**ADDIE: A Case Study in a Blended Chemistry Course Design**

Instructional designers use a process called ADDIE to guide them in creating instructional material. ADDIE stands for Analyse, Design, Develop, Implement and Evaluate. Multimedia courses are increasingly used in government, industry and academia because its implementation reduces training costs. Consequently, the processes used for designing courses need to be assessed for their true worth. In this paper, my goal is to explore the ADDIE model, which is basic and meant to be adapted to the needs of each different instructional design (ID) project. Thus, my approach is a case study.

**Evaluate**

**Develop**

**Analyse**

**Implement**

**Design**

Figure 1: The steps of the ADDIE model

Shibley, Amaral, Shank & Shibley (2011) created a blended course for first-year undergraduate general chemistry to improve engagement, learning efficacy and consistency across course sections. The course was proven effective, relative to the lecture format used in a control group. Consequently, the authors will apply their format in other chemistry courses and maybe across the curriculum. Considering the potentially huge impact of using the ADDIE model in this case, the question that guides my analysis is: Was ADDIE applied effectively? This analysis requires the reader to consult the article by Shibley et al. (2011) and is structured according to the ADDIE steps.

**Analysis**

The students’ needs and goals were studied well. However, the students’ pre-requisite knowledge for this course could have been studied to inform the design of review material.

**Design**

Course design increased student-content interaction with a comprehensive set of online activities. These activities and structured teamwork tasks were aimed at the more difficult concepts. This method would have worked well if students were sure to grasp the course’s simpler concepts, but this was not verified.

**Develop**

The design team provided an online class guide which included mandatory assignments and learning resources to prepare students for each class. Scaffolding was provided in the class guide, but it is not clear whether feedback was given to correct misconceptions. Quizzes and assignments did not necessarily include feedback, which has been found to play an important role in learning (Gibbs, & Simpson, 2005).

**Implement**

The students formed groups to tackle increasingly difficult questions using clickers, and were supported by a peer mentor. This scaffolding approach to presenting content in class was a practical approach. In addition, collaboration has proven effective as students are likely to be more receptive to a peer’s explanations than an instructor’s (Knight, 2002).

The feedback on student progress allowed the teacher to judge whether to provide more explanation or to move on. However, there is no indication that the instructor asked the students to explain their reasoning. It’s important to be able to articulate concepts that underlie questions. As well, the authors did not indicate whether they studied the students “self-concept” at the end of the course. Confidence can be more important than skill acquisition (Papastergiou, Gerodimos & Antoniou, 2011).

**Evaluate**

The GPA of the students in the hybrid course was higher than in the lecture course, with a statistically significant difference. The pass rate was higher too. In a questionnaire, over 90% of respondents considered the blended format to be helpful (Shibley et al, 2011). However, the authors did not reveal any flaws that they or the students had found in the course. They did not discuss the instructors’ role in depth nor does it appear that they considered whether other solutions were relevant, such as instructor training, having students write study problems for each other (Bozarth, 2010). I suggest that the course include diagnostic tests and remedial materials to place all students on a level playing field. It should also include content applicable to laboratory instruction to address the transfer of knowledge to experimentation.

The authors were pleased with their initial results and expressed an interest in doing further studies on their course. Unfortunately, instead of immediately pursuing this research, they preferred to redesign more chemistry courses using their model. They seem to believe they have found a magic recipe for course delivery. Having too much faith in the ADDIE model may have blurred their view of their potential for further improvement.

**References**

Bozarth, J. (2010, April 6). Nuts and bolts: When training works. Learning Solutions Magazine. Retrieved from: <http://www.learningsolutionsmag.com/articles/442/nuts-and-bolts-when-training-works>

Gibbs, G. & Simpson, C. (2005). Conditions under which assessment supports students’ learning. Learning and Teaching in Higher Education, 2004-05(1), 3-31. Retrieved from: <http://www.open.ac.uk/fast/pdfs/Gibbs%20and%20Simpson%202004-05.pdf>

Knight, R. (2002). *Five easy lessons: Strategies for successful physics teaching*. Boston, MA: Addison Wesley.

Pappas, C. (2007). *The ADDIE instructional design model.* Retrieved from: http://www.slideshare.net/CPappasOnline/the-addie-instructional-design-model

Papastergiou, M., Gerodimos, V., & Antoniou, P. (2011). Multimedia blogging in physical education: Effects on student knowledge and ICT self-efficacy. Computers & Education, 57, 1998-2010. doi:10.1016/j.compedu.2011.05.001

Shibley, I., Amaral, K. E., Shank, J. D. & Shibley, L. R. (2011). Designing a blended course: Using ADDIE to guide instructional design. *Journal of College Science Teaching, 40*(6), 80-85. Retrieved from: <http://www.nsta.org>

Strickland, A. W. (n.d.). *ADDIE.* Retrieved from: http://web.archive.org/web/20060709154016/http://ed.isu.edu/addie/index.html