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Teaching the Twenty-First Century Learner

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Teaching the Twenty-first Century Learner

by

Roxann A. Humbert

Introduction

“In the twenty-first century, we are Netizens (Net Citizens) who live as citizens of the world thanks to the global connectivity that the internet makes possible” (Hauben & Hauben, 1997, p. 3). Technology has changed and continues to change our society, and we experience the effects of its changes in our personal lives from the way we shop and do banking to the sophisticated equipment it takes to fix our automobiles and the tremendous advancements in medicine. Technology will continue to evolve at a rapid pace and to affect the way we live, work, and, most important, learn. Never before has it been so critical for educators to look at what is going on in today’s classrooms and evaluate whether or not we are preparing our students for the twenty-first century.

While education is changing at all levels, the landscape of higher education in particular must adapt to meet the needs of the twenty-first century learner. Faculty will no longer be able to teach the way they were taught because their classrooms will have to provide students with opportunities to obtain the skills necessary to be productive members of society and to prepare them for jobs in the twenty-first century. Students must emerge from the classroom as savvy technology users, problem solvers, critical thinkers, and lifelong learners. Faculty must become comfortable with and competent in using technology, they must design their curriculums around constructivist-learning strategies, they must include more project-based assignments, and they must use “authentic assessment techniques” if they wish to be successful in educating their students for the twenty-first century.

The Twenty-first Century Classroom

Of course, this is the twenty-first century and many of us are already teaching in a twenty-first century classroom. This is true. The twentieth century classroom, however, looked very different in 1905 than it did in 1999. Likewise, the classrooms of today will look very different in 2099. While we cannot predict what the classroom of 2099 will look like, we do know what the current and near-future twenty-first century classroom must look like if educators are to succeed in preparing our students to be productive twenty-first century Netizens.

The twenty-first century classroom is changing physically, culturally, and instructionally. Physically, a monitor and mouse, and

smaller technological devices like the tablet PC and Personal Digital Assistant (PDA) are replacing paper and pencil. In addition, the computer screen is supplementing the chalkboard, providing several advantages to the student and teacher. Teachers can prepare their visuals ahead of time so that class time can be spent explaining the visual instead of drawing it. Since these visuals are in digital format, they can be sent to the student as an email attachment or posted on a public web site or in an online course management system prior to or following the class session. A final physical change that will occur is that online documents will replace books, papers, and journals. Students will no longer visit the library but rather go to the online "cybrary." Fairmont State is well on its way to making this change. The campus library has access to a collection of more than 50,000 e-books and thousands of online journals. In addition, a concentrated effort is being made to digitize class handouts, tests, and other materials typically available in hard-copy format.

Culturally, learning will no longer be restricted by time and place but rather will take place at any time and any place. Students will be able to attend class just as easily online at 1:30 a.m. as they can in the traditional classroom at 1:30 p.m. In addition, the term *classroom* will have a much broader scope. It will no longer mean a set-up of neatly aligned chairs and desks with a podium in front of the room. Classrooms will be set up to encourage student collaboration and to model the environments they will have in the workplace. In addition, in many cases, the classroom will not be physically located on the college campus. Rather, students will work in labs and other community settings. Just as future teachers observe and teach in classrooms and future nurses observe and work in hospital clinics, students from all disciplines will need to have these experiences in order to prepare for twenty-first century jobs. As on-the-job technology requirements become more sophisticated, campuses will not be able to afford the technology the students need in order to learn the necessary skills. Campuses will have to rely on collaborative efforts with businesses and government agencies to help their students gain the skills and knowledge they need for the future.

Instructionally, the teacher will no longer be the "sage on the stage" or "drone on the throne" but rather a "guide on the side" as we think of the teacher in terms of expert learner and the student as the novice learner. This means faculty must move from being

objectivist to constructivist in their approaches to learning. The objectivist believes that teachers are the keepers of the knowledge and/or content whose job it is transfer this information to the student. Constructivists, on the other hand, believe that students construct their own knowledge based upon previous experiences. With the tremendous amount of content available via the World Wide Web (WWW), faculty will no longer need to be the supplier of knowledge, but rather they must help their students learn how to evaluate and to synthesize that content.

