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A Model to Integrate Online Teaching and Learning Tools Into the Classroom

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With the evolution of the World Wide Web, online teaching and learning has gained a tremendous amount of popularity. New Web teaching and learning tools are created at a fast pace to help better address the multitude of teaching and learning styles. Liu and Thompson (1999) found that faculty members are more likely to use a wider variety of educational technologies when exposed to online teaching and learning tools and thus teach to a broader array of learning styles. The increasing diversity of learning strategies is a growing challenge for teachers. One way to address this challenge is to incorporate online learning tools into the traditional classroom. Such a combination may benefit both students and teachers if those tools provide quality teaching and learning opportunities and outcomes. However, little research exists on how learning environments can be created that successfully combine online teaching and learning with traditional classroom environments to enhance student learning.

This article introduces a model that addresses how an effective combination of online and traditional classroom teaching can be obtained. The article shows how learning outcomes and preferences as well as the awareness of student characteristics and student feedback such as the perception of classroom environment can be used to enhance the quality of a combined learning environment.

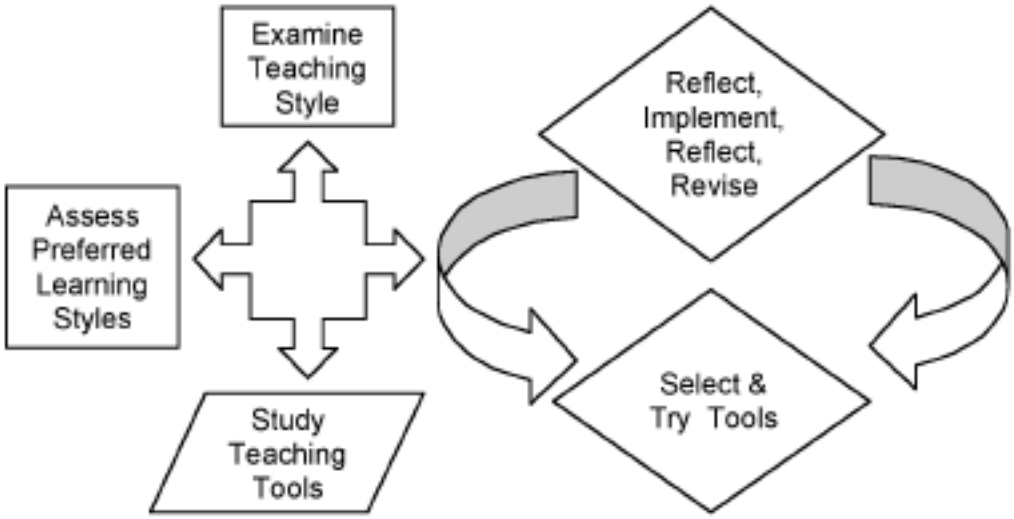
Students' perceptions of the classroom environment are indicators of successful learning. Cheung (1998) stated that student feedback is essential for improving the academic quality of online learning. Sherry, Fulford, and Zhang (1998) discussed the positive relationships between students' satisfaction with instruction and their subsequent success in a course. Fitzelle and Trochim (1996) found that enjoyment and control of pace were significant factors in student success with online instruction. It follows that assessing students' perceptions of their preferred instructional environment is an integral role in developing instruction that motivates students to achieve desired learning outcomes.

When considering the replacement of one teaching method or tool with another, it should be assured that the quality of the learning experience is not diminished. It is important to not simply accommodate students' preferred learning styles, but also to expand on students' learning strategies by exposing them to other viable and interesting ways of learning. The combination of online learning with traditional classroom instruction could diversify teaching and learning alike, and as a bonus enhance technological literacy of both the faculty and students.

Literature identifies various models of combining online learning with traditional classroom learning and assessing the quality of such combinations (Eberling, 2000; Grasha & Yangarber-Hicks, 2000; Simon, 2000; Spoon & Schell, 1998). In general, students participating in entire classes online have demonstrated no significant differences in learning when compared to students taking classes in traditional classroom settings (Benbunan-Fich & Hiltz, 1999; Johnson, Aragon, Shaik, & Palma-Rivas, 2001; LaRose, Gregg, & Eastin, 1998; Swan & Jackman, 2000). Wheeler and Jarboe (2001) added that a combination of online and traditional classroom instruction has become the most popular way to use Internet teaching and learning tools. LaRose et al. (1998) discussed the potential of online learning to enhance individual student learning. Furthermore, Ester (1994-95), Goldberg (1997), and Wheeler and Jarboe (2001) found that students with access to both traditional lectures and an online environment faired better academically than students instructed either entirely in the traditional classroom or entirely via the Internet. Sanders and Mirrison-Shetlar (2001) found that including Web-based components in an otherwise traditional college level biology course increased student learning and enhanced problem-solving skills.

