12-15-2011

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Abstract:

The need to justify and prove the quality of online education has resulted in hundreds of studies comparing classroom and online learning. While some have shown a significant difference across one or more variables between the two learning methods, many others have found no significant difference. Concept maps have long been utilized for assessing knowledge and course learning. This study utilizes concept maps to compare end-of-semester learning in classroom and online sections of the same courses. Data collection is in progress at the time of submission.

Keywords: online learning, concept maps

I. INTRODUCTION

The last ten to fifteen years have seen educators and researchers focus much attention on the (possible) differences between classroom and online courses. (Online courses for the purpose of this paper are defined as courses where the majority of content, interaction, assessment, and communication occur through a Learning Management System accessible via the Internet.) The impetus for this attention has come from both the desire to study a new method of educational delivery as well as the need to prove the quality of this new method as being at least on par with the traditional method. Nearly every possible variable and learning outcome has been studied – examination performance, course grades, passing rates, gender differences, time on task, and many others – with many studies showing "no significant difference" among the methods [e.g., Cook et al., 2008; Johnson et al., 2000; Shachar and Neumann, 2003; Smith and Palm, 2007; Thirunarayanan and Perez-Prad, 2001]. In fact, the No Significant Difference phenomenon (www.nosignificantdifference.org) started around 2000 and continues to grow with support from the latest research.

The business school at the University of Michigan-Dearborn has been teaching online graduate courses since 2001. Each online course has been developed (in nearly every situation) by the same faculty member who teaches the classroom course. The school makes it very clear in publications, recruiting, and public relations that the quality of the online courses is at the same high level as that of the classroom courses. Various measurements and surveys have been conducted over time, and each one has shown that online course quality is indeed quite high. However, actual comparisons among the classroom and online courses have only recently been implemented. One such comparison concerns the student course evaluations, but a more traditional comparison would need to include student learning.

II. CONCEPT MAPS AND KNOWLEDGE ASSESSMENT

Concept Mapping

Originally developed as a research technique to make sense of data gathered in clinical interviews [Novak and Musonda, 1991], concept mapping has been used in numerous ways in education, psychology, and organizational settings [Fraser, 1993; Novak, 1995]. Concept mapping, a specific form of mental modeling, allows both the creator and viewer to visualize the relationships among concepts as well as the hierarchical structure and organization of these relationships. Understanding these relationships at the discipline level forms the basis for much of our knowledge [Goldsmith and Johnson, 1990], and concept maps allow for structured representations of these relationships better than other techniques [Markham et al., 1994].

A concept map is a pictorial representation of a domain or discipline that consists of concepts (words or ideas representing events, objects, or emotions) represented as nodes that are connected to each other by arcs. The connecting arcs represent the conceptual links – stating that the concepts are conceptually and logically related in some manner – between two or more concepts within the concept map [Dorough and Rye, 1997]. Figure 1 shows a representative concept map of the domain of Information Systems (located just right of center near the middle of the map).

