Chapter 1. Phase Theory: A Teleological Taxonomy of Web Course Management

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In this paper, phase theory is introduced as a teleological taxonomy of Web course management systems, such as WebCT (Goldberg, 1997), TopClass (ECT Inc, 1997), Virtual-U (Harasim & Calvert, 1997), LearningSpace (Lotus Corporation, 1998). Phase theory is based wholly on the educator's intuition, personal preferences and prior educational experiences with Web course tools. Central to phase theory is the view that educators learn to manage their Web courses in phases.

PHASE THEORY: ASSUMPTIONS

A theory is properly grounded when its assumptions provide its context, rationale, and legitimacy in empirical research and expert opinion. Like other recent theories of technology-based teaching (Gunawardena, Lowe & Anderson, 1997; Kearsley & Schneiderman, 1998; Mayer, 1997), the assumptions and principles of phase theory are presented in a conceptual framework. In this light, three assumptions for a phase theory of Web course management are presented first:

Assumption I. The need, timeliness.
Assumption II. Web course management systems.
Assumption III. Instructional design.

Assumption I: The Need, Timeliness

One of the most important assumptions for considering a new theory is its timeliness. Is this the right time for this particular theory? Is the field overloaded with new theories, or is there a reported need for alternative ways of conceptualizing things-a new theory? At the present time, there appears to be a need for a new theory of Web course management. The need is for a descriptive framework of expert opinion and research-based principles from which to invent new methods or select known instructional methods that might work (Reigeluth, 1997). “There is a need for more new instructional theories... to offer guidance on how distance learning technologies can be used effectively”, (Reigeluth & Squire, 1998, p. 46) to reflect the current increased emphasis on alternative perspectives in the field (Richey, 1997).
Assumption II: Web Course Management

2.1 Prevalence of Tools

Colleges, universities and training organizations around the world that aspire to offer students a Web-supported, on-site and by distance education will continue to use a Web course management system (e.g., ECT Inc, 1997; Goldberg, 1997; Harasim & Calvert, 1997; Lotus Corporation, 1998; WBT Systems, 1997). Stand-alone Web pages, organizational e-mail, chat and list servs will continue to play a supporting role.

2.2 Suspect Claims

Recent claims that Web course management systems should be considered suspect, include:

2.2.1 The claim that the tools and help offered in current Web course management systems can enable designers or instructors with little or no technical preparation to customize design, deliver, and enhance education or training delivered over the World Wide Web;

2.2.2 The claim that the capability of combining online collaborative interaction matches the benefits of face-to-face classroom discussion.

Assumption III: Instructional Design

3.1 Limited Use

Despite their longevity, familiar ID models and theories (e.g., Dick & Carey, 1996; Gagne, 1985) are too static (Boshier, Mohapi, Moulton, Qayyum, Sadownik, & Wilson, 1997), inert (Yang, Moore & Burton, 1995), and unusable (Wild & Quinn, 1998) for prescribing the conditions of interactive learning for all learners in all settings.

ID models and theories are often based on psychological and educational theories that some believe (Tergan, 1998) are simply too broad in scope and too rigid for delivering instruction on hypermedia systems like the Web. Also, “instructional design (ID) procedures often don't work” (Winn, 1997, p. 36). For these reasons, ID models and theories are hardly ever used with contemporary authoring, multimedia and hypermedia systems, and when they are, are regularly misapplied (Gros, Elen, Kerres, Merrienboer & Spector, 1997).

3.2 Prevalence of ID
Educational institutions will continue to offer training in instructional design. Departments and institutions of distance education will continue to employ people trained in current models and theories of instructional design to deliver instruction in a variety of formats, including over the World Wide Web.

**PHASE THEORY: PRINCIPLES**

Theories are meant to explain something or to help us understand the way things are within a certain domain (Wilson, 1997). Phase theory is intended to help distance educators understand the way things are for Web course management. The seven principles of phase theory are:

I. Descriptive theory.
II. Teleological taxonomy.
III. A three-concept cluster.
IV. Phasing.
V. Origin.
IV. Principles, not templates.
VII. Principles, not assistance.