The constructivist theory also suggests two other instructional changes that will likely occur. Students will become active learners instead of passive listeners, and learning will take place among students as well as between teacher and student. In addition, the online learning environment will make it possible for instructors to team teach with instructors from other institutions and to invite other experts to speak virtually to their classes. These scenarios also open up the opportunity for faculty to learn from each other. The final instructional change will be that the focus in the classroom will change from teaching to learning, and in the process, the typical mid-term and final exam method of assessment will be replaced with multiple means of assessments including authentic assessments. Such assessments present students with real-world challenges that require them to apply their relevant skills and knowledge.

Characteristics of the Twenty-first Century Learner

The type of learner we find in the college classroom has changed significantly in the past twenty years:

Not only are there more 19-21 year olds, but students are more computer savvy and visually oriented (the "MTV generation"), becoming increasingly older on average, and they often need more specialized work-related training immediately. In addition, these new types of students often have other pressing needs on their time such as jobs and families, and they are increasingly spread out geographically. (Neil and Kestner, 2003)

As the characteristics of college students change, so must the environments and methods in which they learn change. Classroom changes are a good start in providing students with an environment better suited to their lifestyles. There is, however, evidence that what and how we teach must also change. The Partnership for 21st

Century Skills identifies three necessary components of twenty-first century content. These include global awareness; financial, economic, and business literacy; and civic literacy (Partnership for 21st Century Skills, n.d., pp. 13-14).

As Netizens we are not just citizens of Fairmont, West Virginia, Marion County, the state of West Virginia, the United States of American or North America; we are citizens of the world. Just as we do not say Fairmont or West Virginia warming but global warming, we must begin to orient our teaching toward global concerns. Teaching architectural students about sustainable design is an example of how we can incorporate all three components of twenty-first century content into a classroom. Having students design buildings, communities, and other products that are sustainable raises their global awareness. By definition, sustainable design is “designing responsibly to resolve complex problems in order to protect, nurture, and improve our environment” (Dezignaré, 2005, ¶1). Having these same students develop proposals to “sell” their sustainable designs is a way to teach them financial, economic, and business literacy. Having students research the benefits of sustainable products to a community teaches them civic literacy. In order to prepare our students as Netizens, these three components can and should be applied to other disciplines.

Twenty-first Century Learner Skills

Knowing what the twenty-first century classroom and learner looks like and identifying proposed components of the twenty-first century content is a first step in looking at educating the twenty-first century college student. The next step is to identify the skills twenty-first century learners will need when they leave the classroom and ways faculty can help students acquire those skills. Students must have four essential skills: technology savviness, problem solving, critical thinking, and lifelong learning ability.

Technology Savvy Users

Edward R. Murrow said of the television, one of the greatest inventions of the twentieth century: “This instrument can teach, it can illuminate; yes, and it can even inspire. But it can do so only to the extent that humans are determined to use it to those ends.

Otherwise, it is nothing but wires and lights in a box" (Grossman, 2003, 6). Murrow's description applies also to the computer, one of the greatest inventions educators will use in twenty-first century. Computers can teach, they can illuminate, and they can inspire. But they can do so only to the extent that we as educators use them toward that end. Otherwise, they will be nothing more than hardware and software sitting in the corner of the classroom.

How will we make sure our students leave our classrooms technologically savvy? One thing is for certain, providing students with basic computer skills is not enough. Traditional students entering college are already coming equipped with basic computer skills. Nationally, 80% of the students in grades 1-12 use computers at school and 40% of them use computers at home and in most of these cases the computers have Internet access (Neil and Kestner, 2003). West Virginia students are no exception. West Virginia students have more access to and the ability to use technology than those in most of the country. "West Virginia ranked No. 4 in the nation for having a low number of students share classroom computers. The state also ranked fourth for connecting a high number of students to the Internet" (Broadwater, 2005, 2).

