Chapter 3

Technology Adoption and the Internet

Bruce L. Mann
Memorial University, Canada

Learning Objectives

1. Distinguish between the two best-known frameworks of technological innovation.
2. Describe the identifying characteristics of phase theory.
4. Describe how a study of the levels of adoption of the Web or other Internet technology by the faculty at your college or school can be considered to be “data-driven research.”
5. Explain how educational research on “the adoption of Internet technology” would differ from research on “teaching or learning with the Internet.”

Abstract

Technology adoption has been a popular research style among educational leaders since the mid-1970s. This chapter is an introduction to research on a few technology adoption models with a particular focus on their application in Internet-based teaching and learning. A few technology adoptions are the Concerns-Based Adoption Model (CBAM), Rogers’ Theory of Diffusion, the Instructional Transformation Model and Phase Theory.
Adoption Models and Theories

Web-based teaching and learning can be studied as “a technological innovation.” Tim Berners-Lee created the technology that made the Web possible in 1990 while working for CERN, a European Particle Physics Laboratory. Its original purpose was to give physicists in the field of high energy a means to communicate and exchange ideas easily. The Web was created to be a pool of human knowledge, distributed to share human beings’ ideas (Berners-Lee, 1997; Berners-Lee et al., 1994). Although online teaching and learning is still a favorite focus of much graduate student research, “adoption of Web or other Internet technology in an educational setting,” usually by novices at your college or school has come of age, and can be said to be a style of educational research in its own right.

Two Well-Known Technology-Adoption Models

In this chapter we discuss two well-known frameworks of technological innovation that may be considered in studies that treat the Web as an educational innovation: the Concerns-Based Adoption Model (CBAM) and Rogers’ Theory of Diffusion.

Concerns-Based Adoption Model (CBAM)

Web-based educational research can be studied as an innovation using the Concerns-Based Adoption Model (CBAM). The Concerns-Based Adoption Model can be applied in research to anyone experiencing change (including changes to Web-based technology in educational settings), that is, policy makers, teachers, parents and students (Hall & Hord, 1987; Hord, Rutherford, Huling-Austin, & Hall, 1987).

The CBAM holds that people considering and experiencing change evolve in the kinds of questions they ask and in their use of whatever the change is. In general, early questions are more self-oriented: What is it? How will it affect me? When these questions are resolved, questions emerge that are more task-oriented: How do I do it? How can I use these materials efficiently? How can I organize myself? Why is it taking so much time? Finally, when self- and task concerns are largely resolved, the individual can focus on impact. Educators ask: Is this change working for students? Or is there something that will work even better?

Central to the CBAM is the change facilitator. People and the change facilitator’s understanding of the point of view of the participants are the most important factors in the change process of this model. The change facilitator is a person or persons who will deliver actions on the basis of the needs of individuals or groups involved in the change. Facilitators have a resource system available to them as well as various interventions.
Table 1. Stages of concern in the CBAM (from Hord et al., 1987)

<table>
<thead>
<tr>
<th>Stages</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0  Awareness</td>
<td>I am not concerned about it (innovation).</td>
</tr>
<tr>
<td>1  Informational</td>
<td>I would like to know more about it.</td>
</tr>
<tr>
<td>2  Personal</td>
<td>How will using it affect me?</td>
</tr>
<tr>
<td>3  Management</td>
<td>I seem to be spending all my time getting material ready.</td>
</tr>
<tr>
<td>4  Consequence</td>
<td>How is my use affecting students?</td>
</tr>
<tr>
<td>5  Collaboration</td>
<td>I am concerned about relating what I am doing with what other instructors are doing.</td>
</tr>
<tr>
<td>6  Refocusing</td>
<td>I have some ideas about something that would work even better.</td>
</tr>
</tbody>
</table>

Table 2. Levels of use in the CBAM (adapted from Hord et al., 1987)

