ETEC 520 Assignment #1

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Part I: Academic Context

The academic context I have chosen is Anytown Middle School, a suburban public school offering grades 5-8 in Anytown, California.

The community it serves is ethnically diverse, and 30% of the student population requires some assistance in English as a second language.

Anytown’s student population is neither the richest nor the poorest: the mean annual income per household in Anytown is approximately $60,000. However, there is a group of students from families with a lower socio-economic status who have significantly fewer opportunities than the average student and are less likely to have supportive home environments.

Anytown Middle School is small for a suburban American school: 500 students. These students are taught by a core group of 20 teachers, with assistance from 2 full-time and 3 part-time staff in areas such as learning assistance, career and personal planning, music, and arts. The core group of teachers has an average of 13 years of experience, and there is a fairly even distribution of veterans and younger, less experienced teachers.

Teaching and learning styles are fairly traditional: there is no strong foundation of technology-assisted learning here, nor is there a great deal of money for experimentation and development. The occasional visit to the school computer lab or video in class is about as far as technology has penetrated. There is a desire to use technology appropriately to aide and enhance education, but money, strategy, and leadership have been issues. A new vice-principal has just been named who wants to pursue new opportunities, but he faces significant challenges.

Academically, the school scores in the middle ranges of high stakes tests that compare all the schools in the state.

Parental involvement is rather higher than average due to a strong focus on this area over the past five years.
Part II: Environmental Scan

As Bates argues regarding post-secondary education, those who wish to integrate technology into education must “address some of the fundamental issues facing higher education today and how these are likely to affect their day-to-day work” (Bates, 2000, p49). This is no less true in K-12 education.

An environmental scan of Anytown Middle School reveals a number of interesting factors that will play important roles in the future development of teaching and learning.

Economic factors

Public funding for education in California has increased slightly over the past 3-4 years, though it has not necessarily kept pace with inflation. Also, while the state government has been tightening its belt, some costs have been offloaded onto local governments.

School board officials expect current funding levels to be maintained, but are concerned that costs will continue to increase as infrastructure needs, salary increases, and inflation take their toll. Furthermore, with the state of California still climbing out of an enormous deficit in 2003, the outlook for future funding is shaky at best.

With this in mind, it is difficult to project how the costs of the future generation of technology-based teaching tools will be funded.

Physical infrastructure factors

Anytown Middle School is fortunate to have a relatively new building – only 12 years old. However, since the architectural designs for the building were created almost 15 years ago, before a great deal of attention was paid to technology needs in education, the building lacks basics such as Ethernet cabling to every classroom.

Some missing elements, such as this one, can be leapfrogged with technologies such wireless network access, but other important needs are harder to address. For example, a potential 1-to-1 computing initiative - something the original architects never considered - would be difficult without adding more power outlets throughout the building.

Human resource factors

There are three key factors Anytown is facing: teacher experience with technology, turnover, and fatigue.

In an era of increasing technology, teacher age is a double-edge sword. While Anytown’s older teachers are the most experienced teachers, and are therefore, for the most part,
fairly effective, they are in their 40s and 50s, did not grow up with technology, and are least familiar with technology. Ongoing training for these older – and the younger - teachers will be needed over a period of years. It’s not just the skills they will need, but new pedagogies and techniques for teaching with technology.

At the same time, teacher turnover is a concern. While an average annual turnover rate of 10% is not unheard of (Guin, 2004), Anytown is fortunate to have a significantly lower rate: 7%. Even so, that is an average of two new hires each and every year. Continuity, organizational learning, and keeping the school operating without unduly taxing veterans is a challenge.

A perhaps more insidious and difficult to combat problem is teacher fatigue, invited by countless new programs at the national, state, district, and school levels. As Kacy Guin notes, schools "are constantly reinventing the wheel. And for those of us that stay, it drains our energy. You know you can't constantly be starting over. It leads to burnout." (Guin, 2004).

Since integrating technology into the curriculum is a change that Anytown will face over the next few years, injecting energy into the staff to gear up for the change will be a challenge.

School leadership factors

Leaders in Anytown Middle School will have many challenges over the next number of years as they judiciously fund and implement new programs that incorporate technology, but the biggest is cultural change. As Tony Bates puts it, “the widespread use of new technologies in an organization does constitute a major cultural change … for such change to be successful, leadership of the highest quality is required” (Bates, 2000, p42).

Unfortunately, cultural change is among the most difficult types of change to ignite in an organization.

