The Impact of Instructional Design Methodology on Achievement in Alternative Course Delivery Formats: Two Field Evaluations

Drew Parker
Faculty of Business Administration
parker@sfu.ca

Cher Hill
Faculty of Education
chill@sfu.ca

Simon Fraser University
8888 University Drive
Burnaby, British Columbia
Canada V4A 1S6

Vivian Merrill
University of Waterloo
Waterloo, Ontario
Canada N2L 3G1
vrmerrill@temagami.uwaterloo.ca

Introduction

This paper discusses a work in progress that addresses the potential impact of using four models of learning to inform the instructional design of two university level online courses. We first present each course and the instructional design challenges they pose. We then show how selected learning theories are used to inform redesign of the courses, making them better suited to the online classroom environment. Finally, we discuss how application of these prescriptions enhance the ability to achieve desired learning outcomes and also demonstrate the flexible application of instructional design models in two distinct content areas.

Course I: The Analysis and Design of Business Information Systems

This course has been taught in a place-based format since 1989 and online since 1996. The course contains both conceptual material such as an explanation of roles in a project, steps in a process, and procedural challenges a systems analyst must overcome, and technique-oriented material, such as the drawing of particular types of charts, graphs, exhibits and models. Evaluation of differences between the two different mediums of instruction indicates that there are benefits and difficulties unique to each format. One noted difference is the tendency of the place-based students to express concern about the volume of conceptual information to be learned and discussed in tutorial and in examination settings. The virtual format, in turn, offers a different set of challenges. While students discuss conceptual issues in far more depth than afforded in the place-based setting (Parker & Rossner-Merrill, 1998), they expressed concern about their ability to deal with the required techniques and lacked confidence in their ability to apply them appropriately.

Redesign of the Business Course

A redesign experiment is underway where the virtual seminar takes place within three distinct modes of instruction using prescriptions drawn from cognitive flexibility, problem solving, and dual coding theories. Students will be randomly assigned to each mode. The control group follows the current cognitive flexibility design of the course (Rossner-Merrill, Parker, Mamchur & Chu, 1998). The other two groups will receive identical assignment sets, but these are redesigned in accordance with principles drawn from problem solving and dual coding theories respectively. In the first instance treatment involves a series of increasing challenges for students to solve, thus allowing them to acquire and apply problem solving skills and increased confidence in their ability to do so. In the second instance, text is combined with graphical and audio files to test the format's capability to instil technique-oriented knowledge. Results are recorded in identical assignments, but grades will be normalised within, not across, each mode. The course redesign process will be repeated for the place-based setting in the following term. Based on outcomes from preliminary work, these results are expected:

H1: Cognitive Flexibility (control) will yield highest conceptual scores

H2: Problem Solving will yield the highest confidence scores

H3: Dual Coding will yield the highest technique ability scores

H4: Overall, the virtual group scores on conceptual abilities will remain high as before, but technique abilities will significantly improve. The place-based group scores on technique abilities will remain high as before, but conceptual abilities will significantly improve.

Course II: Introduction to Educational Psychology

In this course students are expected to understand what makes "good thinkers" in terms of how knowledge is understood, used and applied. To this end they study models and theories in educational psychology, how to analyse educational practices and how to develop and defend positions on evaluating educational practices. The course is offered by correspondence and is currently undergoing redesign for adaptation to the online medium of instruction. It is a prerequisite for aspiring or pre-service student teachers who are required to work or volunteer in classroom settings as part of their preparation for formal entry into teacher training or into the classroom setting. Problems posed by the correspondence version of the course are twofold. First, contact with the instructor is limited to two hours per week for all students. Second, opportunities for students to benefit from exposure to expert teachers in ways that prolong and deepen their short experiences of the classroom setting are lacking. Thus advantages to be gained from the mentoring capacity and practical experiences provided by expert teachers are severely curtailed. The online version of the course offers an opportunity to redress these situations and to better prepare aspiring teachers for entry into the teaching training program or into regular classroom placements.

Redesign of the Education Course

Redesign decisions for this course are guided by prescriptions drawn from situated learning theory and related strategies associated with expert mentoring and collaborative learning. As applied, these include revising the Study Guide to reflect and incorporate the interactive nature of online learning, adding a conferencing component to the course, and designing a web site that allows students to access appropriate theoretical and practical knowledge available on the internet. Further, new activities and assignments are designed to maximise and extend students' experiences in classroom settings and to enhance collaborative opportunities to acquire and apply conceptual understanding of educational psychology theories and models of learning. Compared to the correspondence version of the course, we expect that the addition of the virtual format described in the foregoing, will result in the following outcomes:

H1: The extension of expert mentoring to continue in the virtual format will significantly improve students' abilities to analyse educational practices and to develop more effective means to assess their impact on classroom learning.

H2: The addition of web resources, collaborative learning and strategic learning practices will significantly improve students' abilities to understand and apply knowledge gained from the more abstract study of theories and models of learning.

References:

• Parker, D., Rossner-Merrill, V. (1998). *Socialisation of distance education: The web as enabler*. Proceedings of the World Conference of the World Wide Web, Internet and Intranet, AACE, Orlando, Florida.

• Vivian Rossner-Merrill, Drew Parker, Carolyn Mamchur & Stephanie Chu (1998). Using constructivist instructional design featured in two online courses: Notes from the field. *Educational Media International*, 35 (4), December, 1998.

• Phil H. Winne (1999). *Introduction to Education Psychology*. Education 220-3 Study Guide. Faculty of Education and Centre for Distance Education, Simon Fraser University.