The model presented in Figure 1 suggests five considerations that may be useful when creating a quality mix of online and traditional classroom teaching and learning. The steps Examine Teaching Style, Assess Preferred Learning Styles, and Study Teaching Tools can occur simultaneously or in any order. It is recommended that the instructor fully understands and completes the first three steps prior to

Figure 1. Model for incorporating online teaching tools.



moving on to Select and Try Tools and then Reflect, Implement, Reflect, and Revise. The entire process is ongoing and iterative. Each step is explained in more detail on the following pages.

Step 1: Examine Your Teaching Style

Assessing the preferred personal teaching style is one of the first steps a teacher should take prior to selecting and implementing online teaching and learning tools. Understanding one's personal teaching style can help to determine which traditional course components can be best enhanced with online teaching and learning technology and which tools will most comfortably match the teacher's personal teaching style. Preferred teaching style may be identified through careful personal reflection or through use of any of a number of available instruction/teaching styles inventories. Two common instruments designed to assess teaching styles are the Canfield Instructional Styles Inventory (ISI) and Grasha's 5 Teaching Styles Inventory. The ISI categorizes teaching styles along two basic dyads: social or independent, and conceptual or applied. For example, if the identified teaching style is social, a teacher wishing to incorporate online instructional components might consider which available online tools could effectively replace or supplement traditional social instructional techniques such as group discussion and team activities. Online chat rooms or discussion tools designed to create a social learning environment and a sense of community between teacher and students might be helpful. Conversely, if after consideration it is determined that the existing online tools do not meet these particular needs, the teacher might refrain from using online chat rooms or discussion tools to supplement classroom teaching in this instance.

Grasha's 5 Teaching Styles Inventory describes teaching styles within five major categories: facilitator, formal authority, expert, personal model, and delegator. If a teaching style is predominantly the role of a facilitator, the teacher should identify tools that help to support the facilitator role.[1] On the other hand, if the teaching style is identified as expert, the teacher might include video or audio enhanced presentations and lectures.

With respect to identifying the teaching style, this model does not give preference to any particular teaching style or teaching styles assessment tool. The teacher is free to choose whichever approach he or she is comfortable with. It might even be helpful to choose multiple instruments or approaches as each addresses different elements of teaching styles. Nevertheless, being aware of teaching styles alone does not guarantee that student learning takes place. In order to facilitate student learning, a teacher also needs to consider and be aware of his or her students' preferred learning styles.

Step 2: Assess Your Students' Preferred Learning Styles

Understanding how students learn is imper-

ative.This is especially true when considering the incorporation of a greater variety of teaching tools, as is the case when combining online and traditional classroom teaching. Several studies (Ayersman & Reed, 1995-96; Ester, 1994-95; Ross, Drysdale, & Schultz, 2001) have found relationships between learning styles and student perceptions of and/or learning successes with online instructional components. In a study designed to decrease the levels of students' computer anxiety, the highest level of computer anxiety was demonstrated by students identified as divergers and the lowest levels were demonstrated by students identified as convergers using the Kolb Learning Styles Indicator (Ayersman & Reed, 1995-96).

Literature discusses a wide array of instruments to assess learning styles (Crowe, 2000; Dunn & Griggs, 2000; Miller, 2001). Four commonly used instruments are the Myers-Briggs Type Indicator (MBTI), the Kolb Learning Style Indicator, the Canfield Learning Styles Instrument (LSI), and the Dunn, Dunn, and Price Productivity Environmental Preference Survey (PEP). While the MBTI focuses on the four dimensions of extroversion versus introversion, sensing versus intuition, thinking versus feeling, and judging versus perceptive, the Kolb Learning Style Indicator collects student information on four scales including preference for concrete experiencing, abstract conceptualization, reflective observation, and active experimentation. The Canfield LSI places learning styles into categories such as social, independent, applied, and conceptual. The PEP profiles student learning preferences in such learning related factors as noise and light levels, temperature, motivation, persistence, structure, authority, senses, time of day, etc. However, it might not always be necessary to formally assess students' learning styles. Information about students' preferred learning styles may be collected informally through discussions with students or observations of students in the classroom.

