

Five Tips to Ensure Effective Learning in the Computer Laboratory

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“Classroom management is not a skill that can be mastered once and for all.”

(Sandholtz, Ringstaff, & Dwyer, 1997, p. 72).

An early study of technology in the classroom found that managing a technology-rich classroom was significantly different from the previous experience of many teachers (Sandholtz, Ringstaff, & Dwyer, 1997). This pioneering research found that when even experienced teachers were placed in a technology rich environment they experienced many of the same concerns as first year teachers. Common patterns of concerns included:

- Student misbehavior and attitudes predominantly due to students being unsure of ethical guidelines and time-management issues
- Physical environment such as workflow, physical arrangement and safety issues, and organization.
- Technical problems including enough supplies when they are needed, repairs, printing, network problems and software management
- Dynamics of the environment which resulted in more mobility than many previously normal classroom activities (Sandholtz, 1997, p. 56-62).

Constructivist learning encourages students to take control of their learning (Boethel & Dimock, 1999). To accomplish this, teachers need to create a learning environment that assists students to take control of their own learning. “In constructivist learning environments, instruction begins with the introduction of a problem rather than with the explanation of a concept, theory or set of



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facts” (Boethel and Dimock, p.12). The laboratory, whether scientific or technological, is the purest constructivist environment. In these environs, teachers pose learning problems that allow students to explore, construct, discuss, and evaluate their own learning (Boethel & Dimock). Whether through the use of technology or with the use of scientific equipment and supplies, students control the results and thus construct learning based on their collection and application of data.

Effective teaching is essential to student learning. Stronge (2002) points out that the hallmarks of effective teaching are planning, preparation and managing the learning environment. There are five principles that teachers can follow to ensure effective learning in the computer laboratory.

1. Plan for instruction
2. Prepare the learning environment
3. Prepare the students to learn
4. Make the best use of limited time
5. Construct a safe environment

Tip 1: Plan for instruction

All effective instruction begins with knowing what is to be taught and how it is to be assessed. Thus the first step in successful instruction is to determine the content standards and specific instructional objectives to be addressed. Practitioners recognize that teaching is not linear but circular. Thus, at the same time goals and objectives are identified, effective and appropriate assessment needs to be designed. Assessment should function as a learning tool for both students and teacher (Brown, 2006). As students complete their assessments, they should demonstrate their ability to apply the knowledge and skills intended by the teacher. Thus their level of success drives future instruction.

Once the key issues of content and assessment have been decided, the next step is to select activities aligned with the relevant content and life-practice of the students. Learning should be linked to students’ prior knowledge and understandings. It is also important to establish the rationale for the activity. Why are students asked to do this? What is its relevance?

Tip 2: Prepare the learning environment

Many unexpected things occur when students learn. This is the novelty that teachers seek in their classroom – the thrill of discovery. What the teacher needs to assure as far as possible is that unexpected things do not detract from learning. Students should not focus on printing the graph but rather on constructing and interpreting the graph.

Thus, it is important to have the routine matters carefully planned and managed in advance. All supplies should be ready including sufficient quantities to complete the task. Successful instruction with technology requires transparency of supply issues. Plan enough in advance that extra paper or print cartridges can be ordered. If paper and ink are financial issues, develop alternatives to hard copies – web posting, intranet web pages, PowerPoint presentations, for example. Other alternatives could include procedures to limit or eliminate student printing such as submitting electronic files to be printed at teacher discretion or requiring permission from the teacher before printing materials.



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Activities must flow smoothly to facilitate learning. Advance planning and testing allows the teacher to identify potential areas of difficulty; test common errors such as student access to graphics and print capabilities, jammed print queues, and quantity of graphics available for rich student learning; and verify that students can access files or programs that they need and can print the necessary information in the lab itself. [Be sure to note that teacher network privileges may be different than student privileges and teacher privileges may not cover some administrative issues such as printer selection and print queue clearance.]

Part of setting up the proper environment is evaluating the flow pattern of movement within the classroom (McLeod, Fisher, and Hoover, 2003). This is equally true in the computer laboratory. For effective instruction teachers should limit unnecessary movement and avoid creating bottlenecks. When students have to move frequently or wait on others, the opportunity for time off-task is increased. Supplies should be gathered, access established and materials distributed to appropriate locations in advance. Excess materials can also interrupt flow as students often assume that the amount available is the amount to be used. If working in an unfamiliar classroom, it is best to locate extra supplies (handouts, paper, ink cartridges, beakers) and place them in a location that is easily accessible to the teacher but not necessarily readily accessible to students.

