

Chapter 3. Methods

Generating Instructional Design Guidelines

This study is an initial stage in the development of instructional design theory. In this study, I began the process of developing instructional design guidelines for social interaction in online education as a means to meet specified learning goals. Using post facto naturalistic case studies as my primary source of data, I developed a “situationalities framework” that identifies the instructional methods and situationalities that are important to consider when choosing specific methods of social interaction techniques to implement in online learning. Situationalities describe conditions, desired outcomes, and values about instruction that help an educator decide when particular methods should and should not be used. This situationalities framework can be used in the continuing development of specific guidelines for methods of social interaction in online learning.

The overall study design I used can be summarized as a naturalistic study that combines several qualitative methods, a collective case study with instrumental features (Stake 1995). I used multiple cases and analyze the cases in order to understand elements of each that were not necessarily the primary intent of the original author’s focus. The first specific method I used is the case survey, a variation of a cross-case analysis and a form of aggregative research. Case surveys are used to aggregate “diverse case studies together under a common conceptual framework so that findings will be cumulative...” (Lucas, 1974). Following preliminary analysis of case survey data and the drafting of an initial situationalities framework, I used semi-structured, active interviews (Fontana & Frey, 2000; Holstein & Gubrium, 1995) with a selection of case study authors. Finally, I

used several rounds of member-checking (Guba & Lincoln, 1981) to refine, revise, and validate my findings with case study authors.

One of the defining characteristics of a case survey approach is to choose case studies with pre-specified criteria (Guba & Lincoln, 1981; Lucas, 1974; Merriam 1988). In order to develop a situationalities framework, I chose thirty case studies of online learning environments or courses. Cases selected met criteria that had to do with publishing source, recency, inclusion of discussion about learning goals and values, social interaction methods, and the effectiveness of the methods chosen in meeting the stated learning goals and values. The criteria are explained in detail below (see Case Selection).

Once selected, I read and analyzed each case to determine four types of information. First, I identified the learning goals and values that guided the design of the learning environment or the development of the course. Then, I identified the particular methods of social interaction used by the designers or participants in the case. Next, I identified conditions that the researcher(s) indicated were relevant to the selection or effectiveness of the methods of social interaction used in the case. Finally, I looked for evidence of the effectiveness of the chosen social interaction techniques in meeting the stated learning goals.

Once I read and analyzed each case, I developed a classification scheme (see Chapter 5) to group the situationalities into categories. I used the situationality categories to synthesize the findings across cases and develop a summative situationalities framework. Design guidelines derived from the classification scheme and framework take into account the conditions under which specific methods of social interaction

should be effective in meeting specific learning goals. The case analysis reports and summative situationalities framework and design guidelines were reviewed with five case study authors chosen for their potential to provide insight into social interaction in online learning. This review is explained in detail below (see Author Interviews in the Data Collection section).

Case Selection

Cases were selected based on a set of criteria explained below. Cases should be selected for their usefulness to the study – their direct relevance to the study questions (Stake 1995). Stake (1995) asserts that researchers should choose cases to “maximize what we can learn... pick cases that are hospitable to our inquiry ... with actors willing to comment on certain draft materials” (p. 4). Cases were selected on the basis of five criteria that have to do with publishing source, recency, the discussion of learning goals and values, a description of social interaction methods, and the presence of some discussion of the effectiveness of the methods chosen in meeting the stated learning goals and values. Each criterion is described in more detail below.

Publication Source

Published cases were chosen primarily because they are easily accessible. In order to include a large number of cases, it was important to use completed case studies, since it would take an overwhelming amount of resources (time, money) for me (or even a sizable research team) to create all the cases as part of one study. Additionally, using published works provided a set of studies that have met the quality standards of peer

reviewers in the Instructional Design field in general, evidenced by the fact that they were actually published. This should enhance the quality of the study findings.

Cases were chosen from many sources. (Appendix A lists the 30 case studies selected for this study.) Each publishing source used a peer review or referee system to assure the quality and help establish the reliability of the cases. The publishing sources were chosen to include a mix of paper-based and web-based journals, conference proceedings, and books (edited volumes). Paper-based journals are readily available in local academic libraries. Online journals (e-journals) often provide cases that focus solely on online learning environments. Conference proceedings often provide more recent research reports than do published journals due to the shorter lead time prior to publication. Similar to published journal articles in quality, books or edited volumes sometimes provide additional space for an author to elaborate on a study, especially as it applies to the conceptual basis for the book. A detailed list of case study sources is provided in Appendix B.

