Some efficient and effective classroom designs that accommodate technology for promoting learning

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In recent years there has been an increased emphasis on the design of classrooms so that instructional technologies will enhance the learning environment. Good design does not happen accidentally, and when classroom designs are in the planning stages, the first priority should be the needs of the students. This paper will discuss classroom design issues that can effectively and efficiently accommodate technology for promoting learning.

The North Carolina Office of Public Instruction, in its 2002 school facility report indicated that there were specific parameters that should be considered when integrating technology into the classroom. With a goal of at least five computers in a classroom, their report stated that each workstation would require 15 to 20 square feet of classroom space. Printers and file servers would require about the same amount of space. Having the teacher computer located at her desk would not require additional space, but with five student computers and a printer, about 100-125 square feet of additional space would be needed per classroom. The report stated that by sharing existing circulation area with that required for computer circulation, some room size savings could be realized (North Carolina Department of Public Instruction, 2002).

Recent trends in computing support the role of wireless technology in the design of schools. Technology is seen as a tool that supports learning and is something personal for students that helps them to journey along their chosen learning paths. McKenzie (2001) reported that wireless networks that use mobile computers are preferable to the still-prevalent practice of putting desktop machines in each classroom. He asserted that there are many reasons why mobile computing is preferable for the classroom:

- ß Ease of movement. Laptops can be moved anywhere in the building and require no special furniture.
- ß Relaxed fit. Laptops are easier to accommodate within existing classrooms because of their small size.
- ß Strategic deployment. Laptop computers can be deployed on rolling carts where and when they are needed most, creating one-to-one opportunities that traditional methods of used wired computers do not provide.
- ß Flexibility. Laptops can be used within existing rooms and can be configured to fit the teacherís preference and practices.
- ß Cleanliness. Clutter is eliminated when cables are eliminated.
- ß Low profile. Teachers and students can maintain critical eye contact when vision is not obstructed by bulky monitors.
- ß Convenience. Laptops are readily available and easily stored when not in use. There is minimal set up time and they can be started up quickly without the need to move to a computer with connectivity.
- ß Simplicity. Teachers and students can focus on learning, not on hardware.

According to Carlson (2000), wireless technology is often less expensive than traditional wired technology. In older buildings, wireless implementation may cost only about a fifth of what a school would spend on retrofitting for traditional installation. Computers can be rolled out into common areas such as cafeterias and media centers, providing students with the personal learning space that 21st Century learners expect.

Levin (2002) supported the use of wireless laptops when considering effective use of technology to enhance the classroom environment. He indicated that in order to maximize student participation and interaction in the learning process, students should each have their own laptop

computer. He believed that in a wireless classroom, flexibility and access are critical in positively affecting student interest and engagement. To address teacher concerns about student attentiveness and distraction with their own computers easily accessible, he suggested that the laptop covers be closed except when computing was a necessary activity.

Another 21st Century teaching and learning tool that is beginning to become prevalent in the classroom is the interactive whiteboard. Several research studies have indicated that the benefits for using this type of technology in the classroom are significant (Bell, M.A., Glover D., Miller, D. & Johnson, C.). Research has indicated that the benefits to teachers and students are many, but there are factors that must be considered for effective use. Smith (2001) indicated that the whiteboard should be positioned so to avoid sunlight and obstructions between the projector and the board.

Classroom design cannot ignore the impact of appropriate furniture to support effective technology use. Many schools adhere to the notion that because the traditional furniture is already in place and paid for, it should continue to be used (Dolan, 2003). Tables need non-permanent wire cables that provide flexibility in movement. With the move toward wireless technology, traditional desks or tablet armchairs are unacceptable. Further, to create an environment of collaboration, a table that can accommodate a computer system, books, and at least two students, should be at least five feet by two feet (Dolan, 2003).

Agron (2004) synthesized conversations with a panel of prominent education architects to envision the planning that must take place in order to design and support the school of the future. One architect indicated that the school of the future will be challenged to anticipate change. One change that is absolutely inevitable is that all students will have a laptop (or a personal computing device of some kind) on a wireless network, which will be essential for the learning process. The traditional classroom of 30 chairs lined up in rows will not be possible in an engaged

environment. The conversation clearly articulated that schools are not preparing for the 21st century classroom in general. Schools and systems of all sizes are continuing to plan in a traditional fashion that will not support the inevitable changes that are occurring in teaching and learning.

The architects reported that schools must accommodate a multiplicity of functions rather than a specificity of function; where lots of things can happen rather than specific things. They reported that flowing space is different from open space and a definition was needed. They believed that flowing space has a parallel to learning. Flexibility was affected by how easily a multiplicity of teaching and learning settings can be utilized, created and recreated (Agron, 2004)

The key to successful classroom design that effectively and efficiently integrates technology into the learning environment is flexibility. Change is inevitable, and no matter how carefully a facility is planned, the plan will be out of date over time. A flexible classroom that can envision the learnerís needs but be ready for change will be one that addresses the heart of teaching and learning.

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