<table>
<thead>
<tr>
<th>Levels</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0  Non Use</td>
<td>State in which the individual has little or no knowledge of the innovation, no involvement with it, and is doing nothing toward becoming involved.</td>
</tr>
<tr>
<td>1  Orientation</td>
<td>State in which the individual has acquired or is acquiring information about the innovation and/or has explored its value.</td>
</tr>
<tr>
<td>2  Preparation</td>
<td>State in which the user is preparing for the first use of the innovation.</td>
</tr>
<tr>
<td>3  Mechanical Use</td>
<td>State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes are made more to meet the user needs than the needs of students. The user is primarily engaged in an attempt to master tasks required to use the innovation.</td>
</tr>
<tr>
<td>4  Routine and Refinement</td>
<td>State in which use of the innovation is stabilized. Few if any changes are being made in ongoing use. In the refinement portion of this level the user varies the use of the innovation to increase the impact on clients.</td>
</tr>
<tr>
<td>5  Integration</td>
<td>State in which the user is combining own efforts to use the innovation with related activities of colleagues to achieve a collective impact on clients.</td>
</tr>
<tr>
<td>6  Renewal</td>
<td>State in which the user reevaluates the quality of use of the innovation, seeks major modifications of, or alternatives to, present innovation to achieve increased impact on clients, examines new developments in the field, and explores new goals for self and the organization.</td>
</tr>
</tbody>
</table>

Which resources to use and when to deploy them, and what interventions to use and when to use them, is based on concerns-based diagnosis. For the diagnosis, the change facilitator uses various techniques for probing the change environment and the people involved.
The levels of use are used by the change facilitator to identify those individuals who are still experimenting and those who have not even started. The levels of use describe behaviors of the innovation users and do not include attitudinal or motivational aspects of the individual (Hall, Loucks, Rutherford, & Newlove, 1975). It focuses on general pattern of teacher behavior. The individual becomes familiar with and increasingly knowledgeable about the innovation before use actually begins.

Central to the CBAM is the change facilitator (Hord et al., 1987). People and the change facilitator’s understanding of the point of view of the participants are the most important factors in the change process of this model (Hope, 1996). The change facilitator, a person or persons, delivers actions on the basis of the needs of individuals or groups involved in the change. Facilitators have a resource system available to them as well as various interventions. A concerns-based diagnosis examines which resources to use and when to deploy them, and what interventions to use and when to use them. For the diagnosis, the change facilitator uses various techniques for probing the change environment and the people involved. The stages of concern of the people involved in the change, levels of use of the innovation, and the way in which the innovation is employed (innovations configurations), are evaluation tools that the change facilitator may use to diagnose the condition of the change process. The strategy used by the change facilitator to facilitate change may be any combination of interventions and resource usage, depending on the results and interpretation of the concerns-based diagnosis.

**Thesis Research Using the CBAM**

**High School Teachers Adopting IT**

In 2001, Terrence Bruchal completed a Ph.D. thesis titled, “An Integrated Model for the Implementation of Computer Technology.” The purpose of his study was to describe the various change models that were used to guide implementation of computer technology in a large high school over the duration of the study (1987 to 1995), to confirm that successful change was achieved, and to develop an integrated approach for using various models during the implementation of computer technology. The study site was an inner-city high school of approximately 1,400 students and 75 staff members. These numbers gradually decreased to approximately 1,100 students and 65 staff by 1995. The school was a composite high school and, in addition to academic programs, offered a wide range of programs. In September 1987, only a handful of teachers were interested in using computer technology. During that year, a model of change was chosen to guide the development of a technology plan, and implementation began. Over the following eight years an increasing number of teachers became involved in the project. Teachers initially used computers only as productivity tools. Gradually the teachers began using computers for automation, then instruction, and finally the use of computers became integrated into everyday instructional use. A record was kept from 1987 to 1995 of anything that affected or was affected by technology in the school. The documentation included implementation plans, yearly event timelines, school reviews, and an evaluation of the computer implementation program including interviews and a survey. From observations and these data, a case study was developed and analyzed using the Concerns Based
Adoption Model 1 (CBAM) as the analytical model. From the beginning of the implementation of the project to the end of data collection, implementation strategies evolved, partially to accommodate new conditions and occasionally to rectify ineffective strategies. It was concluded that change, involving the use of four different change models, had occurred successfully at the study site. In general, there was a movement from singular processes with deliberate outcomes to pluralistic processes with emergent outcomes as implementation progressed. Throughout the progression of change, there was a movement from lower to higher levels of innovation configuration, stages of concern, levels of use (diagnostic tools of the CBAM), and diversity among users of computer technology.