However, the cultural change is not an end in itself; it is a means to an end. Determining that end is a challenge for school leadership that is perhaps even more difficult than cultural change. School leaders – and by this I mean more than principals and vice-principals – must envision a future in which technology supports and enhances education … not a future in which education is supplanted by technology. As Otto Peters writes, teacher must be on guard and not allow unbridled enthusiasm for new technologies to “dehumanize the processes of teaching and learning and thus [ become ] detrimental to education” (Peters, 2003, p35).
Technology Factors

Anytown Middle School currently has 65 computers, primarily in two computer labs, that can be used for instructional purposes. The labs must be booked by teachers – a cumbersome process. Most of the computers in the labs are 3-5 years old, and, while perfectly adequate for word processing and basic web browsing activities, are not suited to demanding multimedia tasks. They will certainly even be adequate in another 3-5 years.

Anytown has a variety of learning CD-ROMs which are primarily used for remedial instruction, but has no learning management system, making personalized delivery of education virtually impossible, or at least not scalable.

Anytown does not have a groupware infrastructure to provide students with email, messaging, forums, shared disk space, personal web space, and so on.
Part III: Scenario

What will it be like to be a student at Anytown Middle School in 2010? Let’s project five years into the future to imagine a scenario, a future in which an energetic young leader and a cadre of dedicated teachers have used technology-based tools to reinvent schooling at Anytown.

So let’s imagine a day in the life of a student: Jane Doe, a 13-year old in the eighth grade.

A Day in the Life: Jane Doe

On Monday morning, Jane doesn’t go to school immediately. She stays home a little longer, because her mother doesn’t start work until 10:00. But at 8:00, Jane starts up her eMate, a Mac tablet that Anytown Middle School gives every student. Jane’s tablet supports wireless internet access, and fortunately, the Starbucks across the street from the Doe’s second-floor apartment has a free wireless network.

Jane logs into Anytown Middle School’s web-based learning management system (LMS), which then knows that she’s “in school,” and records that fact with a time and date stamp. Now Jane’s teacher can find her online, as can any of the students in Jane’s cohort, no matter where she is.

Jane is nearing the closing stages of one of her courses: American History 10a, which deals primarily with post-World War I domestic issues. Since she’s at the end of the unit, she’s heavily involved in analyzing the economic and political factors that led up to Roosevelt’s New Deal, and attempting, with her team of three local students, to synthesize the data and produce a report.

This four-person Anytown learning team is in touch with a group of German students who are studying the inter-war period in their own country, and occasionally the two groups meet to compare notes in a Multi-User Domain (MUD) attached to Anytown’s learning management system. When both groups finish their projects, they’ll present their findings to each other and compare notes on how Germany’s and America’s responses to poverty and depression differed – and on how they were similar.

Jane is nearing the end of this unit and she’s working on one section of the report that her group will present. To make sure she’s accurately representing the facts, she reviews a video that the learning management system loaded onto her tablet and checks a few trusted websites. As she does so, a plug-in to the school’s learning management system pops up on her tablet’s screen and asks her a few questions about what she’s just seen, which she answers. The data, which provides a snapshot of Jane’s understanding at this point, will be used to help her teacher (and the learning management system) customize further materials for Jane to access and digest.
She also checks the text for this class. Since the district negotiated a bulk deal with a consortium of textbook manufacturers at the beginning of the year, any textbook in the consortium’s digital library is automatically available in the Resources section of Anytown’s learning management system. Jane’s teacher highlighted this book as one that offered not only a succinct reporting of salient facts about the New Deal, but also had insightful commentary from a variety of perspectives on the significance and impact of key events, decisions, and policies. The text also includes period video, audio of Roosevelt’s speeches, and interactive pictorial representations of life in the 1930s.

After Jane spends an hour or so reviewing information and making notes in her own handwriting on her tablet, her mother is ready to go to work. Jane checks to be sure her eMate is fully charged, and knowing the battery will last all day, puts it in her backpack. Her mom drops her off at school.

Anytown now serves almost 700 students, but is not over-crowded: schooling is a year-round occupation, and there is always one set of students on break. As Jane walks in, a RFID tag in her backpack notifies the student information system (SIS) that she is in the building. The student information system notifies the learning management system, but Jane does not appear as active on her cohort’s digital dashboards: she has not logged in yet.

Once in school, Jane joins her cohort in one of the learning labs. Learning labs are modified classrooms that feature multiple team workspaces for discussion, projects, and interaction. Each lab is presided over by a teacher/media specialist/librarian, who maintains order, ensures students are on-task, and assists in a general way with learning, information retrieval, and project management. Each of these teacher/facilitators also has an area of focus, and teaches regularly.