Recency

It is important that the studies selected have had the opportunity to use recent major technologies, such as the WWW, desktop video, and other communications technologies. Most studies published since 1993 report on research that has been conducted since the emergence of the WWW in the early 1990's. Even though not all online learning environments use the WWW or other new technologies, the fact that some designers have chosen not to use these newer communications technologies in their learning environment design(s) may be significant, and may contribute to the understanding of specific conditions or sets of conditions. Additionally, selecting recent

literature may increase the likelihood that a research team or author is available for follow-on interviews. Therefore, I chose case studies with publication dates of 1993 or later. Most (28 of 30) case studies have publication dates of 1997 or later.

Discussion of learning goals and values

Each case selected must provide some discussion of the learning goals or instructional values the design is trying to meet. Examples of learning goals and values include developing a community of learners, creating a collaborative atmosphere, providing a problem-centered learning environment, implementing learner-centered principles, creating learning teams, coaching students, and establishing cognitive apprenticeship relationships. These goals and values are sometimes explicitly stated, and at other times are implied in a discussion of fundamental learning assumptions. For example, several studies describe using collaborative work groups to implement a constructivist learning environment. Other cases use a particular learning theory discussion or approach to frame learning goals and values. For the purposes of this study, the specific learning goals and values are not important in and of themselves, however it is imperative that the case studies report on at least one learning goal or value that the designer(s) had in mind when creating the learning environment or course, and how social interaction techniques were used to meet this goal or value.

Instructional methods using social interaction

Instructional methods that enable or facilitate social interaction must be included as part of the learning environment or course design. This criterion is important because not all online learning environments or courses rely upon social interaction to facilitate learning. Some courses use methods of social interaction solely to meet social (non-

learning) goals. Other courses may be designed without any regard to any social interaction, since related case reports avoid a discussion of social interaction of any kind, even though it may still occur “by chance.” Yet other online environments are designed solely for individual use independent of any “other,” whether peer or tutor. Clearly, in order to develop sets of methods and conditions that may determine the effectiveness of social interaction methods, social interaction has to be addressed in every case in the study.

Effectiveness of social interaction techniques

It is not enough for a chosen case just to discuss the learning goals and methods of social interaction without including an analysis of the effectiveness of these methods in reaching the learning goals of the environment. This discussion can take many forms and vary greatly in the depth of the analysis, but it must be present. For the purposes of this study, it is important that each case addresses effectiveness of at least one social interaction method in meeting at least one of the major learning goals of the environment.

Data Collection

This section addresses three methods of data collection I used in the study. A description of the data analysis techniques I used follows in the next section. I collected data from two primary sources, selected case studies from the published literature in the field, and interviews with a sample of case study authors. A third source, the entire set of case study authors, was solicited for comments after I provided them a condensed version of my preliminary findings. First, case studies were identified, screened and selected. After case study data had been gathered and analyzed, five case study authors were

selected for interviews as a method of confirming or clarifying findings, pursuing interesting questions that had arisen from the case study, and providing additional information relevant to the study. The methods that were used to collect each type of datum are described in greater detail below.

Case studies

Once relevant cases were selected, I acquired a paper copy of each case. For cases available online, I also acquired a digital copy of each case. These cases were identified with a unique case number (i.e., C101, C102, etc.) and placed in a labeled folder with the same case number. The identifying information for each case was recorded in a database (created specifically for this study) for later reference and analysis.

Author Interviews

Semi-structured, active interviews with selected case study authors provided the second major source of data for this study. Semi-structured, active interviews provide both the structure needed to ensure crucial questions are asked and issues explored during the interview, yet retain the freedom for the interview participants to explore issues that emerge during the interview itself, issues raised by either the researcher or the interview subject (Fontana & Frey, 2000; Holstein & Gubrium, 1995). Data from these interviews was used to revise, refine, and confirm the preliminary findings developed during the case study analysis phase.

Selection of sample

I chose the sample of authors based upon the opportunity to learn more about sets of conditions or the effectiveness of specific social interaction methods. Once again, the sample was not chosen as a representative sample, but rather it was chosen because these

authors provide the best chance to learn more about the study issues and were able to help me answer the research questions. The sample included authors who chose the same social interaction methods under different sets of conditions, those who chose different social interaction methods under the same set of learning conditions, and several who chose the same social interaction methods under similar conditions, but reported varying levels of effectiveness in meeting learning goals.