So, rather than teaching basic computer skills, we must teach technology skills and concepts. For example, I have used approximately ten different email packages in the past twenty years. For the most part these email packages all have the same concepts—the ability to create notebooks or folders to store mail, the ability to forward, copy, and blind copy email, etc. Had I simply been taught how to point and click my way through the first email software I learned, I would not have been able to transfer the basic concepts to other email packages. Faculty must keep this in mind when they teach students about technology. While students need to be trained to use software, they also need to be educated about the concepts underlying the software used in their classrooms.

In addition to teaching about technology and technological concepts, higher-education faculty must model the use of technology in their classrooms and demonstrate its use in various fields of study. No one discipline can afford the luxury of not including technology as part of the curriculum. Jobs that just a decade ago used little or no technology now make extensive use of it. In fact, the Department of Labor says, 70 percent of all jobs require technology literacy; by the year 2010 *all* jobs will require significant technical skills. And if

that seems unimaginable, consider this: the Department of Labor says that 80 percent of those future jobs *do not yet exist* (Moses, 2001, pp. 8-9).

If students leave our classrooms without having had the opportunity to work with the technologies prevalent in their fields of study, they will enter the market place disadvantaged.

Problem Solvers

Nationally and internationally, there is growing recognition that if education is to produce skilled thinkers and innovators in a fast-changing global economy, then problem-solving skills are more important than ever. (Business Council, 2002, p. 49). There are many ways educators can help students develop problem-solving skills. Faculty can assist students by developing cross-curricular projects, using case studies, employing computer simulations, and incorporating project-based learning.

- *Cross-curricular Projects*

One way to foster problem-solving skills is to break down the walls between the various disciplines and expose students to team building, team learning, and team discovery. Math, science, and English faculty from Fairmont State are collaborating to provide their students with this opportunity through the Coal in Appalachia project. Students in physics, biology, chemistry, and folklore are learning discipline-specific concepts through the study of coal. Projects such as these can help students see coal in a larger context and, one hopes, raise their awareness that what a biologist studies has an impact on what a chemist does, thus teaching them team work.

- *Case Studies*

Case studies are another way to teach the twenty-first century learner. There are a number of ways to use case studies in the classroom. One method is to create hypothetical case studies and have students work in groups to analyze and propose ways to handle such cases. For instance, in an education class, the professor could give students case studies involving children with different learning disabilities; the students could discuss how they would develop a plan to teach the children described in the case study they were assigned.

Another way to incorporate case studies is through service learning. By having students work with “real” cases in the community, they have the opportunity to practice in situations similar to what they will experience when they leave the classroom. In fact, at Fairmont State students can experience “real” cases without leaving the classroom. Gary K. Bennett, Associate Professor of Finance/Accounting, gives his students real experience completing income tax forms. Faculty and students can bring their income tax forms to students in Bennett’s class, and he will oversee their work. Students are able to apply the knowledge they have regarding tax law in a monitored environment, giving the students opportunities to make errors that can be corrected instead of making costly mistakes once they are in the field.

- *Computer Simulations*

A third way for faculty to prepare their students for the twenty-first century is through the use of computer simulations. Simulations are a great way to teach students problem-solving skills. For example, nursing students can practice patient care and see the results of their choices without affecting human life. Engineering students can see the results of applying different techniques to their designs before they begin building something. Biology students can learn how to dissect frogs without killing real frogs.

- *Project-based Learning*

Developing curricula based on real-world projects and building learning communities are the underlying premises of project-based learning. Adria Steinberg identified six A’s of project-based learning. These include authenticity, academic rigor, applied learning, active exploration, adult relationships, and assessment. To test each of Steinberg’s six A’s of project learning, faculty can ask themselves the questions in Table 1.