Once a teacher has identified his or her teaching style and is able to identify students' learning styles, an appropriate mix of online and traditional teaching and learning tools may be identified. For example, if the LSI is used and students identify themselves as social learners, it will be beneficial to incorporate online and traditional teaching and learning tools such as online chat rooms or discussion tools. If the social learning style cannot be adequately met using only online tools for a particular course, the instructor might decide to emphasize the social learning style more heavily using traditional classroom tools or a combination of traditional and online tools. If a teacher's teaching style is learner centered but the students prefer the teacher centered environment, students may obtain lower learning outcomes due to a mismatch of teaching and learning styles. In such a scenario, the teacher could identify and apply or supplement learner-centered instruction with tools that enhance a teacher-centered learning style. This approach would not only widen students' learning strategies but also a teacher's portfolio of teaching techniques. Matching the teaching style with the learning style of students may not solve all issues related to learning in the college environment, but it could help to identify Internet technologies for a better integration of traditional and online teaching and learning tools and thus address a wider variety of learning styles.

Step 3: Study Online and Traditional Teaching and Learning Tools

A good command of both online and traditional teaching and learning tools is important for the development of a successful combination of those tools. The following section focuses on online teaching and learning tools and on how these tools can be incorporated into the classroom.

A broad array of online teaching and learning tools are available. Almost all aspects of classroom teaching can be enhanced or replaced with online technology in some contexts. To obtain a broader overview of enhancing the classroom with Web technology, the classroom environment can be categorized into four components: administration, assessment, content delivery, and community (Schmidt, 2002b). Various online tools exist to help in these components. Appropriate selection of online tools will depend not only on the instructional content but also on the quality of the available tools and the level of technical ability of teacher and students. For example, if

both teacher and students have mastered a specific content delivery tool, it can be beneficial to deliver content online rather than in the classroom. Similarly, if the teacher has found ways to meaningfully incorporate synchronous communication tools (such as chat), students might also benefit from the added community component. The following discussion of each component will demonstrate how Web tools could be incorporated to meet certain aspects of a course to enhance student learning.

The administrative component is the foundation for the organization of a course and allows a teacher to spend more class time interacting creatively with students rather than on mundane activities. For example, activities such as turning in or returning graded assignments during class time can be replaced with Internet technology. The time "gained" during class can then be used for other higher order thinking and learning activities. The assessment component addresses student performance. Using online assessment tools such as online quizzes to provide instant feedback and repeated testing opportunities for practicing purposes may help students learn the subject matter more thoroughly. This method also leads to more class time for student-student and student-teacher interaction (Schmidt, 2002b). Sanders and Morrison-Shetlar (2001) found that students were comfortable tracking quizzes and tests online and liked having online access to their individual grades to assess how well they were doing in the coursework.

The content delivery component focuses on the communication of course content and learning activities. Research shows that a significant amount of learning can take place outside the traditional classroom if students have access to and are motivated to study the material at their own pace. Ryan, Hodson Carlton, and Ali (1998) found that students enjoy using the Internet for the structured presentation of course material and prefer traditional class time to be used for informal interaction and the development of advanced thinking skills.

The community component addresses development of a community of learners, the sense of community among students and between teachers and students. Online teaching and learning tools can help to create a community of learners that is no longer limited to just one teacher and his or her students in the classroom. Depending on teaching and learning styles, a community (including experts and experienced practitioners) from outside the classroom can be introduced to the classroom and benefit both the teacher and the learners. Numerous academic and educational online communities can be accessed and included in the learning process.[2] It takes careful planning to help students deal effectively with the many challenges of online interaction and community building. Sanders and Morrison-Shetlar (2001) reported that students had mixed perceptions about the value of being required to access and participate in chat rooms and bulletin boards as the primary community components of classes. Students generally preferred asynchronous tools to synchronous tools.

Once the first three steps are completed, the challenge is to balance the identified preferred learning and teaching styles against the advantages and disadvantages of available online instructional technology. This should be viewed as a problem-solving challenge with many potentially correct solutions.

