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THE DESIGN OF ELECTRONIC MEDIA-BASED ACTIVE LEARNING EXPERIENCES

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1. Introduction

It seems that the tradition of K-12 classroom learning materials among Western cultures may particularly benefit some learners–referred to here as reflective learners–who possess preferences for processing information by thinking about observations. By nature, learning materials, both print and electronic media-based, have tended to be structured sequentially, emphasize the classification of concepts and focus on the representation of theory in the absence of direct, concrete experience with information. Unfortunately, it seems that this approach to the presentation of information may not be compatible with the dominant preferences of active learners, or those learners who prefer to learn, and do so best, by making and doing (i.e. using information in order to understand it). "Schools ask [students] to listen and reflect," says Bernice McCarthy, author of *The 4MAT® System*, a teaching model based, in part, on the learning style research of David Kolb. As a consequence, active learners–approximately half of all people–often do not have the advantage of regular learning experiences that are compatible with their preferences. The expectation for K-12 active learners, it seems, is that they either adapt to learning reflectively or fall behind in their academic pursuits [McCarthy 1980].

However, as a consequence of what seems to have emerged as the complex negotiation of the integration of electronic media-based technology into the classroom environment, as well as the general popularity of learner-centred education and constructivist theory (i.e. "learning through the construction of knowledge"), Western education may be ripe for revolution. In fact, such a change of perspective toward teaching and learning might likely be characterized by an increased willingness among educators to explore the presentation of information through what have been considered heretofore to be unconventional means [Heide 2001, Ivers 1998]. Motivated by an interest in how learning materials might be designed to prompt and support the active processing of information, I am engaged in an ongoing investigation of the constitution and nature of the components of active learning experiences, through literature-based research and the development of speculative learning materials and environments. The purpose of this paper is to share a concept and related strategies that I have developed for the design of a proposed yet, thus far, speculative electronic workbook series, for high school-level students. This series, titled DO LEARN, is based upon *The 4MAT® System* teaching model and is configured to accommodate the preferences of active learners.

2. What Active Learning Is and What It Is Not

My initial foray into the design of activity-based learning experiences involved a project that I undertook as a student in the Master of Graphic Design program at North Carolina State University, titled, "The Printed Page Designed for Students with Active Learning Preferences," under the guidance of Professor Meredith Davis. The printed page was selected as the medium for the project,

primarily because the prospect of designing a textbook, which is an inherently reflective means of conveying information, that supported active learner preferences seemed to present a particular challenge. In its ordinary manifestation, a book is rather limited in its capacity to accommodate activity-based learning. Though it may be simple, and even commonplace, for textbooks to *promote* activity–through the presentation of directions for a project, for instance–it seems to be a far more complicated matter, and is indeed rare, for an experience that supports active cognitive processing to be *replicated* within a print-based environment. Likewise, it seems that it may be nearly as difficult to replicate an active learning experience within an electronic media-based environment.

My initial strategy for the design of activity within a printed medium involved the appropriation of textbook content from existing sources, splitting large blocks of text into smaller fragments and composing those fragments in a visually dynamic manner on a page. This spatial rearrangement of information was intended to promote choice, in terms of the order in which learners could access information, in order to satisfy the preference of active learners for self-direction [Brosterman 1997, Montessori 1983]. Nonetheless, though active visually, these studies did not encourage learning through activity. As a result, the conclusion was drawn that, perhaps, it is not so much the formal manner in which content is presented that determines whether or not an environment is equipped to support activity-based learning but, rather, the nature of the content itself. In other words, if a body of content is written and structured in such a way as to require that it be processed reflectively, then the experience of processing that information will be reflective. Though my initial compositions demonstrated the appearance of activity, the content was still rooted in abstraction and reflection and, therefore, it is improbable that the studies would have the capacity to promote the active processing of information. Also, it seems unlikely, if the same strategy for the appropriation of existing textbook content was employed in the development of an electronic environment intended to support active learning, that it would be successful–even if the content were to, say, be accessed through hyperlinks.

