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## **Beliefs and Protocols for Successful Web-based Instruction**

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Following the introduction of the World Wide Web in 1993, its use as an adjunct instructional method has gained rapid prominence. Many claim that the Web promotes learning by making resources and materials more accessible, by increasing student-instructor contact, by supporting individually tailored instruction and independent learning, and by facilitating dynamic interconnections within and between knowledge domains (Owston, 1997). The Web's station as a gateway to a worldwide database of information and the relatively simple syntax of basic HTML tagging have made the Web a valuable interface for course content in post-secondary education. However, the value of Web-based instruction lies between two ends of a continuum. At one end, the Web may serve as a delivery mechanism, a mere repository for repurposed information. At the other end, the Web may provide a means for tapping into intrinsic components of content-based instruction that would otherwise remain unexposed to the learner. In either case, the effective use of Web-based instruction requires instructors to establish protocols - explicit standards that guide how that materials should be used - in order to ensure that diverse students users can benefit equally from using the Web both in and out of the classroom. Such protocols are the manifestation of beliefs held by instructors and designers concerning how students think and learn. A deeper understanding of how these beliefs are structured – and of how beliefs and protocols interact – provides the foundation requisite for the development and delivery of effective Web-based Instruction.

We shall begin by providing a foundation for understanding belief and the role it plays in pedagogical decisions. Next, we shall examine attributes uniquely associated with Web-based content development and delivery. Finally, we shall explore three cases of flourishing Web-based instructional environments, with an eye toward the beliefs and protocols embedded within each, in an effort to stimulate reflection and provide models for success. In so doing, We shall draw primarily upon two sources for support: the concept of “belief” offered by William James, and the concept of “folk pedagogy” introduced by Bruner.

### ***From Belief ...***

*“The desire for a certain kind of truth here brings about that special truth’s existence”  
-- The Will To Believe, William James (pg. 24)*

Implicit within one's pedagogy are beliefs about students, beliefs about the various attributes of media technologies, and beliefs about the essential qualities of the content being taught. Instructors and course designers make decisions based on how these beliefs interact. Often, the process used to make these decisions is guided by sets

of strategies deployed before actual instruction begins. While principles advanced by the more prevalent instructional design models value initial consideration of student needs and instructional goals as requisite, it is perhaps most important to begin the design process with a consideration of the beliefs one holds concerning the components of instruction. For William James, the founder of American psychology, understanding belief must begin with the act of believing as it relates to hypotheses and options.

In *The Will to Believe*, James writes of *live* and *dead* hypotheses. Live hypotheses are those propositions which one may consider to be truly possible, for example: “Students learn best via direct instruction.” Dead hypotheses are ones which fall outside the realm of believability completely. Hypotheses provide the thrust for exercising belief when making decisions. According to James, belief is engaged when opportunities to select between competing hypotheses present themselves, requiring action and decision between two or more *genuine* options. Options may be a combination of (1) living or dead, (2) forced or avoidable, and (3) momentous or trivial. A genuine option, however, is one which is living, forced and momentous.

Options are *living* when a choice between two live hypotheses is presented, as opposed to a choice between a live and a dead hypothesis. For example, choosing between “Students learn best via direct instruction” and “Students learn best via self-directed activity” presents a live option, since either may be considered plausible. However, choosing between “Students learn best via direct instruction” and “All students are incapable of learning anything when instructed directly” is more likely a dead option. An option is *forced* when a choice between competing hypotheses is unavoidable – that is, the option of “do nothing” does not exist at that moment. Choosing between instructional methods is often a forced choice, since the option of standing in front of a classroom full of students and doing nothing is, for most, unavailable. Finally, an option is momentous when the opportunity to choose between competing hypotheses presents a situation which is unique, significant and irreversible. Certainly, choosing to move one’s course and course materials to a Web-based format would qualify as unique, significant and – for the duration of that particular period of instruction, at least – irreversible.

Genuine options exist for instructors and designers in all instructional situations. However, when considering Web-based instruction, opportunities to decide among live hypotheses may be missed, due to a lack of understanding of which options, exactly, are the genuine ones and which are not. The implications of these options are often less clear because of insufficient attention to beliefs and the role they play in guiding action. However, the pedagogical constructs which result from the choices between perceived genuine options will remain explicit within a web-based environment.

## ... to Pedagogy ...

“Pedagogy is never innocent. It is a medium that carries its own message”  
-- *The Culture of Education*, Jerome Bruner (pg. 63)

In *The Culture of Education*, Bruner (1996) notes that the beliefs and assumptions that an instructor has developed concerning the learner results in the construction of a *folk pedagogy*. . The *folk* in folk pedagogy is essential, because it draws attention to the belief-laden nature of pedagogical constructs. For Bruner, beliefs about mind and beliefs about knowledge are intricately interwoven and they provide the foundation for decisions about what actually takes place in instructional environments:

...educational practices in classrooms are premised on a set of folk beliefs about learners' minds, ... They need to be made explicit and to be reexamined. Different approaches to learning and different forms of instruction – from imitation, to instruction, to discovery, to collaboration – reflect differing beliefs and assumptions about the learner – from actor, to knower, to private experiencer, to collaborative thinker. (pg. 49-50)

We have used Bruner's identification of folk beliefs as a foundation for exploring the assumptions about the learner in a Web-based environment. Using Bruner's taxonomy of four prevalent models of learners' minds, We address beliefs and protocols according to the following:: (1) student as imitative learner, (2) student as didactic learner, (3) student as epistemologist, and (4) student as canonical learner.

