Inquiry-Based Learning for Multidisciplinary Programs

A Conceptual and Practical Resource for Educators

EDITED BY Patrick Blessinger and John M Carfora
INQUIRY-BASED LEARNING FOR MULTIDISCIPLINARY PROGRAMS: A CONCEPTUAL AND PRACTICAL RESOURCE FOR EDUCATORS
INNOVATIONS IN HIGHER EDUCATION TEACHING AND LEARNING

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INNOVATIONS IN HIGHER EDUCATION TEACHING AND LEARNING VOLUME 3

INQUIRY-BASED LEARNING FOR MULTIDISCIPLINARY PROGRAMS: A CONCEPTUAL AND PRACTICAL RESOURCE FOR EDUCATORS

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Created in partnership with the International Higher Education Teaching and Learning Association

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SERIES EDITOR’S INTRODUCTION

The purpose of this series is to publish current research and scholarship on innovative teaching and learning practices in higher education. The series is developed around the premise that teaching and learning is more effective when instructors and students are actively and meaningfully engaged in the teaching-learning process.

The main objectives of this series are to:

1. present how innovative teaching and learning practices are being used in higher education institutions around the world across a wide variety of disciplines and countries,
2. present the latest models, theories, concepts, paradigms, and frameworks that educators should consider when adopting, implementing, assessing, and evaluating innovative teaching and learning practices, and
3. consider the implications of theory and practice on policy, strategy, and leadership.

This series will appeal to anyone in higher education who is involved in the teaching and learning process from any discipline, institutional type, or nationality. The volumes in this series will focus on a variety of authentic case studies and other empirical research that illustrates how educators from around the world are using innovative approaches to create more effective and meaningful learning environments.

Innovation teaching and learning is any approach, strategy, method, practice, or means that has been shown to improve, enhance, or transform the teaching-learning environment. Innovation involves doing things differently or in a novel way in order to improve outcomes. In short, Innovation is positive change. With respect to teaching and learning, innovation is the implementation of new or improved educational practices that result in improved educational and learning outcomes. This innovation can be any positive change related to teaching, curriculum, assessment, technology, or other tools, programs, policies, or processes that leads to improved educational and learning outcomes. Innovation can occur in institutional
development, program development, professional development, or learning development.

The volumes in this series will not only highlight the benefits and theoretical frameworks of such innovations through authentic case studies and other empirical research but also look at the challenges and contexts associated with implementing and assessing innovative teaching and learning practices. The volumes represent all disciplines from a wide range of national, cultural, and organizational contexts. The volumes in this series will explore a wide variety of teaching and learning topics such as active learning, integrative learning, transformative learning, inquiry-based learning, problem-based learning, meaningful learning, blended learning, creative learning, experiential learning, lifelong and lifewide learning, global learning, learning assessment and analytics, student research, faculty and student learning communities, as well as other topics.

This series brings together distinguished scholars and educational practitioners from around the world to disseminate the latest knowledge on innovative teaching and learning scholarship and practices. The authors offer a range of disciplinary perspectives from different cultural contexts. This series provides a unique and valuable resource for instructors, administrators, and anyone interested in improving and transforming teaching and learning.

Patrick Blessinger
Founder and Executive Director,
International HETL Association
FOREWORD

It gives me great pleasure to write the Foreword for the third volume of Inquiry-Based Learning. As an educator, this topic has always been dear to my heart. It is a topic that is meaningful because this process of learning encourages higher level thinking processes for all learners at any level of study — thinking skills that are needed by all, for the 21st century. Inquiry is not a “method” of doing mathematics, science, literacy, or other subjects. Inquiry-based learning is an approach to tentatively explore, investigate, and discover answers to formulated questions. As Wells (1999) stated, equally important in an inquiry approach is that answers to questions are taken seriously and are investigated rigorously, as the circumstances permit.

In this volume, you will read about successful implementation of elements of inquiry that may be integrated in a variety of learning settings. I would suggest that as you read this volume you consider what inquiry should look like when the approach is used in your own educational setting.

As an educator, professor, teacher, and consultant, I continue to provide professional development for teachers and administrators that integrate the following inquiry components: (1) tap into the learners’ prior knowledge, (2) integrate collaborative work and hands-on experiences using materials, (3) follow the problem-solving process and strategies, (4) accept multiple solutions to problems, (5) encourage high-level thinking through open-ended situations, (6) create conversations around solving problems, and (7) reflect on ideas both in discussion and in writing (Cozza & Bonekemper, 2007). Unfortunately, I have found that an inquiry lesson is often falsely represented with teachers only focusing on asking students to perform hands-on tasks. I have also witnessed that inquiry is not usually an agenda to be integrated into an administrator’s vision action plan. What the reader should realize is that inquiry is not an all or nothing process. Like most instructional practices, it manifests itself along a continuum that shifts according to time, place, and circumstance (Audet, 2005) based on the influence of lesson topic and task, learning environment, and a student’s experiences.

Some factors to consider in an inquiry model are the following: the level of inquiry is based on the relative amounts of student versus teacher control
over an activity, and that the inquiry process skills are developmental in nature. Based on my experiences, choosing the inquiry model in a lesson should be influenced by the topic of study, age level of the learner, amount of experience of the learner, and the nature of the task. It is important to note that merging inquiry into programs should be a gradual process over-time. Teachers and students need to gain an understanding of just what inquiry looks like during a slow release of control over classroom events.

An important framework to consider for a continuum of inquiry learning from grades pk-16 includes the following elements: students at all levels should progress through a cycle from questioning and hypothesizing to data collection, analysis, application, synthesis, and evaluation. How do teachers sequence instruction when using the framework? Although teachers’ approaches vary, a three series sequence of student performance occurs: messing around with materials, guided inquiry (Ritchart, Stone Wiske, Buchovecky, & Hetland, 1998), problem solving, and metacognitive applications (Cozza & Oreshkina, 2013). Teachers build on students’ prior experiences with initial explorations of central questions, materials, and issues about a topic. For example, in a science electricity class, third graders brainstorm and hypothesize just how lights turn on and off considering materials such as a light bulb, electrical wire, and a battery. During guided inquiry, small collaborative groups solve problem and use the materials to test how a bulb lights. Students record through drawings which diagram lights a bulb and which does not. The students explore, investigate, question, synthesize ideas and draw conclusions. As a culminating task, students become metacognitive and reflect on the investigation to understand just how they met the lesson goals. The inquiry process moves the learners’ performances from simple to complex thinking tasks, from structured to more open-ended activities, and from collaborative to more independent evaluations. This is the inquiry process that should be included in school vision plans, integrated into professional development programs for educators, and connected to all pk-16 classrooms.

Inquiry is the practice of extracting meaning from experience (Audet, 2005) and it is a habit that integrates naturally in the teaching and learning processes. High-level thinking skills (skills required for the 21st century) are interwoven through all inquiry endeavors. What I suggest is that readers of this volume consider the concepts presented and reflect on how such factors might influence and become meaningful for your own performance as a professional.

Barbara Cozza
REFERENCES


PART I
CONCEPTS AND PRINCIPLES