Lessons Learned Through Online Study of Indicators of Constructivism in Online Courses

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Introduction

Many online course developers and instructors are committed to providing quality online courses that are not only accessible and convenient, but also well prepare learners for the 21st century as critical thinkers and collaborators. Increasingly, constructivism (or the active construction of knowledge by the learner as opposed to the passive reception of knowledge from the instructor) is becoming the learning theory of choice of course developers and instructors alike to achieve this learning goal. However, available research is still limited in terms of providing validated indicators of constructivist principles in online courses.

The purpose of this paper is twofold. First, it describes a study that identified indicators of constructivist principles applied to the development of Internet-based courses; and second, it addresses this study as an example of online research—an approach to research that is becoming increasing popular—highlighting the advantages and disadvantages of the approach taken in this study.

Indicators of Constructivist Principles in Internet-Based Courses

This study aimed to assist educators and course developers in providing greater assurance of quality in Internet-based courses by identifying indicators that reflect the application of the principles of constructivist learning theory to course development. If it can be assumed that online learning is amenable to constructivist learning principles and such courses can be markedly improved by adherence to this construct, then defining related indicators is important.

The study used a Delphi survey research method and a panel of experts with identified interests and expertise in constructivist learning theory and instructional technology. The panel identified and validated important indicators of constructivist principles for use with Internet-based courses. Anonymously panelists completed an online Web survey over three rounds of questioning during a one-month period. The Web survey automatically updated response frequencies and commentary. In doing so, it permitted asynchronous electronic communication between panelists and the researchers. Panelists also corresponded with the researchers through e-mail.

Expert panelists proposed and rated categories and indicators of constructivist-compatible principles, which the researchers complied and organized. Over the three rounds, the survey yielded 10 categories and a total of 110 indicators in 10 categories. Panelists rated 53% of the 110 indicators as $M = 3.51$ or higher (on a 5-point scale). A selection of the revised list, with indicators receiving a mean rating of 4.50 or higher, is presented in Table 1. The categories and associated indicators provide an initial framework that may help educators apply constructivist principles to the development of Internet-based courses. However, the researchers caution readers because the category and indicator list does not represent a definitive compilation. Additional research is needed to further identify indicators and validate the categories and indicators compiled in this study.

Table 1. Indicators Rated 4.50 or Higher

<table>
<thead>
<tr>
<th>#</th>
<th>Category</th>
<th>Indicators identified by expert panel</th>
<th>Rnd-1</th>
<th>Rnd-2</th>
<th>Ave.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AOL</td>
<td>Opportunities to revise or modify work.</td>
<td>4.50</td>
<td>5.00</td>
<td>4.75</td>
</tr>
<tr>
<td>2</td>
<td>PBL</td>
<td>Students explore nontrivial problem areas and ask questions, debate ideas, make predictions, and draw conclusions while creating relevant artifacts.</td>
<td>4.60</td>
<td>4.80</td>
<td>4.70</td>
</tr>
<tr>
<td>3</td>
<td>COLL</td>
<td>Examples of collaborative and cooperative small group work.</td>
<td>4.80</td>
<td>4.80</td>
<td>4.80</td>
</tr>
</tbody>
</table>
work would include: threaded discussions (internal); discussions with outside experts; synchronous chats; small-group exercises; projects and papers with multiple authors.

4 PBL Projects are shared with peers during development and completion, thus supporting knowledge construction in social learning settings. 4.60 4.75 4.68

5 COG Students construct, build, or enact something that is representative of an abstract theory or idea. 4.40 4.80 4.60

6 AUT Example methods of authentic practices include: making or building things; analyzing problems; designing solutions; trying out solutions; testing and evaluating solutions. 4.60 4.60 4.60

7 SAFE Instructors avoid public humiliation or unneeded social comparison of students. 4.50 4.60 4.55

8 SAFE High levels of trust and support (which in turn will allow greater levels of public criticism) are maintained. 4.50 4.60 4.55

9 PBL Project “assignments” are purposefully under-designed to allow a large degree of flexibility in interpretation, which is in keeping with the construction of new knowledge. 4.40 4.60 4.50

10 COG Sample types of tasks or methods include: reflective journal entries; threaded discussions; rationales and reflections on projects; projects requiring high levels of self-directed work and organization; evaluation of others’ work. 4.20 4.80 4.50

11 COG Students critically evaluate own (and others’) work. 4.60 4.40 4.50

12 AUT Reported or perceived relevance/utility of the tasks. 4.40 4.60 4.50

13 AUT Assessments are performance-based or related to real work settings. 4.60 4.40 4.50

Category Code descriptions:
PBL - Project-based learning tasks
COLL - Collaborative and cooperative small group work
COG - Tasks that require higher order cognitive skills
AUT - Tasks that are authentic, relevant, and meaningful
SAFE - Safe environment
AOL - Assessment of learning
Web Survey Method

A second aim of the paper is to discuss the use of the Web for data collection and expert panel discussions. As mentioned, the study employed a Delphi research method to reach consensus of participant opinion through three rounds of questioning. The researchers constructed Web survey forms containing tags that interacted with FileMaker Pro database files. From the Web, participants could submit data to and extract them from the database. Interfacing with database files through Web documents afforded participants the opportunity to see a compilation of other participants’ submissions, and to respond to them in an interactive manner. A database was also useful for data sorting and analysis.