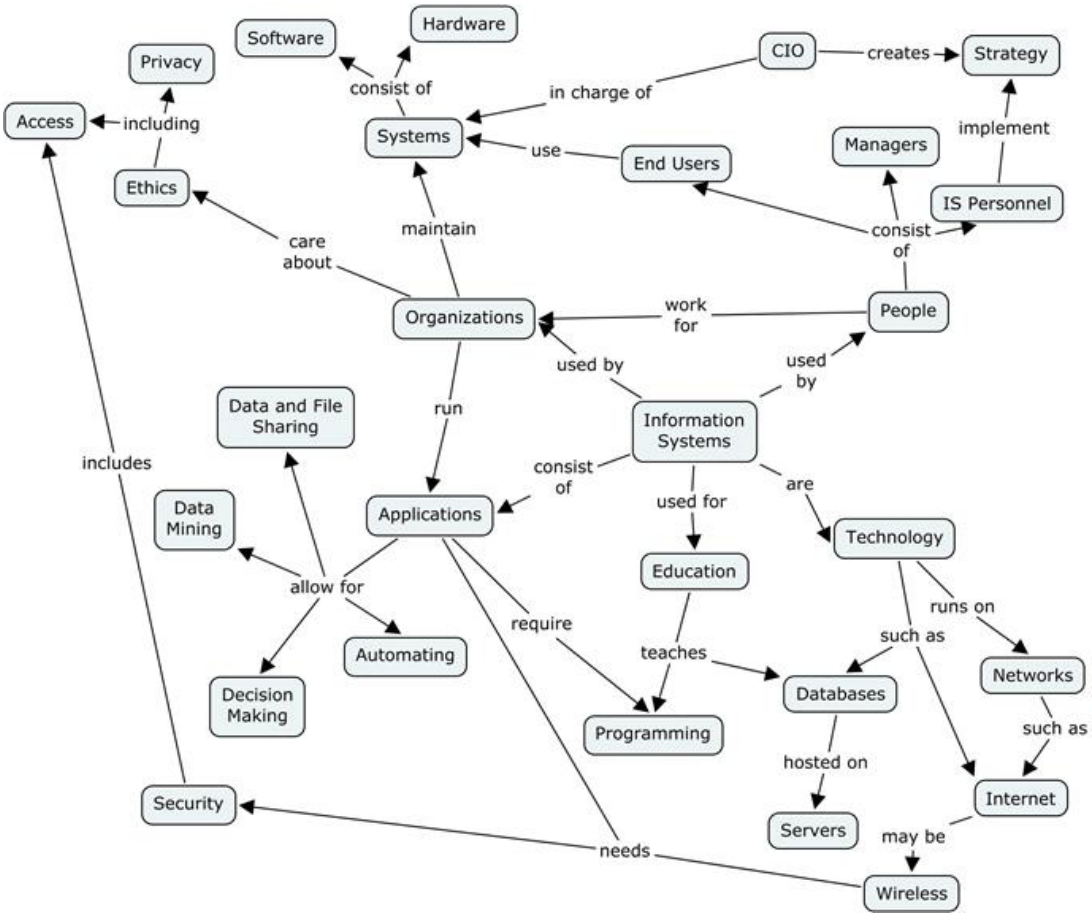

Figure 1. Sample Concept Map

Using concept maps to assess knowledge has been and continues to be an area of study among concept mapping researchers and educators [Croasdell et al., 2003; Freeman and Urbaczewski, 1999, 2003, 2006; Gouveia and Valadares 2004; Rocha et al., 2004; Suen et al, 1997]. The use of concept maps to assess declarative knowledge has received much attention [Goldsmith et al., 1991; Ruiz-Primo, 2004], especially in the sciences [Ruiz-Primo and Shavelson, 1996; Shavelson et al., 1994; Stoddart, 2006]. Concept maps have been utilized and studied in distance learning courses, but the existing literature mainly concerns their use in the curriculum [Cabral et al., 2004; Conceição, 2004; Rowley, 2006] or teaching how to create concept maps at a distance (Douglas et al., 2004; Gérin-Lajoie and Basque, 2006; Rábago, 2004].

Knowledge Assessment

Colleges and schools of business worldwide seek accreditation by various bodies. It can be argued that the highest accreditation comes from the Association to Advance Collegiate Schools of Business (AACSB). AACSB accredits approximately 5% of business schools worldwide. In order to earn AACSB accreditation, a school must show that it is in compliance with many tenets, such as adequate funding for the mission, qualification of the faculty, and also an assessment of learning program.

The assessment of learning programs implemented by AACSB-accredited schools vary greatly, but most include some type of exit examination, either standardized nationally or developed locally. The faculty at these schools are expected to use the feedback generated from the assessment process to foster continuous improvement in the curriculum, thus closing the feedback loop. While concept maps can be used for knowledge assessment as mentioned earlier in this section, they have not traditionally been used in this type of programmatic assessment exercise [Freeman and Urbaczewski, 2006].

Furthermore, AACSB has increased their focus on online programs. In order for AACSB to assure that all programs offered by an accredited school are of high quality, special requirements may be made of those programs. Given that distance students may be hundreds or thousands of kilometers from the main campus, the use of traditional programmatic assessment methods may be impractical and/or inappropriate for these types of programs. However, if the degree awarded by the university is the same, whether earned on-campus or in a distance program, it is appropriate to assume that the knowledge provided and learned is similar and should be also part of an overall assessment program.

This study will use concept maps created by the students in both classroom and online courses to compare the knowledge gained from the two methods of teaching. This study is not proposing a new or innovative use of concept maps, as they have been used for assessment of knowledge for some time, but this study is using concept maps in an attempt to provide additional insight towards the long-standing debate regarding quality differences, if any, between classroom and online courses. This study is also furthering the assessment of learning program necessary for business school accreditation. It is the hypothesis of the researchers that classroom and online students gain similar knowledge of the course's topic and that this will be evident through the concept maps.

III. METHODOLOGY

The course schedule in the business school was analyzed to determine which courses were being offered both in the classroom and online in the fall 2011 semester. In total, eight courses qualified as having both a classroom and an online section; for half of the courses, both the classroom and online section will be taught by the same instructor. Prior to the start of the semester, instructors teaching the relevant sections of courses in Business Law, Decision Sciences, Finance, Management Information Systems, and Operations Management will be contacted and given an explanation of the research project. If either the classroom course instructor or the online course instructor does not agree to participate, data will not be collected from either section.

During the last week of the semester, students in the participating courses will be given an explanation of concept maps and their uses, as well as instructions on the creation of concept maps using relevant but non-biasing examples. They will be asked to create a concept map of the topics/knowledge from their course and to indicate whether they were in the classroom or the online section. The explanation and instructions will be provided via a web page to all sections so as to not bias the sample, and students will be given the option of submitting their completed concept map on paper via an available drop-box at an administrative assistant's desk or via email to one of the researchers. Students will be given two weeks to complete their concept map. Neither researcher is an instructor in any of the sections.

IV. ANALYSES

At the time of paper submission, the data collection phase has not yet begun. No data is yet available regarding the number of submitted concept maps.

After all of the concept maps are collected, they will be analyzed using a similar approach to that used by Stoddart [2006] whereby the size (number of concepts and number of propositions), accuracy (course-specific knowledge and common knowledge), and depth (elaboration of facts and higher-order explanations) of the concept maps will be measured. Comparisons within each course section, between classroom and online sections of the same course, and between the classroom students and the online students overall will then be made.

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