**Principle I: Descriptive Theory**

Phase theory is a descriptive theory of professional development of Web course management, not a decision theory of instructional development *per se*.

Descriptive theories are useful for understanding why a design theory does or does not work, and in areas where no design theories exist, it can help a practitioner to invent new methods or select known instructional methods that might work (Reigeluth, 1997, p. 43).

Descriptive theories are different from decision or prescriptive theories (Simon, in Reigeluth, 1997; Smith & Ragan, 1999). Whereas prescriptive or decision theories attempt to offer a means to accomplish given ends (e.g., Bonk & Cummings, 1998; Maddux & Johnson, 1997; Mikovsky, 1998; Riley, 1998; Wilkinson, Bennett & Oliver, 1997), descriptive theories attempt to describe how things function. Similarly, phase theory is different from decision theories of instructional design, such as Gagné’s (1985) events of instruction.

Unlike theories that invariably revert to systematic procedures of instructional design, phase theory descriptions should assist practitioners to determine their own inventions, or selection of known instructional methods that might achieve their aims with Web course management systems. Bannan-Ritland and associates (1998) for example, recommended an interesting framework for Web-based instruction that invariably reverted to principles of instructional design.
However, these categories and components do not in and of themselves guarantee good instruction since it is obviously the instructional design methods which ultimately determine the site's effectiveness in producing effective learning (Bannan-Ritland et al, 1998, p. 80).

Despite current perceptions that decision theories of instructional design often do not work (for reasons stated earlier in the assumptions section), some authors are still reluctant to relinquish methods of systematic instruction for interactive multimedia environments like the Web. Phase theory purports to provide educators with a descriptive theory of professional development of Web course managers.

**Principle II: Teleological Taxonomy**

In theory construction, taxonomic classification is a way of organizing concepts that allows for grouping by pre-identified categories. The classifications in phase theory are both taxonomic and teleological, based on critical realist approach to Web course management (described later). Taxonomic classifications require division into groups based on shared characteristics.

A taxonomy consists of systems of categories constructed to fit empirical observations so that relationships among categories can be described (Seels, 1997, p. 15).

The phases in this taxonomy, to a greater or lesser extent, utilize the features provided in a Web course management system for the purpose of managing teaching and learning in some way.

The taxonomy is also teleological insofar as the phenomena in each phase are discussed in pragmatic terms; according to its intended purpose(s), instead of observed behaviours (empiricism), or postulated causes (rationalist). The phasing teleology includes: initial insight; the inherent awkwardness of competitive elaboration; the apparent re-socialization effect during phasing in and out; and of course, the different ontological characteristics of management in each phase.

The “lesson enhancement” phase for example, is so named for its teleology or purpose of enhancing print-based or lecture-based lessons; either to provide a collaborative environment, a means of self-expression, or a means of assessing students. The teleology of “resource-based teaching and learning” phase resides in its provision for storing and retrieving materials that either provides content, supports a learning activity, supports a learning process; or builds on other resources. And, the “learning environment” phase is so named for its teleology of creating a virtual reality interface that maintains the Web-dependent inquiry environments for learners’ knowledge construction.
Recent observations of college participants (Mann, 1998a), and reported earlier in this paper greatly informed the revisions to the three-category system (i.e., lesson enhancement, online resource-based learning, online learning environment). To some extent, the questions of taxonomic classification are questions of schema. It can be expected that the schemata will limit the taxonomic structure we eventually accept. In this way, taxonomies stimulate further research, which will test the categories used, summarize knowledge, and allow predictions and comparisons that one would not think of without them (Seels, 1997).

**Principle III: A Three-Concept Cluster**

Phase theory clusters three concepts together as professional development for educators, namely: lesson enhancement, online resource-based learning and online learning environment.