It appears that open-ended, activity-based learning experiences may support the preferences of active learners while, in contrast, linear, closed-ended and exercise-based textbook content does not. Consequently, the approach of rearranging existing textbook content was abandoned in favor of the development of new content intended to stimulate open-ended learning. An open-ended learning experience may be defined as an activity-based procedure in which learning is stimulated through actual experience with information presented as a kit-of-parts to be manipulated and assembled in multiple ways to achieve multiple possible and appropriate solutions. A closed-ended learning experience, on the other hand, is an exercise-based procedure that involves a strict, step-by-step process that leads to a single, correct outcome [Davis 2002].

3. DO LEARN

DO LEARN is a speculative monthly classroom supplement for high school-level students and is designed to support the preference among active learners to process information through self-direction. High school-level active learners were selected as the target audience for this project since it is those students who seem, in particular, to be denied regular educational experiences that satisfy their learning preferences, perhaps more than any other student group throughout grades K-12. This discrepancy may be due to the bias among Western cultures that intellectual maturity and intelligence are dependant upon, primarily, logical and rational thought and the "ability to be abstract." It seems that students within traditional educational environments are most often groomed and expected to "outgrow" their need to learn through experience by the time they reach high school. Perhaps one's facility at processing abstract information reflectively may even be a significant factor in the determination of her academic success at the high school-level and beyond [McCarthy 1980].

A self-contained kit of activities, DO LEARN is designed to function in addition to existing classroom curricula and materials. Each instalment of the learning supplement is intended to be general, neutral and complete enough so that it need not correspond directly with other coursework, nor requires prior study of particular content, in order to support potentially enriching learning experiences. As a supplement, a fundamental objective of DO LEARN is to allow schools and teachers flexibility in the

integration of activity-based learning experiences within their classroom routines. Teachers may set aside time in class on a weekly or monthly basis, for instance, for students to work on DO LEARN activities, or the activities may be assigned as homework. Additionally, DO LEARN is designed so that students may perform activities either on an individual basis or as members of groups. It seems that group work may be particularly beneficial, since it affords students opportunities to share insight and perspective and bounce ideas off of one another. Group work may also support peer sharing and evaluation experiences, as means through which students may learn from one another and develop critical thinking skills. Since DO LEARN is electronic, it seems to afford potential opportunities for students to share their work with one another not only within the classroom, but remotely, via the Internet. Since it is intended that the activities be self-directed, teachers would be encouraged to allow students the freedom to choose whether or not to work with others or individually.

The content of installments of DO LEARN is intended to be discipline-specific. Designed as a model for electronic media-based learning and not for the demonstration of content alone, the structure of the learning supplements may be adjusted to support the content of various disciplines. Voluntary content standards for twelve disciplines taught in K-12 education were developed in the United States in recent years, under the leadership of discipline-based educational associations. As the result of recognition among some educators that, perhaps, learning should be approached differently now than it has been traditionally, the standards are dedicated to learning as the development of thinking and reasoning skills, not the rote memorization of facts. This perspective on learning seems to be consistent with the preferences of active learners–to learn by using information, as opposed to by memorizing facts and concepts. I referenced the standards for language arts in the development of content for a demonstration instalment, titled, DO LEARN LANGUAGE ARTS (e.g. "Demonstrates competence in using different information sources, including those of a technical nature, to accomplish specific tasks" and "Demonstrates competence in the stylistic and rhetorical aspects of writing") [Kendall and Marzano 1996]. These standards represent the most important information in a discipline, worthy of, as described by Grant Wiggins and Jay McTighe in *Understanding by Design*, "enduring" understanding [Wiggins and McTighe 1998].