**English Teachers Adopting IT**

In 2000, Matthew Savage completed a masters’ thesis using the CBAM, on the concerns of English teachers about the integration of information technology. His study investigated the concerns that teachers of English Language Arts have about using information technologies in the classroom. A total of 30 teachers of English Language Arts from across New Brunswick agreed to complete surveys. Also, 20 individuals were interviewed. This study, which utilizes the Concerns-Based Adoption Model 1 as a means to determine levels of concern, reveals that most teachers are still at the Awareness stage (which translates to non-use in the classroom). From the interview and the survey information, this study has identified three distinct groups: (1) those teachers who are nearing retirement and who are not interested in learning about information technology; (2) those teachers who are mid-way through their careers and who have the time, the energy, and the desire to learn how to use information technology better; and (3) those teachers who are beginning their careers who are weighed down with their new and changing roles as teachers. Among these groups, the study recommended that those teachers who were at the mid-point of their careers should be targeted by administrative staff to undertake the task of learning and assisting in the implementation of information technologies. This study also revealed that when teachers are able to use information technologies at home, they are more likely to use them in the classroom. Also, the study identified the need for teachers to see tangible benefits if they were going to use information technology in their teaching.

**Rogers’ Theory of Diffusion**

Another well-known technology adoption scheme is Rogers’ Theory of Diffusion. Web-based teaching and learning may also be studied using Rogers’ Theory of Diffusion which categorizes individuals, as well as the rate at which an innovation is taken up by a group of potential adopters, by characteristics of the innovation itself. These include:

- **Relative advantage:** The benefits and the costs resulting from adoption of an innovation, often expressed as economic profitability, social prestige, or other benefits
• **Compatibility**: The degree to which it matches values and experiences of individuals in the community and does not cause contradictory situations in the individual’s life

• **Complexity**: The degree to which the innovation is perceived as relatively difficult to understand and use, and is usually negatively related to its rate of adoption

• **Trialability**: The degree to which an innovation may be experimented with on a limited basis, and is positively related to its rate of adoption

• **Observability**: The degree to which the results of an innovation are visible to others, and is positively related to its rate of adoption

Secondly, the rate of diffusion may be influenced by characteristics of the adopter. These include:

• Level of education

• Social status

• Organizational issues (organizational structure, size, and degree of decentralization or centralization)

**Thesis Research Using Rogers’ Theory of Diffusion**

**Early Adopters and Faculty Preference**

In 1998 Michele Jacobsen completed her Ph.D. at the University of Calgary on “Adoption Patterns and Characteristics of Faculty Who Integrate Computer Technology for Teaching and Learning in Higher Education.” This exploratory investigation built upon and extended Rogers’ (1995) theory of the diffusion of innovations and adopter categories in order to describe current faculty innovativeness, as well as to explore the differences between early adopting faculty and mainstream faculty. A mixed-method research design, using both quantitative and qualitative methodologies, was employed to investigate the difference between those who readily adopt technology for teaching and learning and those who do not. In 1998, collecting data using the Internet was a relatively new research methodology. Data collected using this procedure was compared to that collected using conventional methods to determine whether equivalent results can be obtained. Seventy-six faculty members from across disciplines at two large North American universities completed a 195-item survey about computer use patterns, self-rated expertise, technology adoption patterns, generalized self-efficacy, changes to classroom environments, incentives and barriers, preferred methods for learning about technology, and methods for integrating technology and evaluating the outcomes. In-depth interviews were conducted with faculty who have adopted technology for teaching and learning. Survey results were used to establish baseline data for future comparisons, to identify trends, issues, and concerns unique to post-secondary instructors, to differentiate between two adopting groups, and as a source of demographic and attitudinal data used in descriptive and exploratory statistical analyses. Qualitative data
was analyzed for emergent categories and themes, and was used to explore faculty member’s innovation-decision processes.

As expected, some differences were found between early adopters and mainstream faculty for self-rated computer expertise and total adoption of technology for teaching and learning. Some differences were found between faculty who used the Web-based and paper-based survey. Recommendations were made for campus-wide technology integration plans based upon findings that early adopter and mainstream faculty preferred different methods for learning about technology, different types of support and training, and reported different motivators and impediments to integrating computer technology into their teaching.

**Alternative Adoption Frameworks**

Researchers sometimes like to look “outside the box” so to speak at alternate frameworks of technological innovation that may be considered in studies that treat the Web as an educational innovation.

**Burkman’s UOID Process**

In the 1980s, graduate education students were encouraged to know about Burkman’s User-Oriented Instructional Development Process (UOID) published in Gagne’s seminal book on the foundations of instructional technology (Burkman, 1987). The UOID process rejected the idea that technological superiority is a sufficient condition for its adoption into instruction. The UOID process consisted of four steps:

1. Identify the potential adopter.
2. Measure relevant potential adopter perceptions.
3. Design and develop a user-friendly product.
4. Inform the potential adopter (of the product’s user-friendliness).