A theory is a cluster of concepts organized together to form a whole. Not all concepts in the cluster are precisely defined; in fact usually key concepts- the ones most central to the theory- are not operationally defined, but instead maintain a flexibility and fluidity so they can be used in a variety of ways in addressing different problems (Wilson, 1997, p. 22).

“Resource-based learning” and “learning environments” already have well-established precedents in education. Relative to the others, “lesson enhancement” is a new concept. The three phases are explained below:

- Phase 1. Lesson enhancement.
- Phase 2. Online resource-based teaching and learning.
- Phase 3. Online learning environment.

**Phase 1: Lesson Enhancement**

Lesson enhancement is the initial phase of Web course management, and is often introduced to students as an extracurricular activity. Decisions about lesson enhancement tend to be intuitive rather than empirical or theoretical; initial ideas stochastic and idiosyncratic. Usually with help from the resident technologist, the Web course designer will decide to introduce the Internet or Web-supported material as extra-curricular activities to enhance the curriculum. Three types of lesson enhancement are categorized for this phase, as follows:

- 1.1 Immersive Collaborative Environment.
- 1.2 Online Self-Expression.
- 1.3 Online Lesson Assessment.

**1.1 Immersive Collaborative Environment (ICE)**
An immersive collaborative environment (ICE) is one way an educator or distance developer can initiate Lesson Enhancement with her students. An ICE can be any combination of threaded, electronic bulletin boards, newsgroups, and chat rooms supported by the Web course management system. The goal of an ICE is to, "significantly enhance the instructional capability of a Web course from a mere text and resource delivery to a dynamic, evolving interaction concerning instructional content" (Bannan-Ritland, Harvey & Milhelm, 1998). Figure 1 shows a typical WebCT Bulletin Board collaboration.

![Figure 1. Online collaboration using a bulletin board system.](image)

Most of the Web course management packages listed above can provide these capabilities. There are several principles associated with maintaining an ICE, namely:

1.1.1 Prep time. The preparation time required for an ICE is about twice the amount required for a conventional course, and least double what it is to maintain it. The rewards are: 1) twice the engagement by about a third of the students; 2) about twice the
number of students engaged; 3) twice the student time-on-task; and 4) about twice the quality of student work from about a third of the students.

1.1.2 Dribble files. Web course management systems will maintain a log or dribble file of students' "messages read" and "new postings".

1.1.3 Effort. Students will work only as hard in an ICE as they perceive their instructor working. If students perceive that the commitment is less than originally stated, students will assume the standard has dropped and drop the quantity and quality of their postings accordingly.

1.1.4 Communication. Although an ICE is a "media mix" (Mann, 1997) of both writing and speaking, the mental activity more closely resembles that of associating ideas during a telephone conversation than revising paragraphs in an essay. Therefore, students who prefer to express themselves verbally; by argument or debate, are favoured in an ICE over the literate souls with a passion for creative writing.

1.1.5 Skills transfer. There are many similarities between the bulletin boards, newsgroups, and chat rooms provided in the Web management systems and those offered by public web sites. Therefore, students who browse and post messages to bulletin boards, newsgroups or chat rooms in public web sites will have an advantage in an ICE over students who have not.

1.1.6 Team-like. Bulletin boards, newsgroups, and chat rooms are team-like, interactive environments. Students who thrive in an interactive environment (e.g., sports teams, debating club) are favoured in an ICE over those who work better individually.

1.1.7 Incremental. An ICE requires consistent commitment from the instructor and tutors to ongoing engagement with students online. Immersive collaboration means student immersion, not instructor immersion. A wise Web course manager increases the amount of student interaction incrementally. Requesting too much online, too fast will overwhelm and tire both the moderator and her audience; ostensibly throwing them both out of phase with the content. Staying in-phase means getting a best student opinion, satisfactory summary statement, or group consensus before giving a moderator's view.
1.1.8 Engagement. An ICE increases the engagement of some students with the course content. However, there will always be those who lurk but do not post, and those who neither read nor post, for whatever reason.