### 1. Student as imitative learner

For many, the belief that proper instruction consists of a repetitive process of “watch one, do one” provides the foundation for most instructional decisions. Successful outcomes are more likely, it is believed, when students are placed in an instructional environment which combines recurrent and channeled activity -- eventually leading to competence in the discipline. Designers and instructors who view the student as an imitative learner are operating according to behavioristic assumptions about the learner. As noted by Bruner, these assumptions are that: “... (a) the child does not know how to do  $x$ , ... (b) the child can learn how to do  $x$  by being *shown* ... (c) the child wants to do  $x$ , and (d) that she may, in fact, be trying to do  $x$ .” (pg. 53) The prevalence of modeling as an instructional strategy across learning environments suggest that many instructional designers believe that students are primarily imitative learners, and that performance can suggest understanding. However, a Web-based environment is an open-ended one. Demonstrating search strategies or hypernavigation through a vast content area, for example, may be based on the structure of an informed mind; however, assuming interest and the existence of such structure runs the risk of leaving novice learners linked to content information that lacks credibility or is only marginally relevant to their perceived task

at hand. Consequently, it may be necessary to define relevant context and criterion for bounding content to task, to mitigate a folk pedagogy that assumes students' imitation suggests understanding.

## **2. Student as didactic learner**

Viewing the student as didactic learner is based upon the belief that students are inherently “hard-wired” with certain capacities and capabilities that may be either tapped into or molded – according to the instructor’s or designer’s intentions – to facilitate knowledge acquisition. Such beliefs lead to the assumption that certain *schemata* exist within each learner’s head that guide the student’s cognitive processing. For those who hold such beliefs about students, instructional strategies often emerge that are less concerned with students *doing* something skillfully but rather, according to Bruner, “the ability to acquire new knowledge by the aid of certain ‘mental abilities’ ...” (pg. 55) Such “mental abilities” take the form of various intelligences, such as verbal, interpersonal, numerical, and emotional. It is assumed, then, that students already possess pre-determined levels of these intelligences and the role of the instructor or designer is to provide the student with mechanisms which she may use to operate at the higher end of her intellectual spectrum.

A technology-savvy instructor who believes that a web-based interface has an apparent logic to its design may mistake confused student-users as lacking in aptitude for the subject-matter when--in reality--the structure of the interface is serving as more of a deterrent than an aid in matching the information to students' existing schemas. In addition, the instructor may not question the level of access to sufficiently-powered computers needed to successfully run advanced functions such as Java. Individual student motivation may be inappropriately linked to one’s prior experience and access to web-based technologies. Expectations for student access, and assistance in defining alternatives in the case of problematic situations, should be stated explicitly in order to guard against a folk pedagogy that defines student motivation or effort.

## **3. Student as epistemologist**

In *Mindstorms*, Seymour Papert introduces the framework of “child as epistemologist” by suggesting that “... children appropriate to their own use materials they find about them, most saliently the models and metaphors suggested by the surrounding culture.” (Papert, pg. 19) Drawing from the developmental theories of Piaget, many instructors and designers believe learning is a constant process of negotiation between the workings of the world and the workings of one’s own mind. Bruner describes the process of thinking about one’s own thinking as “going meta,”

where learning occurs when “naïve theories are brought into congruence with those of parents and teachers not through imitation, not through didactic instruction, but by discourse, collaboration, and negotiation.” (pg. 57) Instructors and designers who believe that students are active epistemologists often operate under the assumption that students are interested in continuously developing their own learning, and that the student should initiate her own process for thinking and learning by engaging in collaborative discourse to form an environment where she is most likely to develop and learn according to her own design.

Designing instruction for the student-as-epistemologist reflects current enchantment with constructivist approaches (Duffy & Cunningham, 1996). However, because constructivist approaches draw on individualized understanding, processes of instruction can be messy, recursive, dissonant and diffuse as individuals work out new conceptions over time. Without sufficient time and resources, an instructor may inadvertently promise more than is possible to deliver. On the other hand, when properly structured and moderated, Web-based discussion-groups can diminish a folk pedagogy structured on arbitrary interaction toward a directed pedagogy structured by purposeful and emergent interaction.

#### **4. Student as canonical learner**

Finally, many instructional situations are constructed on the belief that certain things are “known” by both the student and by the society into which the student is being enculturated. Often, there is dissonance between these sources of knowledge, and it is the role of the educator to help the student distinguish between the two. At times, instructors and designers are guided by the belief that “...teaching should help children grasp the distinction between personal knowledge, on the one side, and ‘what is taken to be known’ by the culture, on the other.” (pg. 61) What is “culturally known” becomes a common knowledge base with historical significance and relevant to those who are members of the community at hand. This knowledge base has been developed by predecessors, and serves as a guide or roadmap for solving everyday problems. Failure to recognize the validity of such knowledge results in a lost history of who we are, how we came to be, and how we can continue to sustain our culture and environment. The assumptions about learners that arise from these beliefs in need of guidance into the citizenry, and that exposure to “what we already know” is the most effective means to accomplish this.