Authenticity

- Is the project based on a problem or question that is meaningful to the student?
- Is the problem or question one that an adult might tackle at work or in the community?
- Does the project provide the student with opportunities to produce something that has personal and/or social value beyond the school?

Academic rigor

- Does the project cause the student to acquire and apply knowledge related to one or more disciplines or content areas?
- Does the project challenge the student to use research methods from one or more disciplines? (For example, does it cause him or her to think like a scientist?)
- Does the student develop higher-order thinking skills? (For example, does he or she search for evidence or seek a different perspective?)

Applied learning

- Does the student solve (e.g., design a product, improve a system, or organize an event) a problem that is grounded in life and work?
- Does the project require organizational skills and self-management?
- Does the project cause the student to learn and use skills (such as problem solving, communication, technology, and teamwork) that are expected in the workplace?

Active exploration

- Does the student spend a significant amount of time doing field-based work?
- Does the project require the student to use various methods, media, and sources to conduct an investigation?
- Is the student expected to make a presentation to explain what he or she has learned?

Adult relationships

- Does the student meet and observe an adult who has relevant expertise and experience?
- Does the student work closely with — and get to know — at least one adult?
- Do adults collaborate with each other and with students on the design and assessment of projects?

Assessment

- Does the student use project criteria (that he or she helped establish) to gauge what he or she is learning?
- Do adults from outside the classroom help the student develop a sense of real-world standards?
- Is the student's work assessed regularly through methods such as exhibitions and portfolios?

Table 1: Taken from Real Learning, Real Work: School-to-Work as High School Reform by Adria Steinberg.

Table 2 examines a work-to-learn project from TERC, a not-for-profit education research and development organization in Cambridge, Massachusetts, as a means to describing these six A's.

Essential Question	How can a DNA sample tell one whether a person is healthy or has committed a crime?
Interest to Students	Most students will be interested in discussing personal health issues and solving crimes.
Beyond the Classroom	The question is important to laboratory technicians, forensic specialists, and many professionals in health care and law enforcement.
Academic and Technical Standards	National Science Education Standards say, "All students should develop an understanding of the molecular basis of heredity." Most states and/or districts are developing similar standards in the life sciences.

Table 2: Taken from Scott Eddleman of the Working to Learn Project at TERC, Cambridge, Mass.

This project meets five out of six of Steinberg's A's. The project is authentic in that it focuses on a problem or question that is meaningful to the student. It involves academic rigor as it causes the student to acquire and apply knowledge related to one or more disciplines or content areas. It involves applied learning as the stu-

dent solves a problem that is grounded in life and work. It involves active exploration on the student's part and requires the student to build adult relationships. The last A, assessment, would have to be developed.

Critical Thinkers

Critical thinking is a difficult concept to grasp let alone teach. As a frame of reference, good thinkers ask questions such as

1. What does this mean?
2. Is there another way to look at this?
3. Why is this happening?
4. What is the evidence for this?
5. How can I be sure?

Critical thinkers, on the other hand, are continuously

- analyzing new situations,
- searching for complexity and ambiguity,
- looking for and making connections among aspects of a situation,
- speculating,
- searching for evidence, and
- seeking links between a particular situation and their prior knowledge and experience.

There are several strategies instructors can use in the classroom to promote critical thinking, four of which are concept mapping, peer evaluations, visual lists (pros and cons), and panel discussions.

Instructors can use concept mapping to determine whether a student understands a complex idea. For instance, in my advanced instructional technology class, I have my students make a concept map of how the ISTE (International Society of Technology Education) Nets are organized. Using technology, Microsoft Word's draw or table tools or a software package such as Inspiration, students draw a physical representation of the ISTE Nets showing the relationship between and among the parts.

Peer evaluations are another great way to promote critical thinking. By using a rubric developed by the students or the instructor, students can analyze and evaluate each other's work. True evaluation requires that one take a critical look at the content being evaluated to determine if it is accurate and reliable.