Interview protocol

I contacted five authors via e-mail to determine if they would be willing to participate in the study. All of the authors I contacted agreed to participate in the study. The setting for the interview depended upon the location, availability of the author, and the resources (time and money) I had for travel. Ideally, all interviews would have taken place face to face. Face to face interviews allow for extremely rich communication, including not just spoken words but also body language, verbal intonation, the direct and immediate use of artifacts and documents to further explain ideas, and the establishment of personal rapport not commonly found in impersonal communication settings (Holstein & Gubrium, 1995). Unfortunately, I was able to coordinate a face-to-face interview with only two of the authors. With two other authors, I was able to arrange phone interviews instead. One final author was teaching overseas. For this author I conducted the interview through e-mail only.

Each interview was completed in approximately one hour. The questions I asked depended upon the specific context of the study and the particular reasons the author was selected for an interview. Appendix C is a sample interview protocol form. I used this form as a “conversational agenda” to provide an initial context to engage the topics of

interest. As the interview progressed, I decided if subsequent questions on the form were necessary or appropriate (Holstein & Gubrium, 1995, pp. 76-77). The standard interview questions include:

1. Please describe the overall learning goals you wanted to achieve in this situation.
What were the underlying learning values that guided the design of your course?
2. What methods of social interaction seemed to work the best in your situation? – Why? Can you envision a situation in which they would not work well?
3. Which of your learning goals were met effectively with the social interaction methods you chose? Were any of your learning goals unmet? Did the social interaction methods chosen contribute to this? Can you think of any other social interaction methods that might have helped meet those goals?
4. If you could implement any method of social interaction you wanted in your learning environment (or course), what would you choose –and why?
5. In your online learning environment (or course), what are you doing differently today – and why?
6. Ask specific questions about the values, methods, and conditions in the situationalities framework – clarifying, extending, etc. (*this will be different for each interview*)

The written consent of the interview subject was gained prior to the start of the interview, using the Human Subjects Committee-approved study information sheet. None of the face-to-face or phone interviews was recorded. Instead, I took handwritten notes. Once the interview was complete, I re-read and completed my notes.

After each interview, I summarized relevant findings from that particular interview and sent a written copy (via e-mail) to the interview subject asking him or her to check my findings against their remembrance of what was said in the interview. This method of member checking should make my findings stronger and more accurate (Guba & Lincoln, 1981). At the same time, using a member checking strategy provided me with another opportunity to ask the authors for additional comments or clarification about their particular case. For some interview subjects, I asked an additional question or two at this time if other interviews (or subsequent analyses) had raised interesting questions the author might have been able to help me answer.

Expert Review

One final method of data collection was used. After I developed an initial situationalities framework and completed and incorporated all data analysis, I sent a copy of the preliminary study findings to each case study author, both those selected for interviews and those not selected. I presented an abbreviated (summary) version of my entire study to date and asked for their comments, questions, and specific constructive feedback. Appendix D is the survey protocol form I used. I included this step both as a courtesy to the authors and as a way to gather additional data that helped me craft the final version of the situationalities framework, my final findings, and the overall conclusions to the study.

Data Analysis

In this study, data analysis was comprised of four major efforts. The first effort was to read and identify relevant information in each of the case studies. This included

reading the study itself several times, looking for critical elements of information that helped answer the research questions. The initial analysis was used to create the situationalities framework, which the analysis of the interview and survey data refined and built upon. This case analysis is explained further below. The second major analysis effort was to analyze the interviews (notes and follow-up information) for information relevant to the study. A third analysis effort was a cross-case analysis, or case survey, looking at all cases and the author interview results once again to look for important themes and common elements or patterns across all cases (Stake, 1995). The final analysis effort included reviewing final comments and feedback received from the case study authors after I sent them a condensed preliminary report of overall findings for their commentary. Each phase of analysis is explained in greater detail below.

Case Analysis

The first step in case analysis was to (re)read the case, identifying specific discussions of critical information—information directly relevant to the research questions. These four critical information elements, and the questions I asked as I read the case are:

1. Learning goals⁵ and values – What are the learning goals and values established for the environment?
2. Social interaction methods – What are the social interaction methods used in the learning environment or course?

⁵ I use the term “learning goals” to include any of the educator’s goals which are relevant to the use of particular instructional methods. Sometimes these goals are focused explicitly on learning, sometimes on other aspects related to learning, such as an interaction mode or a particular critical thinking skill, which may only implicitly focus on learning. For simplicity, I use the term “learning goal” for all of these goals.

3. Conditions of the learning environment – What are the relevant instructional conditions that affect the learning environment design? What are the conditions that affect the effectiveness of the social interaction methods used? For example, these conditions include the following:

- a. Size of class
- b. Experience of instructor
- c. Educational level of students
- d. Technological experience level of instructor and students
- e. Location of students relative to instructor and each other
- f. Synchronicity of instruction
- g. Others⁶

4. Effectiveness of the social interaction methods in helping the learner meet the learning goal(s) – What methods are evaluated as effective? What methods are not effective? What values, goals, and conditions affect the effectiveness assessment? What are the measures of effectiveness the author uses to assess the instructional experience?