Although elegant in both its simplicity and consideration of the opinions, needs, and perceptions of the potential adopters as the primary forces that influence adoption, the UOID process hasn’t managed to sustain the level of interest of today’s graduate students, compared to CBAM and Roger’s Theory of Diffusion.

**The Instructional Transformation Model**

In 1989, Rieber and Welliver, and later Marcinkiewicz (1994), developed an “Instructional Transformation Model” based on the CBAM, to help schools use technology to design their restructuring plans. The Instructional Transformation Model proposes a hierarchy for the successful application of technology and adapts the original level of use into their own “level of computer use in education.” Marcinkiewicz and Welliver (1993) developed
a level of computer use (LCU) questionnaire to measure six levels of use of computers in classrooms by teachers.

**Phase Theory**

From my discussions and workshops with instructors in Europe, Australia, Canada, and the United States I have found that educators throughout a course and from one course to the next, shift between distinctive phases of online behavior. I clumped the phases together into a theory called phase theory (Mann, 1999a, 1999b, 2000). The phases are: lesson enhancement, resource-based teaching, and online learning environment. Notably, only the phases are distinctive, the tasks are not. So educators working in different phases can be doing similar tasks for different purposes.

**Phase 1: Lesson Enhancement**

Lesson enhancement is an instructor’s initiation to Web-course management and is often introduced to students as an extracurricular activity. Usually with help from the resident technologist, the instructor will decide to introduce the Web-supported material as extra-curricular activity to enhance the curriculum. Three types of lesson enhancement are classified for this phase, as follows: (1) immersive collaborative environment; (2) online self-expression; (3) online lesson assessment.

---

Table 3. Levels of Computer Use (LCU) from the model for instructional transformation

<table>
<thead>
<tr>
<th>Levels of Use</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-use</td>
<td>Teacher does not use computers at all.</td>
</tr>
<tr>
<td>Familiarization</td>
<td>Teacher becomes familiar with, but doesn’t use computers in the classroom.</td>
</tr>
<tr>
<td>Utilization</td>
<td>Teacher begins to use computers in classroom.</td>
</tr>
<tr>
<td>Integration</td>
<td>Teacher’s computer use becomes critical to teaching.</td>
</tr>
<tr>
<td>Reorientation</td>
<td>Fine-tuning of the computer-teacher-student relationship.</td>
</tr>
<tr>
<td>Evolution</td>
<td>Continue practising and learning about how to improve instruction through systematic implementation of computer technology.</td>
</tr>
</tbody>
</table>
• **Immersive collaborative environment**: Immersive collaborative environments (ICE’s) are one of the most popular venues for conducting Web-based educational research. An ICE is a lesson enhancement, with the goal of increasing the quantity and quality of interaction between students on a bulletin board or chat room. More recently, an ICE is any combination of threaded bulletin boards, real-time audio chat and instant messaging.

• **Online self-expression**: Like creative writing for a magazine, online self-expression is a student’s initiation to the Web as an author. The instructor provides the Web tools and support throughout the authoring process. Research can be conducted on the products or on the learning process itself.

• **Online lesson assessment**: Online lesson assessment is a lesson enhancement that utilized the Web as a means of assessing students or groups of students or the Web course, itself. In educational research, this can mean either student assessment, peer assessment, self-assessment, formative evaluation, summative evaluation, course evaluation, or program evaluation, all of which are discussed in this book. Lesson assessment can even be the feedback gathered through the maintenance of discussion topics in a Computer Conference or Chat Room.

Lesson enhancement describes the educator’s initiation into Web-course management. Educators, after working in lesson enhancement, said they should not have used so many features. The process was overbearing and at times difficult to manage. With many students and too many student postings, there can be too much variety to handle for one educator. Terms such as “sharing opinions,” “interacting with students,” “socializing,” “socialization,” and perhaps even “social learning” adequately define the linguistic framework of this phase.

