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Technology and Student Learning: Toward a Learner-Centered Teaching Model

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There is a need to reform teacher education programs through the creation of active learning environments that support and improve the depth and scope of student learning. Specifically, teachers should provide intellectually powerful, learner-centered, and technology-rich environments for students without undermining sound pedagogical practices. This article explores a model that could improve education programs with a focus on three pedagogical areas: (a) emphasis on a learner's unique identity; (b) providing active learning environments; and (c) integrating technology into classroom instruction. The focus on the three parameters is grounded on the need to develop a solid pedagogical model that requires teachers to think about what students are learning, the process of learning, the environments supporting student learning, and ways in which current learning position the students for future learning (Weimer, 2002). This article is also intended to stimulate reflections on key strategies to foster active, learner-centered environments in the classroom.

In recent years, learner-centered pedagogy has received considerable attention in education scholarship and practitioner preparation. A learner-

centered approach to teaching incorporates teaching strategies that focus on the needs, preferences, and interests of the learner. This approach is desirable because it helps learners to become actively engaged in the learning process, take responsibility for their learning, and enhances their skills to learn how to learn. One way to help learners learn how to learn is to develop learning tasks that actively engage them and help them to develop higher order skills such as problem-solving and critical-thinking skills. Higher order skills are pivotal in helping learners become skilled at thinking purposefully and connecting life experiences to academic learning, which might translate to meaningful learning (Novak, 1998).

The growing focus of high-stake testing and accountability (Mizell, 2003) has changed the role of instruction, teachers, and students. As a result, teachers are finding challenges to implementing active learning and learner-centered pedagogies in the classroom. To achieve the national goal of education, helping learners use their minds well and be prepared for responsible citizenship, teachers must go beyond teaching only the subject matter, to also providing learners with the tools to become effective learners. In practice, teachers must strive to facilitate learning environments where a sense of inquiry is encouraged, and active learning and critical thinking are the foundation for creative problem solving and global citizenship.

For many teachers, the struggle is to teach learners with backgrounds different from their own (Sadka, Sadka, & Zittleman, 2008). A great majority of preservice teachers are unprepared for the diversity they will face in the schools or classrooms because they have learned little or nothing about it. Teacher education programs, for instance, continue to teach as if diversity were either nonexistent or an annoying problem to be overcome (Beykont, 2002). Effectively teaching diverse students implies that teachers provide every student with the opportunity to learn in a safe and conducive environment. In addition, teachers should constantly set high expectations for all learners, encourage all learners to achieve, and provide all learners with the best possible opportunities to learn effectively in modern diverse classrooms.

While technology can play an important role in restructuring teaching and learning practices, teachers must take a leading role in designing appropriate learning environments that effectively incorporate technology to help their students learn well with technology. Computer technology, as tools, could empower students with thinking and learning skills, and help students interact with complex materials (Gibbons & Fairweather, 1998). However, computers alone cannot realize many educators' vision for technology to improve education (Oppenheimer, 2003). In addition, technology by itself cannot change the nature of classroom instruction unless teachers are able to evaluate and integrate the use of that technology into the curriculum (Gei-

sert & Futrell, 2000). Even so, teachers who practice sound pedagogical practices and value technology in learning can inspire students to learn well with technology tools.

This article explores three pedagogical areas that can affect student learning: (a) emphasis on each learner's unique identity; (b) providing active learning environments; and (c) integrating technology into classroom instruction.

EMPHASIS ON A LEARNER'S UNIQUE IDENTITY

An important element of a learner-centered model is the consideration of the learning characteristics of the learners. Modern classrooms require teachers to teach learners with different cultures, languages, abilities, and many other characteristics (Gollnick & Chinn, 2002). Every learner is a unique individual with unique characteristics that include strengths and challenges. Understanding both and responding with skill and sensitivity allows the education system to support all learners in reaching their full potential. A learner's unique needs can be attributed to language differences, sexual orientation, learning disabilities, diverse learning styles, different developmental levels, social economic status, learning experiences, religion, social class, race, ethnicity, physical, and mental abilities.