The content structure within individual DO LEARN supplements consists primarily of activities, geared toward a particular, broad concept (e.g. "the ways in which one's life is influenced by geography on a day-to-day basis"), that are facilitated by "clues" (i.e. questions) meant to help students generate information–through speculation, accessing existing knowledge, research, interviews, etc.–in order to perform and complete the activities. If compared with Freidrich Froebel's kindergarten teaching system of "occupations" (i.e. structured activities in which students interact with gifts) and "gifts" (i.e. objects to be manipulated and assembled to demonstrate connections and build understanding), the activities in DO LEARN may correlate with occupations, while the clues function similarly to gifts [Brosterman 1997]. The clues are intended to help students to assemble new information and understanding into individual, holistic worldviews by prompting critical thought and the formation of connections among the activities within the supplements, as well as what is learned through the activities, everyday experience and existing knowledge. However, the purpose of the clues is not only to reveal to students how the activities–in the broadest sense–are meant to be performed but, also, their objectives. The activities should be indicative of the overall structure of the open-ended learning experiences offered within DO LEARN supplements. In other words, the activities set parameters and do so by offering suggestions to students in regard to what they might do in order to participate in an activity (e.g. "Close your eyes and imagine your character…as you write, allow your character to develop more and more vividly") while still allowing the experience to remain "open" enough to permit the exploration of a variety of possible solutions [Davis 1975].

The activities within DO LEARN focus on particular scenarios that are intended to function as environments within which students may access concrete information that is used to cast what may be new and unfamiliar concepts with known details [Davis 2002]. It seems that the imagination may be an effective device through which the visualization of activity may be experienced in the absence of actual activity. As suggested by James L. Adams in *Conceptual Blockbusting,* it seems that human

beings possess the capacity to achieve full sensory experiences in their minds' eyes through the stimulation of memory via concrete verbal cues intended to evoke dynamic mental imagery. Guided visualization seems to demonstrate effective potential as a means through which students may engage in imagined scenarios, intended to support the development of understanding of unfamiliar concepts. DO LEARN LANGUAGE ARTS *Character Sketch,* for example, employs a three-part system of guided visualization through which concrete verbal cues may lead students through an example of the development of a character description, so that the students might learn how to write a character description based upon simulated "experience" [Figure 1] [Adams 1974].

Figure 1. Concrete verbal cues are used to prompt visualization

Aside from and in concurrence with the guided visualization scenarios, the activities within DO LEARN offer creation-type experiences through which students may have opportunities to learn through making physical representations of information [Davis 1975]. The representations may be visual (e.g. sketches, maps, charts) and/or verbal (e.g. written descriptions of visual representations, stories, lists of ideas). Also, students may work directly in the workspaces offered within the environment. For instance, there are workspaces in DO LEARN LANGUAGE ARTS *Character Sketch* in which students may write full compositions, as well as places where students may generate and record ideas for their character descriptions.

As mentioned previously, for active learners, the freedom to decide what to do with information and how to do it seems to be of critical importance in regard to the experience of cognitive satisfaction [Brosterman 1997, Montessori 1983]. Within DO LEARN, it is intended that students may be allowed opportunities to choose how to go about performing activities, which may allow a sense of playful exploration and discovery that adds a level of personal relevance to students' relationship with the information content. This may help students to feel motivated, intrinsically, to engage in the activities. In this same spirit, students may pursue the components of the activities in any order that they wish. The structure of the components, which may be accessed through hyperlinks, is designed to convey the content as being interconnected, as opposed to linear, in nature.

The sounds and images–whether moving, still, typographic or photographic–demonstrated within the DO LEARN are meant to support, though not necessarily define, the information and activities with which they are associated. The formal manner in which images are handled may suggest how they should be used. DO LEARN LANGUAGE ARTS *Character Sketch,* for example, includes pale, blurred, sepia-toned images [Figure 2]. By altering the images in order to downplay detail–so that the photographs are less defined than they would be in sharper focus and full-colour–may support students in the application of their own imaginations to the images.