1.1.9 Democratic. ICE values all students' opinions equally. Provision for anonymous postings in the software can maximize the effects of this attribute.

1.1.10 Typists. Those who like to type or can type become more visible than those who cannot or do not wish to type, for one reason or another.

1.1.11 Personalities. In a face-to-face lesson, extrovert personalities tend to dominate discussions while the shy quiet types stay hidden in the background. This is still the case with online ICE, with the natural-born writers overtaking the stage from the natural-born talkers.

1.2 Online Self-Expression

Like creative writing, Web site development can be a medium of self-expression and of public scrutiny. One way that a designer can initiate Internet experiences with her students is to design single web pages that integrate graphics, text, a sound prompt and video clips as an extra-curricular activity to enhance her instruction.

1.2.1 Single Web Pages. Increasing numbers of distance educators, instructors and students are designing single web pages for the World Wide Web (WWW). Then graphics, sound and other files can be added appropriately to complement the text as extra-curricular activities to enhance instruction. Web page development requires authoring in HTML (Hypertext Markup Language). Although they are not absolutely necessary for creating a home page, Web site editors can be beneficial because they simplify the process of creating HTML documents by automating the HTML coding. They also allow the user to easily preview their work (Tanner & Hood, 1997). The rapid prototyping capability of HTML qualifies it as developmental software for use in educational settings.

1.2.2 Student Presentation Areas. Web course management systems can support student groups and allow the designer to designate group membership. As an alternative, Web course management systems can divide the class into groups, given the desired group size. Each group is given a presentation area for the
publication of group projects. Group presentation areas are access-controlled in that an area can be edited only by group members, but can be viewed by any member of the class. The designer can also edit the content of the group presentation area. Groups can also have dedicated bulletin-board fora for collaboration.

1.3 Online Lesson Assessment

An instructor can choose to enhance a lesson with a lesson assessment feature. Lesson assessment can be maintained for groups or individuals by: 1) Setting-up and maintaining discussion topics in a Computer Conference or Chat Room; 2) monitoring student participation throughout the conference in accordance with current issues (Boshier, Mohapi, Moulton, Qayyum, Sadownik, & Wilson, 1997); and, 3) assigning grades on an analysis of the textual output (Gunawardena, Lowe & Anderson, 1997). Figure 2 shows typical online assessment using a Quiz Tool.
1.3.1 Online Individual Assessment. Lesson assessment of individual students can be done with timed, online quizzing and marking. Web course management systems permit several types of questions: multiple choice, matching, short answer, paragraphs and calculations, and will automatically mark each of these question types, except for the paragraph and short answer. Each student can view his or her own marks as entered by the designer, or as generated by the on-line quiz auto-marking mechanism. An explanation can accompany each answer indicating why the chosen answer was correct or incorrect, and perhaps supplying hints or extra information.

1.3.2 Online Group Assessment. The Course Manager can enhance a lesson by relying on a conventional Web course
management system to quiz or survey the students in a course automatically. Figure 3 shows a typical online display of student hits using a Profiling Tool.

**Figure 3.** Online display of student hits using a profiling tool

**Quizzing student knowledge.** The Course Manager may use up to five different question types to quiz students automatically, namely: multiple choice, matching, short answer, and calculation questions. Only the “Paragraph” question type requires subjective assessment by a tutor or Course Manager.

**Surveying student opinion.** A second type of group assessment is the survey. Using the survey capability, students can vote on an issue. Student voting on course-related issues for example, can be useful to
provide student feedback to the Course Manager early in the course. Course benefactors and university administrators too, will see this potential for evaluating courses, or even comparing courses between semesters effectively, as these data can easily be downloaded to spreadsheet software for analysis.