Finally, looking at both sides of an issue can help students to become more critical in their thinking. Two techniques instructors can use to assist students with looking at different sides of the same issue is a pro-and-con list and a debate. Quite often, students equate what is correct with what they believe to be correct. Having students look at the opposite point of view gives them an opportunity to see things in a different light.

Authentic Assessment

Testing as a means of assessment is not always the best way to measure what students have learned or what they will need to know for the future. In addition, traditional tests do not suit every learning style. "Performance assessments are better suited than traditional tests to measure what really counts: whether students can apply their knowledge, skills, and understanding in important, real-world contexts" (McTighe, 1996-1997, p. 6). In order to provide an example of authentic assessment, I will describe how I would teach students about authentic assessment by using authentic assessment. To begin the lesson, students would be assigned a question about authentic assessment. Questions might include

- In authentic assessment, what are the advantages of asking students to take part in authentic projects?
- Does authentic assessment have much application to online ESL classes?
- In your current teaching, do you use authentic assessment? If so, how? If not, why not?
- Do you think the online classroom is more or less adaptable than the face-to-face classroom in terms of authentic assessment?
- One emphasis of authentic assessment is that authentic assessment prepares students for the "real world." Do you think a liberal-arts educator would support or dispute this type of assessment and why?
- Do you think authentic assessment is better suited for certain types of learners or certain content areas, or do you think there are benefits for all learners in any content area?

Next, I would send my students to a web site on Authentic Assessment: (<http://jonathan.mueller.faculty.noctrl.edu/toolbox/index.htm>). I selected this site because it is part of the Multimedia Edu-

cational Resource for Learning and Online Teacher (MERLOT), a free and open resource designed primarily for faculty and students of higher education. Links to online learning materials are collected here along with annotations such as peer reviews and assignments. Students would explore this site to locate information to support the answer to their question. In addition, students would be encouraged to locate other sources to support their position.

Finally, in an online classroom, the students would post their answer and supporting resources to an electronic discussion forum. Students would then respond to other students' postings, asking for clarification or posing questions they might have as a result of reading their classmates' postings. In a traditional classroom, the students would be put in small groups to discuss their answers. In both cases, a rubric provided by the instructor would be used to evaluate the students' answer to the question, their ability to think critically, and their online etiquette.

Lifelong Learners

In this age of a global existence and a changed higher education landscape, faculty must continuously update their knowledge base in order to be proficient in helping their student progress through the twenty-first century. Skills acquired through decades-old college coursework will not suffice. Instead, faculty will need to learn new teaching methods, technologies, etc. In order to produce students who are lifelong learners, they themselves must be lifelong learners. As Alvin Toffler pointed out, "The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn."

To help today's student's function as productive Netizens, we must prepare them to be lifelong learners. Just as we recognize that our college degree is merely a milestone in our lifelong intellectual development, we must encourage our students to do the same. In order to become effective lifelong learners, students not only need to be critical thinkers, they must also be able to apply the critical thinking skills they have acquired to ask themselves continuously, "What do I know," "What do I need to know," and "How can I go about acquiring the knowledge I need?"

Giving students the opportunity to take online classes is one way to prepare them to be lifelong learners. Just as the twenty-first

century classroom is changing, the way in which we will acquire the skills to continue to be successful in the twenty-first century is evolving. With required skills becoming more and more sophisticated and the rate at which information changes increasing ever more steadily, twenty-first century workers cannot rely on instructor-led, locally held classes to obtain the information they need. Instead, learners will use online learning to contact experts and to access information they need. More important, they will demand access to this information when and where they want it.

Conclusion

The question remains, however, are educators doing the best things in the classroom to make sure our students are prepared to live, work, and function in the twenty-first century? I would like to ask all educators if they think our students are receiving the education and skills they need to succeed, and I would like to ask recent graduates if they think their teachers prepared them for the twenty-first century. More important, I would like to challenge all educators to be brave enough to make the changes necessary to provide our students with the opportunity to succeed as Netizens.

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