Figure 2. Photographs are pale, blurry and monotone, in order to support imagination

It is probable that traditional methods of grading pencil and paper tests may not be appropriate for the evaluation of performance-based activities, such as those featured within DO LEARN. Therefore, a system of rubrics, similar to those established by the United States National Assessment Governing Board for the assessment of student projects, may be useful in the evaluation of DO LEARN activities. Basic, proficient and advanced, for example, are terms that may describe varying degrees of sophistication in the understanding of the nature and implications of information. A basic assessment may denote, "…partial mastery of knowledge and skills." A proficient assessment, "…represents solid academic performance." An advanced assessment, "…signifies superior performance." [Kendall and Marzano 1996] As applied to the written composition activity in DO LEARN LANGUAGE ARTS *Character Sketch*, for example, a student who demonstrates the ability to describe a character through the use of superficial details may receive a basic assessment. A student who demonstrates the ability to describe a somewhat nuanced character may receive a proficient assessment. A student who demonstrates the ability to describe a character vividly and empathically may receive a superior assessment.

It may be most convenient and appropriate for DO LEARN supplements to be situated on the Internet and accessed by student subscribers via passwords. The site could be considered "work-in" space, in which students access, save and share activities that they have either completed or are pursuing. The students may be able to chat with one another about project work, through both formal and informal on-line discussions, and group work, as mentioned previously, could continue outside of the actual classroom environment via the Internet. Also, this type of forum would allow teachers to be able to access, observe and evaluate student work easily and regularly and not be obligated to take class time to do so.

Each issue of DO LEARN is to intended to contain a consistent explanation, for both students and teachers, which describes the meaning and objectives of open-ended, activity-based learning and the manner in which the supplement attempts to facilitate that type of learning experience. This explanation would be present in each instalment so that the fundamental premise of DO LEARN may be clear, consistent and acknowledged on a regular basis. Also, by design, there should be no teachers' manuals to accompany DO LEARN supplements. DO LEARN is designed specifically for students and it is intended that each issue contain precisely what students need in order to be able to perform the activities on their own. It seems that a teacher's edition would necessarily function in contradiction with the very nature of open-ended, activity-based learning. Any implication that there may be a correct way to teach DO LEARN seems to suggest that there may be a correct way to "do" DO LEARN. The role of a teacher in association with a DO LEARN experience is not to instruct per se but, rather, to offer support and act as a guide and sounding board off of which students may bounce ideas without judgment or correction.

4. Conclusion

Much of the development of DO LEARN has involved attempts, through making visual studies–both print- and electronic media-based–to develop an understanding of the components of learning experiences that satisfy the preferences of active learners, in order to replicate similar experiences within educational materials. The determination that active learner preferences may be best supported by open-ended, activity-based learning experiences, as well as that content may not neutrally support the preferences of both active and reflective learners and that guided visualization may be an effective device to prompt learning through simulated activity, were significant to the outcome of this project. However, there is still a good deal of analysis of the demonstration artefacts to be done, in regard to issues related to, for instance, the composition of information within virtual space, as well as observations and evaluations to be made of how members of the target audience (i.e. high school-level students with active learning preferences) actually use DO LEARN. There may also be benefit to the observation and evaluation of how students with reflective learning preferences respond to DO LEARN. According to Meredith Davis, "Adult work in this century depends on the ability to imagine that which does not exist and to visualize meaningful patterns in complex data." In other words, the possession of visual thinking skills and facility in the analysis and synthesis of information into fully manifested ideas–like those higher-level thinking skills that are fostered through activity-based learning experiences–are lauded and highly marketable in today's workplace. In light of this perspective, and in the spirit of the position of *The 4MAT® System*–that all students should have opportunities to learn in ways that are both most comfortable and uncomfortable–perhaps the sort of learning experiences that accommodate the preferences of active learners might be valuable for reflective learners, too [McCarthy 1980].

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