Arguably the best kind of online assessment however, has to be the use of a conventional survey tool to enhance grading validity and reliability of student assignments. First students group-up using a grouping capability offered in the software. Next, students work collaboratively on a project or issue using mail and bulletin board tools. Then, they upload their group project into a common file area where other students can view the group’s project. Students within the group could edit their own work, and view the work of other groups in the class. Once all the group work has been uploaded, the students vote on each group’s presentation using the survey tool. Concerning the instructor’s vote, I let "John Doe" vote for me (my proxy voter). "John Doe", as my proxy, held a slightly greater weight than a student's vote. In most cases however, "John Doe's" vote happily conformed to the Median vote (average vote) of all votes cast by students. The Total mark then was easy- the Median vote. In a few cases though, "John Doe's" vote was either at the high end or the low end of the student voting distribution. In these cases, I took the mid-point between "John Doe's" vote and Median vote (roughly). Once most of the students had voted as shown in figure 5, I copied/pasted the results page into a word processor, and attached the results page itself to student's email. In a few cases, where students could not read the rtf file, I pasted the text directly into their email buffer. With the students themselves as graders, and the survey capability in a conventional Web course management system, grading validity and reliability of student assignments can be enhanced.

In sum, lesson enhancement usually describes the educator's initiation into Web course management. Planning to use Web course tools judiciously will keep Web course management problems to a minimum. For example, planning two or three weeks rather than twelve weeks of student postings, or one or two instead of five or six problem-based learning activities, can keep the lesson enhancement phase just that- enhancement. Terms such as "sharing opinions", "interacting with students", "socializing", "socialization", and perhaps even "social learning" adequately defines the linguistic framework of the Lesson Enhancement phase.

Phase 2: Online Resource-Based Teaching & Learning

Online resource-based learning is the next phase of Web course management. "Resources" can take any audiovisual form, namely: text, pictures, video clips; and any knowledge-type, namely: declarative, procedural and/or strategic knowledge for subsequent retrieval by students. The mindset for online
resource-based learning is similar to that of storing and retrieving materials in a media repository or school library. Figure 4 shows a typical listing of files in a Web course.

![WebCT File Manager - Microsoft Internet Explorer](image)

### Directories

**[WEBCT BUILT-IN FILES]**

**[COURSE FILES]**

- chat
- Help
- Outline

### Files

- All
- HTML
- Images
- Audio
- Video

- Class Quiz.txt 2101 Wed Oct 21
- Class Quiz Chat.txt 168 Wed Oct 21
- Lab Skills.txt 1335 Wed Oct 21
- Room 1.txt 1087 Wed Oct 21
- Software Report.txt 1530 Wed Oct 21
- Teach Lesson.txt 948 Wed Oct 21

![Files listed in a file manager.](image)

The following online classification has been adapted from a taxonomy of conventional learning resources developed by Parsons and Gibbs (1994):

2.1 Online resources that provide content;
2.2 Online resources that support a learning activity;
2.3 Online resources that support a learning process; and,
2.4 Online resources that build on other resources.

#### 2.1 Online Resources that Provide Content

- **2.1.1 Online Notes.** Online Lecture Notes or full-text articles are provided by the instructor, and can be a useful resource for students.
2.1.2 **Online Reader.** An Online Reader is a collection of copyright-cleared materials assembled in a duplicated pack to provide the core reading material for the lesson; it usually consists of several chapters, articles and extracts from non-book sources.

2.1.2 **Online Resource Pack.** An Online Resource Pack is a set of readings assembled for no or low cost. Copyright problems can be avoided with proper clearance from the publisher or author. An Online Pack can include data, maps, photographs, video and audio clips, slides or curriculum-related software.

### 2.2 Online Resources that Support A Learning Activity

2.1 **Online Manual.** A manual simply explains how to do things. They can be used for a variety of purposes, such as skills and procedures that are normally explained face-to-face.

2.2.2 **Online Laboratory Guide.** Laboratory guides contain background theory that would otherwise be presented in lectures. Such guides can become too prescriptive, leaving students little to do except follow instructions. But well-developed guides have an appropriate balance of information.