### Phase 2: Online Resource-Based Learning

Resource-based teaching is the second phase of Web-course management. “Resources” can be of any form, namely: text, pictures, video clips, and of any knowledge-type-declarative, procedural and/or strategic knowledge for subsequent retrieval by students. The mindset for resource-based teaching is similar to that of storing and retrieving materials in a media repository or school library:

- Resources that provide content (i.e., online notes, online reader, or an online resource pack).
- Resources that support a learning activity (i.e., online manual, online lab guide, a seminar guide, a fieldwork guide, online projects facts guide, or an online work placement guide).
- Resources that support a learning process (i.e., online skills guide, skills profile, or an online student log).
- Resources that build on other resources (i.e., online textbook study guide, online readings guide, or an online lesson outline).
Resource-based teaching may require a re-definition of pedagogical goals, restructuring of curricular offerings, provision for educator training and support material, and sufficient online tools for the collection of student data. Terms like “stockpiling,” “massing,” “stacking,” “accessing,” and “accumulating” might well define the linguistic framework of the resource-based teaching phase.

**Phase 3: Online Learning Environment**

An “online learning environment” is the third phase of Web course management. In an “online learning environment,” the faculty member is wearing head gear and either driving or monitoring a simulated environment in real time. The learning environment is characterized by exploring, experimenting, constructing, and knowledge transforming. Components include virtual environments, micro-worlds, Web-based pedagogical agents, and chat avatars.

Phase theory, like its counterparts, is a description of faculty behavior as they work with an innovation. Unlike other models, phase theory tracks the ongoing thoughts and feelings of the instructor about the online aspect of their job. The phase theorist records the changing social and psychological patterns as well as the changing role of the instructor throughout the duration of an online course, and then over a succession of online courses. Verbalizations are taken over several time periods to track the faculty member as he or she phases-in and -out of one state and into another. However because of its focus on changing perceptions, and dual roles as descriptive framework and instructional method, phase theory is different, and called a teleological taxonomy of online teaching (Mann, 1999a, 1999b, 2000). Although it was intended as a description of faculty behavior as they work with an innovation, phase theory has also been used for professional development. See Chapter 6, “An Intrinsic Quantitative Case Study of WebCT Developers” for an explanation of how phase theory was used with college instructors as they learned to apply similar tasks for different purposes, based on their own intuition, personal preferences.

**New Frameworks Proposed in Thesis Research**

**E-Mail Support of Technology Adoption by Teachers**

Christensen’s (1997) Stages of Technology Adoption was developed from a doctoral dissertation at the University of North Texas in Denton on the effect of technology integration education on the attitudes of teachers and their students. The framework was used in 2002 by Sheila Tebbano in her Ed.D. thesis entitled, “Understanding the Impact of Follow-Up E-Mail Support on Teacher Adoption of Technology: A Study of Teachers in Self-Selected Web-Based Training.” The purpose of the Tebbano study was to gain an understanding of the impact of post-course follow-up e-mail on teachers’ level of technology adoption and use of the Internet for professional inquiry. Subjects were teachers in the Capital District area of New York State, who self-selected to participate in a Model Schools technology course in 2001 that included a Web or Internet compo-
The research questions included the impact of the experimental treatment on level of technology adoption, teachers’ weekly use of the Internet at home and at school, differences in the pre-post adoption of the two study groups, and whether age, gender, or years of teaching experience were related to teachers’ level of technology adoption. The methodology for this study was entirely Web-based. All data collection and communication with subjects was conducted via the Internet. A survey included the Stages of Technology Adoption (Christensen, 1997). The research also used a post-experimental online questionnaire to collect data regarding the follow-up e-mail treatment. The experimental design tested a treatment that consisted of 12 e-mails that included educational Web sites, online articles, listerv opportunities, and information that supported the use of the Internet for professional inquiry. The results indicated that the experimental e-mail follow-up was successful in producing a statistically significant increase in the experimental subjects’ level of technology adoption. The results support the concept of sustained e-mail support following technology training as a means of increasing teachers’ level of technology adoption. Suggestions for further study and implications for future practice are addressed in the dissertation.