Step 4: Select Online Teaching and Learning Tools

Considering the adoption of online instructional delivery methods may present opportunities to achieve learning objectives beyond the basic acquisition of content knowledge and/or skills such as enhancing students' levels of computer literacy. However, unless very carefully designed and implemented, different forms of instructional tools may favor students with some learning styles and technical expertise at the expense of others. Ross et al. (2001) found that sequential learners studying computer applications using some computer-based instructional tools performed significantly better in acquisition of both skills and knowledge than did students identified as random learners. Students identified as abstract sequential in learning style performed significantly better in this study than students with any other style. Students in this study who failed the courses or withdrew were overwhelmingly identified as abstract random in

style. Similarly, in another study Ross and Schulz (1999) reported that there was significant interaction between learning styles and learning outcomes. In this study students identified as abstract sequential averaged an 18% gain in learning, students identified as concrete sequential and concrete random averaged a 10% learning gain, while students identified as abstract random averaged a 10% decrease in learning. When exploring the relationships between learning styles and learning outcomes in a course instructed using computer-based instructional tools, Davidson and Savenye (1992) identified positive significant correlations between learning outcomes and abstract sequential learning styles and negative significant correlations between learning outcomes and abstract random learning styles.

Khalili and Shashaani (1994) found in their meta-analysis of computer applications for instruction that different types of computer-based instructional tools have different effects on students' learning outcomes. Carefully selected and/or designed online delivery methods may enhance learning outcomes in general but also students' levels of computer literacy and sense of efficacy when using computers as learning tools. In an age of burgeoning adoption of e-mail, e-meetings, and e-teams in the workplace, these expanded computer-based experiences may help to better emulate the new workplace. Additionally, if content is delivered in parallel forms both through traditional means and through using online tools such that students have the opportunities to learn in their preferred modes, some students may become more aware of their own cognitive processes and begin to expand the range of learning environments that they will happily work in.

The two primary indicators of the quality of instructional tools implemented into the classroom are students' perception of the learning environment and students' learning outcomes. Using student feedback and the results from analyses of the learning outcomes enables a teacher to make decisions on what online learning activities best contribute to student learning and what framework best addresses pedagogical and technological issues. In addition, the student feedback helps to decide which online components are less liked and do not result in a positive learning experience.

One tool to help assess the effectiveness of the online tools and the quality of the combined learning environments is classroom action research. Classroom action research helps a teacher to try out new online tools, implement those that are successful, and gather student feedback, reflect, and revise to further improve and develop the course (Schmidt, 2002a).

Step 5: Reflect, Implement, Reflect, and Revise

Because this model suggests an iterative and continuous process, it will be imperative to continuously reflect, implement, further reflect on the outcomes of the implementation, and revise again the mix of online and traditional teaching and learning tools. Due to the changing nature of the online environment, only a dynamic approach to teaching and learning will maximize success.

Students' learning style preferences impact upon the quality of their attitude toward a particular instructional tool, but an instructor's consciousness of the importance of learning style preferences may help him or her to adapt tools for teaching that address the learning needs of students with multiple learning style preferences. Ross et al. (2001) recommended that one important alternative consideration when designing online instructional tools is to teach students to use strategies that will succeed in learning situations that do not favor their preferred learning style.

Conclusions

As mentioned previously, the model suggested in this article is iterative in nature. It is not intended to be a linear process leading to selection of the best combination of instructional methods because the best combination of methods is constantly in flux. This model is rather intended to encourage continuous experimentation with both new and traditional instructional tools and methods to achieve ongoing improvement based on trial assessment and reflection of outcomes. The goal here is to attempt to improve student learning while also promoting enhanced student satisfaction levels

with the learning experiences and environment.

Because this model is dynamic, it is expected that teachers will need to be open to continuous change. Students' learning styles may vary widely from student to student, new online teaching and learning tools will continue to be developed, and an increased awareness of one's teaching style will lead to modifications within the composition of online tools and classroom interaction. Only by considering these variables can a teacher continue to address students' changing learning needs in a creative, flexible, and dynamic teaching and learning environment.

Finding the right combination of online and traditional teaching and learning tools to meet the broad array of learning styles remains one of the greatest challenges in today's teaching environment. Considering teaching and learning styles when incorporating online teaching and learning tools can help a teacher to better address student learning needs. Student learning is strongly impacted by the teacher's ability to communicate the subject matter. Creating a successful learning environment therefore heavily depends on the creativity of the teacher. It will be important to decide which course components can be enhanced most effectively via the Internet and which can be done more effectively in the traditional classroom. Only a continuous assessment of learning and teaching styles and Internet tools will help to appropriately address these issues and best meet student learning needs. We believe that in a world where lifelong learning is essential for students' long-term success, only students who experience learning in positive learning environments are likely to continue their journeys toward becoming successful lifelong learners.

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Endnotes

[1] The Grasha 5 Teaching Styles Inventory can be accessed online at http://fcrc.indstate.edu/tstyles3.html.

[2] Visit http://www.webct.com/wyw or http://www.akiva.com/solutions/community.cfm