2.2.3 **Online Seminar Guide.** Conventionally, seminars explore topics introduced in lectures and supported by the reading list for the lesson as a whole. Seminar Guides go further, providing additional material to help students to prepare for seminars.

2.2.4 **Online Fieldwork Guide.** A special form of fieldwork guide is the “trail,” which takes students along a carefully planned route designed to maximize what can be seen and provides photographs, diagrams and text to illustrate points. Different student groups can even be given a fieldwork guide that takes different approaches to the same site, and can later be asked to compare their experiences and observations.

2.2.5 **Online Project Facts Guide.** A good way to start writing a project facts guide is to list all the requests students make for information and assistance during work on the project, and then to write down useful responses to these requests. Figure 5 shows a typical online resource that supports a learning activity.
2.2.6 Online Work Placement Guide. Some of the guidance and advice, which would normally be delivered face to face, can be replaced by written instructions. A work placement guide can also prompt students to prepare thoroughly for a visit from a VIP, so as to make the best possible use of time.
2.3 Online Resources that Support a Learning Process

2.3.1 Online Skills Guide. The typical Skills Guide is a “how to…” resource concerning the use of the library, writing lab reports or essays, working in groups, giving seminar presentations and so on.
2.3.2 Online Skills Profile. A Skills Profile can come in many different forms, but commonly includes lists of key or transferable skills. Like a Skills Guide, Profiles make little impact unless they are linked to the formal curriculum.

2.3.3 Online Student Log. A Student Log is a “diary.” Student Logs help students to structure and reflect on their learning, and may encourage them to record ideas raised by practice for discussion with other students at a later date.

2.4 Online Resources that Build on Other Resources
2.4.1 Online Textbook Study Guide. A Textbook Study Guide is designed to help students to use their textbooks effectively. This guide contains brief overviews, and questions to be answered by reading selected sections of the textbook. Sometimes, it can be much quicker and cheaper to write a Textbook Study Guide around a good textbook than to attempt to write comprehensive learning materials from scratch.

2.4.2 Online Reading Guide. A Reading Guide usually looks like an extended reading list, with annotations, advice, abstracts, suggestions for alternatives to key texts and so on. A Reading Guide provides information to help students find relevant reading resources or suitable alternatives, and make appropriate use of them. Students find frank, subjective comments more helpful than neural descriptions. They also appreciate detailed information about which parts to read and which to skip: for example, “Very useful in Chapters 3 and 4, especially pages 34 and 39, but Chapters 5 and 9 are unreliable and confusing. Later work by the same author tends to repeat the same arguments. For an alternative, try… or … and for a critique of her views, see….”

2.4.3 Online Lesson Outline. A Lesson Outline (a.k.a. Lesson Guide) provides a resource designed to help students to select and exploit a range of other resources effectively and to operate independently within a lesson.

In sum, four types of resources have been classified as general patterns for online resource-based learning that may require a re-definition of pedagogical goals, restructuring of curricular offerings, provision for instructor training and support material, and sufficient online tools for the collection of student data. Terms like "stockpiling", "massing", "stacking", "accessing", "accumulating" might well define the linguistic framework of the online resource-based learning phase.

Phase 3: Online Learning Environments

An “online learning environment” is the third phase of Web course management. A learning environment is a place where learners work together and support one another as they use a variety of tools and information resources in their pursuit of learning goals and problem solving activities (Wilson, 1995). In general, five components comprise the learning environment, adapted from Perkins (1991), namely:

- Information banks (e.g., an encyclopaedia);
- Symbols pads (e.g., a note pad area);
- Construction kits (e.g., DreamWeaver and Flash-It, Netbook and SpeakEasy);
Learning environments apply principles of cognitive psychology to the Web course. This is particularly true of learning projects characterized by an active or collaborative learning approach (Bissell, Manring, & Rowland, 1999). The following images of ScienceSpace’s Worlds are stills taken from the project’s server. The physical interface to the virtual worlds is typical of current high-end virtual reality. The hardware includes a Silicon Graphics reality engine, coupled with a head-mounted binocular display; an orientation and position sensing system with a 3-Ball sensing unit (similar to a 3-D mouse); stereo sound; and a custom vest that delivers haptic sensations. This physical interface enables us the course managers to immerse the students in 3-D visual, auditory and tactile virtual world.