Tip 3: Prepare the students to learn

It is as important to prepare the students for learning as it is to prepare the classroom environment. Effective learning requires the teacher to 'set the stage' for what the students will be doing. Erwin (2004) claims that the ideal learning environment is a mixture of novelty and routine. Well established routines allow students and teachers to focus on the novelty of new thoughts and information. It is not vital that a new method for collecting lunch money be introduced every day. Attendance is a routine that must be done daily but can easily be done in an invisible and seamless manner. "Developing effective procedures can make the difference between an orderly, efficient classroom and chaos" (Erwin, 2004, p.33). Boyton and Boyton go on to say that two crucial components for establishing effective classroom discipline are "clearly defined parameters of acceptable student behaviors, and monitoring skills" (2005, p. 3). Effectively managed laboratory activities exhibit both of these characteristics.

Prior to any activity, teachers need to establish procedural routines for computer lab activities. Important questions to address include:

1. What do students do upon entry to the computer classroom?
2. What supplies are they allowed or required to bring to the classroom?
3. Where or from whom do they get supplies for their activities?
4. What do they do at the end of class prior to leaving the lab area?
5. What is their assignment and when is it due – at the end of class or at a later time?
6. What are the behavioral expectations and what are the consequences for improper behavior?
7. If students run into difficulty how do they get assistance and from whom?



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An effective technique is to brainstorm problem solving strategies. Student preparation might well include discussing common problems that can arise and brainstorming ways to deal with them.

Prior to working in the computer classroom, it is important to review the activity and its rationale as well as ensure that every student is aware of their activity responsibilities and teacher expectations.

Tip 4: Managing time

Since most learning environments do not have a 1:1 computer:student ratio, neither technology nor laboratory classroom time is sufficient for students to explore all their learning options. Thus, it is important that students make the most efficient use of the time they have. Correspondingly, students with excess time will often be challenged to find things to do. While their curiosity and exploration can result in learning activities, they can also result in inappropriate behaviors and accidents. Both teacher and students should be well prepared before going to the lab (see keys 2 and 3). Efficient routine procedures should be established and clearly understood; unnecessary movement limited to help students stay on task and reduce excess sociability; a clear understanding of goals and objectives and student responsibilities can ensure that everyone has an effective learning experience. McLeod (McLeod, Fisher, and Hoover, 2003) emphasizes that along with these strategies, teachers should circulate throughout the room monitoring learning progress and pacing.

Tip 5: Constructing a safe environment

Safety is always a key measure in any laboratory activity. Whether conducting science labs with chemicals, tools, and supplies that can be misused or technology labs that can result in damaged equipment, lost information, or student access to inappropriate sites, safety measures need to be addressed and safety rules regularly reviewed. Fisher (McLeod, Fisher, and Hoover, 2003) discusses the importance of establishing standards, rules and procedures as key instructional elements. Students need to clearly know what to do, what not to do, and the consequences for failing to follow established rules and procedures.

An important guide for laboratory safety is not to provide too much or too little time. The old adage "Idle hands are the devil's workshop" can be especially true in the laboratory environment as students are already being encouraged to explore and construct their own learning. Moving easily and frequently around the room allows the teacher to monitor both progress and attention to task.

Limiting unnecessary student movement not only helps keep students focused on their tasks but also serves as a safety issue as bottlenecks and poor work flow patterns can increase the likelihood of accidents and inappropriate behavior.

Believing that learning is an intentional activity, the constructivist educator prepares for instruction. Within the computer laboratory, these five tips can make the time spent both effective and efficient:

1. Plan for learning by identifying learning objectives and matching assessment.
2. Prepare the learning environment by thoroughly checking to be sure that the laboratory classroom is ready for student use.



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3. Prepare the students to learn by providing the necessary foundational knowledge to maintain a smooth flow of activity and learning;
4. Make the best use of limited time, and
5. Construct a safe learning environment by anticipating, planning, and monitoring for student safety in the lab environment.

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