In all three rounds of questioning, participants submitted their responses through the Web. The first round presented four general categories of constructivist-compatible instructional practices obtained from the researchers’ review of literature. Using a five-point rating scale, participants rated the importance of each category as it related to Internet-based courses. For each category, participants typed at least five relevant indicators or statements that describe observable and measurable elements, methods, and/or procedures whose presence indicated the use of constructivist principles in an Internet-based course. Participants could also type new categories, indicators, and general comments.

The second round presented the categories of constructivist-compatible instructional practices and several indicators (obtained from participants) intended to reflect the implementation of constructivist learning theory to the development of Internet-based courses. For all categories, participants rated the importance of each indicator from 1 (Not Important) to 5
The survey also presented the average rating each category received in Round 1. The Web survey tallied responses and compiled comments from the previous round. This allowed respondents to consider their responses in relation to those of all other participants.

The third round again presented the categories of constructivist-compatible instructional practices and associated indicators. Participants rated the importance of each indicator. To assist participants, the survey presented comments about the categories and indicators and the average rating of each indicator from Round 2 (see Figure 1).

**Advantage and Disadvantages of the Web Survey Method**

The researchers note three primary advantages about the Web-based survey and online expert panel discussions. First, from their perspective, the Web proved to be a viable alternative to expert panels when panelists could not meet face-to-face. Web surveys provide unique access to geographically dispersed individuals and their interactive capabilities offer much potential for conducting online panel discussions. In this case, the Web and database facilities allowed discussants to deliberate about topic categories and indicators and to refine them.

Second, the Web survey was easily accessible to anyone with email and a Web browser. Once the researchers created the survey, HTML documents, and database files, they notified potential participants through an email that included the site URL. Participants could click the URL and conveniently gain access to the survey. The process eliminated the need for a print survey and it having to be distributed and returned through the postal system. In addition, the researchers did not need to transfer print copy information to digital form and data became immediately available for analysis as soon as respondents submitted them.

Third, compared to print, the Web surveys, as used in this study, enabled interactivity among participants and allowed data to be collected dynamically. For example, participants read other participants’ comments and saw the mean ratings of categories and indicators, which assisted them in rating and refining items. Once participants submitted their responses to the database, their data became instantly available for analysis and display.
A significant disadvantage of conducting panel discussions in this manner is the limited amount of dialogue that took place. The researchers approximate that compared to face-to-face panel discussions, limited commentary occurred online. Depending on a survey’s purpose, the utility of the Web for expert panel discussions and data access and collection diminishes when participants are disinclined to communicate. The amount of commentary that participants contributed across rounds did not exceed much more than a thousand words. One may safely assume that if a panel of 5 or more persons met face-to-face, the quantity of comments would far exceed this total. The researchers encouraged panelists to respond to the comments of others across the survey rounds but limited interaction occurred. From the study, it is impossible to ascertain whether the restricted commentary resulted from time constraints (each round lasted one week), the researchers not facilitating communications effectively through the Web survey interface, or if the panelists simply opted not to respond to others. It is also plausible that since computer-mediated (online) groups are task orientated and disinclined to exchange social-emotional information relative to face-to-face groups meetings (Chidambaram, 1996; Jonassen & Kwon, 2001) that less commentary occurred. The online panelists may have stated their point concisely without engaging in extraneous conversations, which may not have been the case if they met in-person. In addition, for many individuals, typing text messages into a Web page is more labor intensive and time consuming than communicating verbally. Text messages also lack the non-verbal cues that often engage discussants more fully in conversation.

Facilitating Web-base panel discussions online is an area that needs further research. In this study, the Web was a useful medium for data collection, analysis, and dissemination. In the researchers’ view, it seems reasonable that it can also be as effective medium for panel discussions when interfaces are optimally designed and when the panels are appropriately moderated. The researchers did not attempt to moderate the panel. They served only to observe and answer questions when needed. It would be useful to understand the degree and type of moderation that fosters increased quality dialogue among participants.

Summary

In general, the panelists provided much insight about the topic categories and indicators. While their dialogue was limited, the researches considered it informative and valuable to the study objectives. The results of this work offer a preliminary set of categories with indicators of constructivist-compatible principles that may help educators in their Internet-based course development and evaluation efforts. The identification of constructivist-compatible principles as they related to Internet-based courses is an important area that requires further research and the proliferation of online courses and programs in education today emphasizes the need for continued research.

The Web survey proved useful as an alternative to face-to-face panel discussions. As used in this study, it was conveniently accessible to individuals with email and a Web browser. The Web-based survey had several advantages over print surveys. Since the data were stored in a database they could be compiled and analyzed instantly as participants submitted responses. In the study, there was limited dialogue among participants, which may have resulted from the Web interface, among other things. Additional study is needed to explore methods that more actively engage participants in discussion.

References


Biographical Sketches

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