***... to Protocols ...***

*“Watch any mother, any teacher, even any babysitter with a child and you’ll be struck by how much of what they do is steered by notions of ‘what children’s minds are like and how to help them learn,’ ...”*

*-- The Culture of Education, Jerome Bruner (pg. 46)*

*Protocols* are explicit expectations held by the instructor regarding (2) expressions of the instructor’s role as an educator, (1) processes of classroom communication; (3) guidelines delimiting what constitutes relevant conceptions of content, and (4) student actions that demonstrate a desire-to-learn. In short, *protocols are manifestations of an instructor's pedagogy*. Protocols are the confluence of factors that contribute to shaping a teaching style, such as: previous experiences as an instructor, previous experiences with students, exposure to existing models of instruction, and *held beliefs* concerning what constitutes learning, teaching and the interaction of the two. It is this last factor with which we currently are most concerned.

Unfortunately, many teachers have found that rarely is it necessary to reflect on one's pedagogy to develop a teaching style. Instead, teaching style most commonly evolves from a combination of three influences: (1) fixed factors, such as: available resources, class size, and other environmental factors; (2) the structure of knowledge and professional practices dictated by the content; (3) the teacher’s experience as a *student*. Teaching style is often adaptive at best and reactive at worst. That is, it represents the way one either adapts or reacts to the various conditions of instruction. However, when using the Web for course instruction, one has the opportunity to manipulate many of the conditions of instruction that historically have been less malleable, for example : student interface with the information, structure of material presentation, pace, and context. Time and space become less constrictive, as well. As a result, we are beginning to see a renewed interest by instructors and designers engaged in Web-based instruction to take a more reflective approach to designing instructional environments. In so doing, the protocols evolving from such conditions can genuinely reflect the beliefs and assumptions commonly held by the those involved in the design and delivery of instruction.

Held beliefs about what constitute effective teaching and meaningful learning are directly manifest in the protocols of instruction. For example, beliefs about the student as imitative learner provide the foundation for *demonstration* to emerge as the dominant instructional protocol. Beliefs about the student as epistemologist lead instructors and designers to establish environments where students may engage in peer collaboration and discourse in order to discern how to *think as a mathematician would think*. The protocols which evolve from either of these examples will be perceptibly different concerning the expectations of how students will demonstrate appropriate classroom communication, accurate knowledge comprehension of subject-matter, and an acceptable desire to learn. Historically the conditions in which these protocols were forced to operate have been similar across instructional environments. The result has often been a conflict between the protocol(s) that one wishes to promote and those to which the environment is actually conducive. For example, limiting class meeting times to pre-defined schedules may

dampen an instructor's willingness to spend sufficient time on reviewing material that was previously covered, but which remains tentative in the student's mind. The push to move on and get the material covered can result in an abridged instruction. With access to web-based materials, it is possible for the instructor to extend and expand learning options.

## ***.. to the Web***

Web-based instruction affords the designer or instructor an opportunity to create an environment where a range of pedagogic assumptions can be incorporated. . For example, the hyper-navigational features of Web-based technologies can be used to support for constructivist approaches to learning to support active processes of knowledge construction. Examples and archives of accurate performance, work samples, and model answers can be posted for student reference. Resources can be collected for research and writing. Interactive user input, animation, and presentation can be sequenced according to changing student needs. Student work can be focused on creating meaningful texts that, once posted the web, become authentic public resources. Time and distance can be manipulated according to student needs. However, while all of these goals and processes can be attempted with Web-based instruction, they can only be achieved once instructors, designers, and students make proper use of Web-based materials. Executing Web-based instruction that relies on protocols founded upon well-defined beliefs hold the greatest promise for success.

## ***Conclusion***

The increasing ease of using the Web as an instructional resource risks reliance on a folk pedagogy regarding student use of Web-based technology. As Bruner points out, "For any innovations that you, as a "proper" pedagogical theorist, may wish to introduce will have to compete with, replace, or otherwise modify the folk theories that already guide both teachers and pupils." Whether as an instructor designing one's own course website, as a resident technician tagging materials a faculty member wants converted to a Web-based resource, or as an instructional designer consulting with a content expert to build Web-based courseware, it is useful to consider how Web-based materials function as an interface between students and instructor, and between students and content. To make full use of valuable features of the Web as a classroom resource, however, thinking about how to translate pedagogy into a meaningful guide to Web use is essential. If such considerations are non-existent, or even incomplete, Web-based resources become an obstacle to some students and an albatross to those required to update, maintain, and design the site's materials and content. If, however, instructional personnel take a more active approach to relating Web-based learning environments to the

beliefs and assumptions about teaching and learning which drive instructional decisions, such environments are more likely to be more effective settings for sustaining meaningful student learning and teacher development.

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