Information gathered from the case study while answering these questions was recorded in the data analysis database for further analysis. Once data from all cases was entered, I looked for consistent findings among studies that indicated particular situationalities—conditions, goals, and values (or sets of conditions, goals and values) that played a significant role in determining the effectiveness of a social interaction method implemented to reach a particular learning goal. These findings were used to create the preliminary situationalities framework (see Appendix K).

⁶ See Chapter 5 for a complete discussion of the instructional condition classification scheme.

Interview Analysis

After each interview, I reviewed my notes, looking for comments or answers to questions that related directly to the major issues or themes of this study. The major questions framing my analysis were, “What did the authors say about the learning goals and values?,” “What did the authors say about the social interaction methods they used?,” “What did the authors say about the effectiveness of the methods in achieving learning goals?,” and “What situations (values, goals, and conditions) in the learning context seemed to make a difference with regard to the effectiveness of the social interaction methods?” I looked for other relevant emergent themes on a case-by-case basis, looking for patterns in the data indicative of an important insight. As I performed this analysis, I identified follow-on questions to pose to the authors when I sent them the preliminary interview analyses for review and comments.

Once I completed the preliminary analysis, I sent a summary of my findings to each of the authors, asking them for clarification or further explanation of learning goals, social interaction methods, or conditions, as needed, and providing an opportunity for them to comment on the interview analysis. In some cases, they offered additional insight and explanations. This step in the analysis provided a member checking opportunity. I reviewed the additional comments they provided, revising my particular findings for each individual interview and overall findings for the study as appropriate.

Cross-case Analysis

Cross-case analysis has been described as “casting a net” to catch many specimens (cases) of a particular species in order to examine the specimens to further understand the species (Runkel, 1990). In this study, the specimens are the individual

cases and the species is the use of social interaction techniques in online learning environments. Lucas (1974) and Yin (1994) describe this method of cross-case analysis as a “case survey.” The specific analysis across multiple cases looked for patterns across cases. In particular, I created situationality classification schemes and identified common sets of conditions, learning goals, values, and effective social interaction methods in order to complete the situationalities framework and develop preliminary design guidelines based on the framework.

The situationalities framework includes learning goals and values, the social interaction methods that have been effectively used to attain them, and the instructional conditions that are important to consider when choosing a particular method. The preliminary format for the presentation of the framework was determined after data analysis was complete. Appendix K shows the preliminary situationalities framework used in the expert review (author survey) phase.

Expert Review

After completing the initial situationalities framework, I sent it along with a summary of relevant findings of the entire study via e-mail to the author of each case study for review and commentary. Feedback from the authors was used to make final revisions to the situationalities framework and answers to the study questions.

Validity and Reliability of the Research

Since the results of this study, and educational research in general, will be used to inform instructional designers and contribute to prescriptive design theory that will ultimately be used to design instruction, it is imperative that researchers and designers

must be able to trust the results. Messick (1989, in Stake, 1995) has stated that the consequences of using research findings should be considered part of the researcher's responsibility. Stake (1995) asserts that researchers have "ethical obligations to minimize misrepresentation and misunderstanding." (p. 109) In other words, the study must present findings that are valid and reliable. Validity and reliability should be considered through the study's conceptualization and design, and the way data is collected, analyzed, and interpreted (Merriam, 1988). This study implements specific methods to enhance the internal validity, external validity, and reliability of the results. This study must first of all exhibit internal validity before external validity should be considered (Guba & Lincoln, 1981).

Internal Validity

Internal validity is concerned with how well the study findings match reality (Merriam, 1988). The multiple realities that researchers must deal with in naturalistic studies (such as case study research) reside in the minds of the readers, and the concern for internal validity is really a concern for credibility – How credible are the findings to the reader (Guba & Lincoln, 1981)? The credibility of this research is enhanced through the use of multiple sources of data and multiple collection methods – a process of triangulation (Guba & Lincoln, 1981; Yin, 1994). Triangulation is accomplished through the use of both document (case study) analysis and interviews with selected case study authors. Both methods of data collection gather information about the same situation, or case, and provide complimentary data types for analysis. If data and analysis findings gathered from a case study and an accompanying interview with the author are consistent and complementary, the credibility of the study is strengthened. Additionally, in a case

survey approach, if findings are consistent across many cases, the credibility of the study is further strengthened. Threats to internal validity include inconsistencies between case report and author interview data, inconsistencies across multiple cases that cannot be explained by situationalities, and major findings from one form of data that are not supported by a complementing form of data.

