Laptop Learning Activities in the Classroom

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Introduction

This note lists the learning activities that are commonly found in an active classroom and discusses how laptop computers can be incorporated into these learning activities. I assume that a smart classroom is in use with wired or wireless Ethernet and that the instructor's screen can be projected with an LCD projector. I also assume that a course management system such as WebCT or Blackboard is in use. I will use my sophomore calculus III and differential equations courses as examples.

Quizzes and Exams

Online quizzes lasting from a few minutes to the entire class period can be administered using laptops and a course management system. In the case of short online quizzes, the instructor can examine the submissions during the class period.

In stead of writing a traditional paper quiz or exam by hand, it can be written partially by hand and partially using a software application or completely using the software application. Many of my calculus III and differential equations students will submit a quiz written entirely using Maple. These Maple worksheets are "passed in" electronically using WebCT.

The temptation to cheat is exacerbated by the fact that laptop screens are now so easy to see, even from a distance. Moreover, laptops, calculators, PDA's, and pagers are now able to communicate by IR and wireless, so blocking student-web or student-student communication is a challenge. Applications exist for disconnecting a laptop from the network during an exam. Where possible quiz questions should be randomly selected from a set or else the data in a numerical question should be randomly generated within specified ranges. WebCT has the capabilities to do both.

Polling

In polling the instructor puts up a question, students respond, and the results are immediately displayed for the entire class to see. Laptop applications are just beginning to emerge with this capability.

Survey/Minute Paper

Minute papers are typically anonymous and ask questions such as

- Did you prepare for today's class?
- What was the muddiest point in today's lesson?
- Did today's group activity work for you?

In the laptop classroom, minute papers can be done using an online survey tool such as the one found in WebCT.

Lecture-Coding

I often work a problem at the board and then walk the students through a Maple worksheet containing the solution steps. I either write the worksheet during the class or I prepare it before class and put it into the course WebCT site. If the worksheet is available online, most students will have downloaded it at the beginning of class and will be looking at it on their laptops while I project it on the screen. But all of this is rather passive. As a more active alternative, I walk the students through the solution step-by-step at the blackboard and let them code each step in Maple. I make sure that everyone has completed the current step before going on to the next one. There is a certain amount of running back to look at student screens, but all in all this is a very active process in which students are participating at many levels.

Courseware Session

Any software application available on student laptops can be used in the laptop classroom. In my calculus III and differential equations courses, my students use Maple to solve difficult problems whose solution cannot be easily done by hand. During a Maple problem session, I can roam the room and look for students having problems. A glance at all the screens from the back of the room, quickly shows who is stuck. A few sessions of this sort early in the semester help students get off to a quick start with Maple. Any activity that would have previously been done in a lab, can now be done in the classroom, removing the disconnect that often exists been lectures and labs.

Lecture Questions

Students often think of questions during class but are too timid to ask them face-to-face. Students can post these questions to the course Discussion board during class. This is a variant of the minute paper.

Think-Pair-Share

The traditional think-pair-share is in three parts. Students think of answers individually, form pairs to produce joint answers, and then share answers with the class. There may

not always be time in class to hear from every pair. Laptops can be used to submit the answers electronically so that the instructor can review them after class.

Team Quizzes

Team quizzes can be administered online or in a traditional way. In my calculus III and differential equations courses, teams can turn in handwritten work or submit Maple worksheets via WebCT or both. Typically one team member uses a laptop while they all brainstorm.

Team Courseware Session

This is lab teams in the classroom. Tasks could include writing, problem solving, and experimentation.

Peer Editing

Peer editing can take place inside or outside the classroom and is often done in pairs. Document exchange can be electronic. Applications exists which allow the simultaneous editing of a shared electronic document.

Go to the Blackboard

Software applications that allow the sharing of laptop screens are available. If a student's work is shown on the instructor's screen, then it can also be projected for the entire class to see.

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