlier chapters, it appears the introduction of technology plays a considerable role in enhancing IBL experiences.

In chapter 20, “Supporting Equality of Education Through Inquiry-Based Learning,” O’Shea and Young propose IBL as an approach toward education equality in higher education. Additionally, they argue that IBL provides “diverse and flexible levels of challenges to promote educational growth across a variety of populations” (p. 457). They describe undergraduate interventions through which students engage in inquiry-based learning at Florida State University, such as embedding research-based opportunities for large classes through the use of graduate research consultants; involving students as research assistants to faculty and graduate students at a co-curricular level; or connecting students with organizations in developing countries to complete a two-month minimum summer internship. Through such practices, the authors assert that equality in education could be reinforced and offered to students through “a wide range of cost and scalability” (p. 457). In addition, they contend that universities can take a “scaffolding approach” (p. 457) to embed IBL across the curriculum.

The summaries presented above only show snippets of the thorough work invested by the authors in all chapters. Alongside the empirical evidence presented and models proposed, each chapter covers an extensive review of literature on IBL, leaving the reader well informed about its facets, the interplay between its components, and the different terminology used in its discourse. In addition, by framing their IBL strategies in other learning and teaching models, the authors do an excellent job in examining connections to IBL and further enriching the reader’s experience. For example, Greene-Clemons and Daniels (chapter 3) discuss Transformational Teaching and Learning (Mezirow, 1997); Leat and colleagues (chapter 5) refer to Bernstein’s (1975) concepts of classification and framing in convergent and divergent pedagogy; Readron (chapter 15) uses Zambo’s (2013) elbow training for reconceptualizing internships; and both Greene-Clemons and Daniels (chapter 3) and Sindt and Lucas (chapter 18) refer to Kolb’s Theory of Experiential Learning (1984). However, not all research chapters show clear methods of data collection or analysis, leaving unanswered questions about the process.

Though the selection of chapters is broad and rich, its wide-ranging content can overwhelm the reader. Providing certain framing and categorization could clarify the connections between them—especially with the absence of a common

definition of inquiry, its interpretation, and its implementation (Cuevas, Lee, Hart, & Deaktor, 2005). For example, Bell, Urhahne, Schanze, and Ploetzner (2010) discuss three difficulties in defining inquiry-based learning: (1) inquiry can address different entities, physical and non-physical; (2) inquiry activities vary in specificity; and (3) IBL overlaps with other instruction models such as project-based learning and problem-based learning. Moreover, they identify nine categories of the inquiry process used variably in the literature: orientation and asking questions, hypothesis generation, planning, investigation, analysis and interpretation, model, conclusion and evaluation, communication, and prediction. Additionally, IBL, as any other model, is characterized by the dichotomy between teaching and learning as Miller describes in chapter 14. As a result and as evident in the chapters, IBL topics range from professional development, teaching practices, course design, technology integration, and student outcomes. Furthermore, IBL can also be implemented in versatile contexts, such as K–12 settings, higher education, and informal settings. With such an extended landscape of IBL research and practice, a clear categorization of the chapters could help readers navigate them with more ease.

Overall, this book is an excellent resource for educators that provides an overview of several IBL integration possibilities. Likewise, the book is an excellent resource for scholars, providing an in-depth review of IBL research and related theoretical frameworks.

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