A final method of assuring credibility in this study is the use of feedback from study participants in the review of interview analyses and the initial situationalities framework – a process of member checking (Guba & Lincoln, 1981; Stake, 1995). Member checks are used in two stages, first in the author interview follow-on query, and secondly in the final “review and feedback” request to all case study authors.⁷ As stated earlier, these member checks allowed the study participants to comment upon preliminary findings, and assisted me in refining, revising, and confirming the situationalities framework. A threat to credibility with this method occurs if many case study authors decline to participate in either the author interview or the final review and feedback survey. However, each of the five authors initially chosen for the interview phase agreed to participate in an interview, and 15 of the remaining 25 authors participated in the author survey, mitigating this threat to credibility.

A final aspect of internal validity concerns the influence a researcher has on case report findings. The fact that this study will consider individual cases “post facto” without exerting any external influence on the situation helps assure that there is no possibility of this researcher’s influence on the individual cases. A threat to internal validity along these lines could arise due to the influence of the original case study authors in their own study settings, but it is impossible to control for this post facto. I

⁷ See Appendices C and D for sample interview and survey questions.

have to rely on the ethics and methodological rigor of both the authors and the publication reviewers, in the hope that each individual case followed adequate methods to preserve validity and reliability. Including case reports that contain a discussion of internal validity (and potential threats) as part of their reported findings helps reduce the threat to this study.

External Validity

The concern for external validity arises because the findings of this study are intended to provide useful information for generating instructional design theory, which, to be useful, should be applicable in many specific situations and contexts. An argument for the external validity of this study design can be made if you consider the overall research approach. The main purpose of this study is to develop a situationalities framework that could be used to help designers identify the specific conditions, goals, and values of their own context that will affect the use of social interaction methods in online learning environments. Cronbach (1975, as cited in Merriam, 1988, pg. 175-178) and Guba and Lincoln (1981, pg. 118) recommend that a study such as this consider its findings to be a set of “working hypotheses” that fit more or less into a new context.

A situationalities framework of methods linked to conditions (or sets of conditions), goals and values, based on a large number of case studies grounded in real practice, will be used to tailor an instructional approach to a specific context. This framework should allow the study findings and design guidelines developed from this framework to be transferable to a fairly wide variety of contexts. When considering the concept of using findings such as these to generate instructional design theory, Reigeluth and Frick (1999) claim that “when situationalities are incorporated into the theory, the

theory becomes useful for a broader range of situations.” (p. 649). Considering the study findings as design theory that offers “guidelines for practice” rather than “rules to follow” seems to fit Guba and Lincoln’s conception of generalizability as well.

Reliability

Reliability is concerned with whether another investigator could use the same data and follow the same procedures as an original researcher to arrive at the same findings, in order to minimize the errors and biases in a study. The main issue is whether the study processes are consistent, stable over time, and stable across researchers and methods (Miles & Huberman, 1994). The reliability of this research is enhanced through the use of a consistent pattern of data selection, collection and analysis – referred to as a “chain of evidence” (Yin 1994). Yin states that researchers should, “... strive to develop a formal, presentable database, so that, in principle, other investigators can review the evidence directly ...” (pg. 95). In this study, I used a custom-designed database file that ties together case study identification and situationality analysis. This analysis data was used in the author interviews and surveys, and ultimately in the design of the situationalities framework. Using a common, comprehensive database contributes to the consistency of study processes. Additionally, Yin refers to the use of a chain of evidence that would allow a reader to move from one section of the study to the next with clear ties between methods, evidence, and findings. This study report, with its many appendices and the accompanying database⁸, provides this chain to interested readers.

In summary, the methods I used include a case survey of 30 descriptive case studies, selected author interviews, and a member-checking survey of all case authors.

⁸ The actual database application (a Microsoft Access™ file) used in this study, complete with study data, is available from the author upon request.

Using qualitative analysis techniques and tools, I created a “situationalities” framework that includes methods of social interaction, underlying learning goals and values that these methods are chosen to meet, and the specific conditions that affect the effectiveness of these methods. I have also included preliminary prescriptive guidelines to show how this framework can be used to create instructional theory for online learning environments.

In Chapter 4, I explain the data analysis performed on individual case reports and the results of the author interviews and surveys as it relates to specific cases. Cross-case analysis and findings are reported in Chapter 5. Chapter 6 presents the situationalities framework and explains how it can be used to generate prescriptive design guidelines for socially interactive online learning environments.