The increasing student diversity on university campuses implies that, for learners to apply the knowledge, skills, and attitudes that foster cultural competence, teachers must instruct them in inclusive, learner-centered environments in which teachers model the knowledge, skills, and attitudes of culturally competent professionals. Teachers need to have cultural competence that entails " mastering complex awarenesses and sensitivities, various bodies of knowledge, and a set of skills that taken together, underlie effective cross cultural teaching" (Diller & Moule, 2005, p. 5). Specifically, teachers should strive to create classrooms where every learner's unique identity as well as the natural genius of every learner is highly cherished, effectively supported, and fairly rewarded.

The beliefs that teachers harbor about how different learners learn and personal understanding of what constitutes good instructional practices may influence the way they guide diverse learners in the classroom. For instance, teachers' beliefs about how learners from different racial backgrounds learn and the expectations that they have for different racial groups may influence the way they conduct their lessons. Effective pedagogical practices require teachers to engage in self-reflection about their own biases, develop respect for the differences, and the willingness to approach teaching from a multicultural perspective. Although different teaching approaches are developed with the best of intentions, the results could be destructive. As a result,

teachers should keep journals of their actions, attitudes, and interactions with their colleagues and students (Gay, 2002). This is a powerful tool to enhance teachers' ability to embrace and affirm diversity of their students.

Teachers should recognize that one size does not fit all when it comes to teaching and learning. Education that appeals to unique identities of learners recognizes, respects, and uses learners' identities and backgrounds as meaningful sources for creating optimal learning environments (Nieto & Bode, 2008). Further, academic learning can improve remarkably when learners are not required to renounce their cultural heritage. Consequently, it is important for teachers to engage in instructional practices that use "the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning more relevant and effective for them" (Gay, 2002, p. 29).

Teachers should go beyond the cultural mismatch theory (Sowers, 2004) to ensure high expectations for all learners as well as ensure that those expectations are realized. Some of the strategies to realize effective learning for each learner include: (a) having teachers and students work together; (b) developing language and literacy skills across the curriculum; (c) connecting lessons to students' lives; (d) engaging students in challenging lessons; and (e) emphasizing dialogue over lectures (Doherty, Hilberg, Pinal, & Tharp, 2003). It is important for teachers to understand themselves first as learners, before they can assist their students to recognize their unique learning patterns. In addition, teachers need to identify connections between their own teaching patterns and their students' diverse learning styles.

A critical pedagogical element that connects the emphasis on a learner's unique identity with constructivist theory is to create opportunities for student self-reflection. For example, have students reflect on a work sheet such as KWL (**K**now, **W**ant to know, **L**earned; Ogle, 1986), key parameters that uniquely characterizes them as learners such as orientation to time and space, verbal and nonverbal communication patterns, and individual or collaborative learning styles. Another useful learner-centered activity is to have students identify and share the cultural values of their families. Teachers should identify or develop a list of questions useful in leading students on their own personal journeys to understanding their cultural identities. This activity will help learners understand themselves better as well as gain the cultural self-awareness necessary to interact well with their peers. Further, this activity is important to help teachers plan appropriate lessons that incorporate the unique cultural values of their learners.

Teachers could also provide students with focused examples on how unique identities of learners affect learning as well as provide structured opportunities to analyze them through the use of appropriate video clips and easy to relate case studies. Other strategies include, finding ways to encour-

age students to seriously reflect on how they think they learn, requesting students to keep journals on learning, and designing collaborative work where students get to interact, know each other, and work together.

Teachers could plan to hold physical or virtual meetings with each student in their class as well as build a community of learners outside the classroom. This might involve the learner's parents or guardians. Finally, teachers should help learners to appreciate multiple perspectives in the classroom. Learner-centered instructional approaches that focus on the unique identities of learners require a deliberate focus on student strengths and understanding the needs of each learner as an individual.

Tomlinson (2001) provided characteristics of differentiated instruction as a framework for understanding classrooms that focus on the learners' unique identity that include: (a) teachers beginning where students are, and not the front of a curriculum guide; (b) teachers providing specific ways for each individual to learn as deeply as possible and as quickly as possible; (c) teachers using time flexibly, and acting as partners in the learning process; (d) teachers beginning with a clear and solid sense of what constitutes powerful curriculum and engaging instruction; and (e) teachers striving to support the struggling and advanced learners, learners with varied cultural heritages, and learners with different background experiences to reach their highest potential.