Other Frameworks Applied in Thesis Research

Technology Adoption in Higher Education

In 2004, David Abrahams completed his Ph.D. at Cornell University. The title of his thesis was, “Technology Adoption in Higher Education: A Framework for Identifying and Prioritizing Issues and Barriers to Adoption.” This research examined the issues and barriers that inhibit faculty from using technology in instruction. The research proposed a framework that combines the empirical data from concept mapping with the theoretical factors identified from the literature to create a process that identifies the priority issues and barriers to technology adoption. Multi-dimensional scaling and cluster analysis was used to analyze the data gathered from the brainstorming session. A barrier definition and classification scheme was created and used to connect issues to barriers of adoption. Descriptive mixed methods approach were also used to develop a pictorial multivariate conceptual framework for understanding the relationships and inter-relationships between issues and barriers to technology. Fifty-five faculty, nine key administrators and staff participated in a study to identify issues to the use of Web-based technology in instruction at their institution, the University of Minnesota at Moorhead. The stakeholders identified and rated 99 issues to Web-based technology in instruction. The issues were grouped into 11 issue clusters. The study identified Moorhead State University as Early Adoptors of Web-based technology in instruction. The two clusters of issues with the highest average rating of importance were: (1) Leadership and Support and (2) Faculty Issues. Overall, the results of the study indicate that the stakeholders’ perceived lack of Leadership and Support for the technology, and the lack of Knowledge/Information about the technology to be the driving forces inhibiting faculty use of Web-based technology in instruction. Specifically, some of the issues are: (1) Technology must be easy to use; (2) Faculty needs time to learn how to use technology; (3) Technology needs to be supported to use in the classroom. Recommendations for overcoming issues and
barriers to adopting technology in instruction are provided for institutions that are similarly in the early phases of adopting technology in instruction on their campus.

**Perceived Influences**

In 1999, Jean Derco completed an Ed.D. thesis, “Instructional Technology Adoption at the University of Tennessee: Perceived Influences of Select Faculty Members.” This study focused on faculty members who adopted the computer as an educational innovation, seemingly in spite of the barriers. The purpose of the study was to identify how selected university faculty members are integrating instructional technology into their teaching practices and to determine the primary intrinsic and extrinsic rewards and incentives that influenced them to do so. Investigating what rewards and incentives were deemed as important to faculty who have already adopted instructional technologies can assist higher education in creating conditions that will influence more faculty to adopt the new instructional technologies. Data were gathered using a survey instrument, which was completed by 41 faculty members from the University of Tennessee at Knoxville who were identified as integrating instructional technologies into their teaching practices. In addition, 12 of these respondents were selected to participate in a semi-structured interview. In summary, e-mail was reported as being used more than any other computer-driven instructional technology followed by using Web-based materials that support course content, showing computer-projected visuals while lecturing, and providing a Web-based syllabus. This study found that the participating faculty members were overwhelmingly influenced to start using instructional technologies by intrinsic rewards and incentives, primarily because they wanted to increase their teaching effectiveness and improve their instruction. Additionally, the most influential extrinsic rewards and incentives were related to receiving work-related support and recognition or encouragement. It can be concluded from this study’s findings that instructional technology will be adopted by faculty who want to improve their instruction and perceive technology use as beneficial to the teaching/learning process. Recommendations based on the findings included suggestions to increase satisfaction in teaching, encourage instructional technology adoption, address facilities and equipment, and conduct further research.

**Technology Adoption as Idea-Based Research**

Thus far in our discussion, I have said how you might use a technology adoption theory or model to describe the attitude and use of a Web or other Internet technology by the faculty at your college or school. This kind of research activity is called, “data-driven educational research” and may use quantitative, qualitative or mixed methods.

Under certain conditions, however, you may want to re-purpose a technology adoption theory or model to make an impact—to improve the attitude and use of a Web or other
Internet technology by the faculty at your college or school. As a research activity, this aim is called, “idea-based research” (IBR). An IBR is an intervention of some kind: an experiment, case study, ethnographic or action research study, or some combination of these.

### Student Exercise

1. Ask students to rate their own level of use of instant messaging technology (i.e., non-use, familiarization, utilization, integration, re-orientation, evolution), in accordance with the Instructional Transformation Model. Compare these levels with their use of mobile (cell) phone technology.

2. Using the CBAM as your guide, interview teaching staff at your place to determine their stages of concern (i.e., awareness, informational, personal, management, consequence, collaboration or refocusing) as well as the current levels of use of the Web or Internet technologies in their courses (i.e., non-use, orientation, preparation, mechanical use, routine and refinement, integration or renewal).

3. Design a 5-point Likert scale (from 0 to 5) to gain some experience working with the variables in Rogers’ Theory of Diffusion (advantage, compatibility, complexity, trialability, observability).

4. Consider your own feelings about teaching online, your direction, and where it is taking you every day. Identify these feeling in the light of phase theory.

### References


Mann, B. (1998e, November 2). Working through phases: Instructional design in WebCT. Paper presented to *The School of Communications and Multimedia*, Edith Cowan University, Perth, Australia.