![Image from www.virtual.gmu.edu](image)

**Figure 8.** Selecting tools within NewtonWorld’s 3D menu-accessing learning environment.

This virtual reality interface has the potential to complement existing approaches to science instruction through creating inquiry environments for learners' knowledge construction. The focus here is on meaningful learning that is active and involves the students in learning by discovery.
In becoming part of the phenomenon (e.g., a student becomes a point mass, undergoing collisions in a frictionless artificial reality), learners gain direct experiential intuitions about how the natural world operates, and increased understanding of scientific principles most salient to learners' senses (Salzman, Dede & Loftin, 1996).
Seevral Web sites characterize meaningful learning by the design of the subject matter. “Living History” projects for example, teach history through student’s re-enactment of historical events (Bissell, Manring, & Rowland, 1999); through role-playing, simulation and re-enactment. A good annotated listing of examples are provided at the School of Education Web site at the University of Saskatchewan. Terms such as "exploring”, experimenting”, “constructing”, and “knowledge transforming” adequately defines the linguistic framework of the learning environment phase.

**Principle IV: Phasing**

A "phase" is defined in the Merriam Webster Dictionary (1998) as a distinguishable part in a course, a development, or a cycle (e.g., still in the early phases of her career). Phasing, or working in- and out-of phases is determined by personal preference, intuition, and a kind of self-testing called “competitive elaboration” (Julnes & Mark, 1998). Competitive elaboration adheres to an emergent realist philosophy (Mark, Henry & Julnes, 1994; Henry & Julnes, 1994) which incorporates elements of constructivism and empiricism. Together they appear to constitute phasing in- and out-of Web course management patterns in the following way.

### 4.1 The Initial Insight

First, the educator develops an initial insight for a new pattern of Web course management (say, an ICE to support problem-based print material). In thinking about the purpose of the insight, the educator develops one or more explanatory accounts of the pattern, which subsequently defines the phase.

### 4.2 Alternative Insights

Next, competitive elaboration occurs when the educator’s initial insight and explanatory accounts of the pattern become susceptible to an alternative purposeful insight (say, a quiz to support the problem-based print material). These competing insights are "critical competitors" (Mann, 1998b); creative alternatives which may add value and provide comparable or even better patterns of Web course management. The strength and plausibility of each insight can be tested by adding a comparison (say, level of student support) that places them into competition. The outcome of the competition determines a candidate pattern of Web course management, and even a possible change in phasing status.

### 4.3 Patterns Are Tested

Before the decision is made to adopt one insight over the other, the new pattern is tested as warranted action of a self-evaluative activity. The resulting decision then guides the development of more adequate insights and explanatory
accounts (Julnes & Mark, 1998). Notably, only the explanatory accounts of the
purposeful insights that define a phase are distinctive, the tasks are not. So
educators working in different phases of Web course management can be doing
similar tasks and testing similar insights for different purposes. For example,"uploading files" is common to all phases, but explains nothing of the purposeful
insights that define a particular phase per se. Furthermore, predictability and
generalizability of explanatory accounts of purposeful insights that define a phase
are not given a high priority at this early stage of the research, hence the
rationale for implementing a pre-experimental (i.e., case study) research design.
In this way, educators can use competitive elaboration to consider and rule-out
alternative patterns and their insights.