PROVIDING ACTIVE LEARNING ENVIRONMENTS

Active learning is grounded on the constructivist theory that emphasizes hands-on, activity-based teaching and learning during which students develop their own frames of thought. Constructivist theory assumes three basic principles that include: (a) learners forming their own representations of knowledge; (b) learning through active experience and exploration that uncovers inconsistencies between current knowledge representation and their own experiences; and (c) learning within a social context, with interaction between learners, peers and other members of the learning community. The learner's knowledge is viewed as adaptive while the role of teachers is to challenge the child's way of thinking (Gredler, 2001).

Active learning provides opportunities for students to inquire, explore, experiment, collaborate, and experience the joy of discovery (Brooks & Brooks, 2001). Key forms of active learning include discovery learning, problem-based learning, experiential learning, and inquiry-based instruction (Kirschner, Sweller, & Clark, 2006). Active learning incorporates learner-centered approaches—a shift from a teacher-centered lecture approach to a more constructivist approach (Jonassen, 2000). The role of instructors shifts from that of transmitting knowledge to the new role of facilitating, guiding,

or coaching. As a guide, the teacher incorporates mediation, modeling, and coaching as well as providing rich environments and learning experiences for collaborative learning (Sharp, 2006).

Learner-centered teaching demands active learning environments, guiding learners to learn how to learn, recognizing differences in each learner, and creating different learning styles to meet the needs of each learner (Brooks & Brooks, 2001). Research on cognitive tasks indicates that procedural and declarative knowledge can be strengthened through practice (Anderson, 2005). Pierson and McNeil (2000) recommended the "purposeful creation of collaborative, authentic, and content-focused learning environments where future teachers are empowered to develop content, pedagogy, and technology strategies concurrently, as a critical factor in the design of preservice teacher education programs" (p. 9).

To achieve learner-centered environments, teachers must engage in knowledge-building processes throughout their education as well as start thinking about their beliefs and instructional practices. On the other side, students must overcome their fears when trying innovative tasks. In addition, teachers should provide more active learning activities that help students build upon their learning experiences. For instance, a teacher could require students to construct a database. The process of constructing a database starts with brainstorming to come up with specific information they would include in the database, the fields required, and the process of querying and filling the records. This is followed by gathering information, designing the structure, typing in the information, and finally interpreting the information. The process of constructing a database is an active process where learners are "mentally actively" engaged in meaningful learning in such activities as: defining relationships between concepts; constructing records; constructing search procedures; sorting data; comparing data; and communicating by means of reports.

The constructivist approach is based on the understanding that students learn more when they learn actively and take responsibility for their own learning (Henson, 2004). Some of the questions that teachers need to address when designing active learning environments include: to what extent do I establish classroom climates in which students feel free to ask questions, voice opinions, and express new ideas; to what extent do I provide experiences that actively engage students in learning; and to what extent do I design learning activities, including assessments, that provide for student choice?

Intergrating Technology into Classroom Instruction

Computer technology, if used appropriately as an instructional tool,

can provide great opportunities to enhance classroom instruction. Tools are extensions of our human capability (Forcier & Descy, 2002). The power of technology to support learning lies not so much in the technology as in what teachers do with the available technologies (Rogers, 1999). Therefore, teachers should provide intellectually powerful and technology-rich environments for students without undermining sound pedagogical practices (Zisow, 2000).

Computer technology, as a tool, can help students solve problems and think independently and collaboratively (Knapp & Glenn, 1996). Further, the use of computer technology to address realistic situations is likely to promote the integration of disciplines, foster a team approach to problem solving, and enhance individual responsibility (Singh & Means, 1997). Technology can also assist teachers to meet individual student needs through their instruction, and allow for a student-centered learning environment, aligning standards, allowing for testing and diagnosis, allowing teachers to manage classes and other duties more efficiently, and letting teachers pursue career growth opportunities more easily (Education Commission of the States, 2001).

Technology changes the roles of teacher and students: The traditional role of teacher as dispenser of information is challenged, and the teacher's new role is that of a guide—to challenge students' thinking and encourage reflection in the learning process (Brooks & Brooks, 2001). As a guide, the instructor shares knowledge with the learner (Novak, 1998). Further, the learning environment is more learner-centered, one in which students are encouraged to construct meaning from their experiences with the content (Huba & Freed, 2002).

Teachers generally teach the way they were taught (Mehlinger & Powers, 2002) and infusing technological tools into instruction poses unique challenges to teachers who are not willing and ready to change from their traditional instructional practices. Even so, teachers can be encouraged to become change agents and help transform their teaching through the use of technology. Teachers should be encouraged to structure learning environments that model expert behavior to students in constructivist uses of technology-based teaching and learning, in their disciplines (Vrasidas & McIsaac, 2001).

Reil and Becker (2000) argued that authentic use of technology transforms teacher's roles, learner's roles, and conceptualization of knowledge in the process of teaching and learning, and assessment. A U.S. Department of Education (2000) report indicated that:

> Teachers must be comfortable with technology, able to apply it appropriately, and conversant with new technological tools,

> resources, and approaches. If all the pieces are put into place, teachers should find that they are empowered to advance their-own professional skills through these tools as well. (p. 39)

Although teachers play a significant role when teaching with technology, the primary concern in technology use is for teachers to go beyond technical competence to provide students with pedagogical uses and critically analyze their effective use in various contexts (Bush, 2003). Specifically, teachers must place their technical competence within broad educational goals or desired pedagogical frameworks. Bush argued that important overriding uses of instructional technologies should be considered when considering infusing technology into the classroom that include, increasing students' knowledge of the subject concepts and pedagogy, creating opportunities for professional and pedagogical practice, and developing critical strategies to support students in their professional practice and in the use of educational technologies.

A critical issue related to technology use is that computer technology should not drive instruction (Jonassen, 2000). Rather, instruction should drive the technological tools being used. Harris (2000) observed that technology will be a significant tool to recreate learning in the 21st century. However, educators will need to experience a paradigm shift in their vision for technology in education. Further, they need to change their beliefs in learning processes. Harris acknowledged that, "The tremendous technology potential will only be realized if we can create a new vision of how technology will change the way we define teaching and how we believe learning can take place" (p. 1).

The future role of technologies will be determined primarily by whether teachers find value in the instructional possibilities offered by the new tools, and whether the pattern of implementation of the new technologies avoids the mistakes made with past technologies (Kent & McNergney, 1998). Used in combinations, technology tools might lead to the creation of new approaches to teaching and learning. Grabe & Grabe (2008) noted that, "it seems reasonable that teachers will be more likely to help their students learn with technology if the teachers can draw on their own experiences in learning with technology" (p.4).

CONCLUSION

The implementation of learner-centered pedagogy raises primary issues as to how teachers can best educate their students. While active learner-centered pedagogy is desirable in current educational practices, issues such as time could affect its successful implementation in the classroom. Even so,

teachers are likely to spend some time, for instance, learning active learning teaching strategies that incorporate technology into instruction, if they realize the value of computing in education. Further educational reform efforts should not only focus on more machines for classrooms but also developing teaching strategies that complement technology use within the curriculum (Pierson, 2001).

Research shows that colleges of education, for instance, are not doing their jobs effectively in preparing teachers to implement technology (Baslanti, 2006). Teachers need to gain technology skills, but they will be most successful helping their students when they do not act as experts but as guides (Jonassen, Peck, & Wilson, 1999). In addition, teachers need to integrate computer skills into the content areas and recognize that computers are not ends in themselves (International Society for Technology in Education, 2000).

The ultimate goal of teaching is to guide learners to think critically, to learn how to solve problems, and to create knowledge. Gooden (1996) suggested that the most effective way to benefit from technology is to integrate it into the curriculum as opposed to integrating curriculum into the technology. Technology is not a substitute for good instruction. "Constructivist-oriented teachers use computers in more varied ways, have greater technical expertise in the use of computers, use computers frequently with students, and use them in more powerful ways" (Anderson & Becker, 2001, p. 55). These types of teachers are successful in teaching.

The aim of learner-centered education is to enable learners to get along "without" their teachers. Learner-centered approaches focus on strategies to move beyond passive learning to active learning. Students should be encouraged to work with information to derive meaning and understanding, form new mental representations of the material, and construct and reconstruct new knowledge based on their experiences. Teaching as a learner-centered process focuses on an individual's transformative development (Hinchliffe, 2001). The shift toward learner-centered teaching is a change in emphasis that will cause teachers to rethink how they teach and assess their teaching toward the goal of realistic appraisal of student learning. A focus on just learners or technology may not help, but good pedagogical practices that focus on understanding the unique identity of each learner, fostering active learning activities, and incorporating technology into instruction could possibly result in meaningful learning.

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