Principle V: Origin

The observation that educators gradually implement educational
telecommunications in stages originated with Schrum and Berenfeld (1997); first,
as an extra-curricular activity; then, for uploading resources to be used by
students, and; third, for tutoring students in discrete computer-mediated
communication modules. Whereas the cumulative and developmental nature of
this version seem correct, the “stages of educational telecommunications” was
deemed to be too inflexible and task-oriented for a theory of Web course
management, reminiscent theories and models of instructional design. So the
“stages of educational telecommunications” were replaced with the three-phase
schema for assimilating information about Web course management (i.e., lesson
enhancement, online resource-based learning, and online learning environment).

Principle VI: Principles, Not Templates

Phase Theory is different from many information design guidelines and
templates. There are two types of templates in current use: information
templates and instructional design templates. Information templates sometimes
have instructional benefit for some users, but they are not instruction, despite the
labeling. A “template” can either be introduced to students in a non-constructive
manner, as a vessel into which the proper amount and type of information
content is poured by the teacher; or the template may be used to promote
constructive thinking. For example, Gregory and Brown (1997) described how to
develop a Web site utilizing a template for writing HTML. Hergert (1995) created
a modular, multimedia attitude assessment system from a template developed
with authoring software.

Alternatively, phase theory is more personalized than information guidelines or
templates. To some extent, phase theory re-socializes educators to consider
their own personal knowledge and experiences that may be pertinent to Web
course management. The developmental, and to some extent, cumulative and
subsumptive nature of the phases distinguish this theory from ergonomic
guidelines and templates for structuring information.
**Principle VII: Principles, Not Tools**

Phase theory is different from authoring assistance offered by some software developers. Zhao (1998) described the development of an integrated Web-based educational environment using eWeb (ECT Inc. 1997) for educational activities in a range of organizational and theoretical contexts over the Internet. Ward and Tiessen (1997) described the theory-based authoring kit ALiVE! consisting of resource management, collaboration and coordination tools for schools. Undoubtedly, teachers could make good use of such programs. This approach relegates the educator to a facilitator position. Phase theory prefers to keep the responsibility and authority for using or not using tools, the nature and level of student interactions, and the presentation of content provision for feedback with the educator. Moreover, unless program copies and recipes for their use are provided to schools, teachers are unlikely to know where and how to acquire and use them. According to phase theory, the educator becomes more or less of a facilitator depending on the phase they choose to adopt.

**CONCLUSION**

This chapter described a theoretical framework about how people work and think with a Web course management system to help practitioners invent new methods or select known instructional methods that might achieve their aims. One future direction would be to implement phase theory as an instructional strategy to train novice Web managers.

**CREDITS**

Figure 1. Online collaboration using a bulletin board system. In B. Mann. *Education 3943*. Unpublished Website. St. John’s, NF: Memorial University, 1997.

Figure 2. Online Assessment using a Quiz Tool. In B. Mann. *Education 3943*. Unpublished Website. St. John’s, NF: Memorial University, 1997.

Figure 3. Online Display of Student Hits using a Profiling Tool. In B. Mann. *Education 3943*. Unpublished Website. St. John’s, NF: Memorial University, 1997.

Figure 4. Files listed in file manager. In B. Mann. *Education 3943*. Unpublished Website. St. John’s, NF: Memorial University, 1997.

Figure 5. Online Resource that Supports A Learning Activity. ArtMetal Website. Accoll Arts, 1999. Used with permission.

Figure 6. Another online resource that supports a learning activity. ESC Group, France, 1999. Used with permission.
Figure 7. An online resource that supports a learning process, Writing Rules. Melissa Binde, 1999. Used with permission.

Figure 8. Selecting tools within NewtonWorld’s 3D menu-accessing learning environment. In Chris Dede’s Project ScienceSpace, George Mason University. Used by permission.

Figure 9. PaulingWorld’s 3D ball-and-stick representation of a molecule. In Chris Dede’s Project ScienceSpace, George Mason University. Used with permission.

Figure 10. MaxwellWorld's 3D single-charge with field lines. In Chris Dede’s Project ScienceSpace, George Mason University. Used with permission.

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