Jane’s cohort is a loose grouping of 15-25 students who have overlapping and complementary interests and abilities, and are of generally similar age. They do not all take the same courses, but there is sufficient overlap that creative cross-fertilization of ideas is a common occurrence. The cohort is a fairly stable grouping, but it divides into a variety of 3-5 person learning teams which are dynamic and changing as projects, courses, and interests change. Each cohort has a teacher/coach who meets with the cohort regularly, almost daily, and ensures that each student has every opportunity to participate in full. The teacher/coach is also is the first point of contact when conflict resolution and/or discipline are needed.

While working with the group on their report, Jane presents some of her findings from the morning. The group agrees to add some of the new data to the text of the report, but decides that some of the conclusions will be added to the audio-visual presentation that will be part of the final multi-media report.

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1 If anyone does enter the outer doors of the school building without an approved RFID tag, the inner doors will not open. The visitor is required to page reception, and, upon approval, be admitted.
After lunch, Jane joins her cohort as they and another cohort start a new unit together: Ecology 8c. At the beginning of this unit, as with all units, students gather in a lecture theatre that has been cobbled together from two or three classrooms.

All learning units start with old-style teaching: a summary of basic information in the relevant area delivered in a number of seminars. They are delivered by teachers in their area of expertise and interest who do not have learning lab duties at the required time.

Anytown’s learning philosophy emphasizes that although students must, to master a subject, use higher-order thinking and critical analysis skills both cooperatively and independently, the starting point is the basic facts. Not only does this give students an adequate foundation on which to build their personal learning inquiries, it helps Jane and her fellow students score sufficiently well on state high-stakes tests.

The lecture part of a learning unit, however, is not a dry listing of facts. It includes multimedia, and reasons why students should find the particular subject important, relevant, and interesting. Typically, a learning unit features between 5-8 lectures, although more can be added if required.

The seminar lasts an hour. After a brief break, Jane’s cohort meets to discuss what they’ve heard. They compare notes, scan the SCORM-compliant\textsuperscript{2} course that their instructor downloaded from a best-practices teacher’s site and added to the learning management system, and start to offer opinions on the data presented.

After 45 minutes of discussion, the school bell rings, and most of the students break up and head toward home. Jane, whose mother is working late, walks to this month’s designated late learning lab, which is open and staffed until 9:00 PM every weeknight, and catches up on some of her other work while waiting for her mother to come pick her up after work.

Hardware, Software, and Money: How it All Comes Together

The scenario above is technology-intensive: software, hardware, and media. How can a school that does not expect significant funding increases accomplish this?

First of all, the school district negotiated a bulk purchase from Apple Computer for the eMates, acquiring them at just under $450 each. Moore’s Law and the continuing downward pressure on the pricing of digital components has, by 2010, resulting in a fairly powerful unit that holds over two hundred gigabytes of data (including media documents), runs quickly, accepts pen-based input but has an attachable keyboard and mouse, runs 9 hours on one battery charge, and features a large, clear, high-resolution

\textsuperscript{2} “The Sharable Content Object Reference Model (SCORM) aims to foster creation of reusable learning content as "instructional objects" within a common technical framework for computer and Web-based learning.” From Advanced Distributed Learning’s website at:
http://www.adlnet.org/index.cfm?fuseaction=scormabt
display. Since the tablet comes with all the software needed to view and create any kind of content, the school has not needed to purchase any additional software for general use.

Second, the digital library that the school negotiated ‘full-meal-deal’ access to offers more than conventional hard-cover textbooks at a lower price. In fact, a per-student annual savings of $75 is partially funding the tablet, which have a projected useful lifespan of three years.

Third, Anytown sports a powerful array of software that is has acquired for precisely zero dollars. Both its learning management system,\(^3\) which helps teacher tailor each student’s educational path, and its student information system,\(^4\) which manages all the data regarding grades, attendance, and so on, are open source projects that already in 2005 were showing significant promise, and by 2010 are full-featured, stable, easy-to-use packages that interoperate easily with other software.

Both of these open source packages run on top of the most famous open source success story: Linux. Using Linux the school is able to use older hardware for its servers and still have high availability and quick response times … besides saving the money that would otherwise be needed to purchase a server operating system.

Fourth, some of the physical infrastructure that supports wireless networks and the RFID security system was paid for by the state to answer public outcry after a series of school shootings.

Finally, Anytown was able to access some additional funding for truly critical needs: ongoing training for staff, and a full-time technology coordinator who assists teachers whenever needed and slowly instigated change over a 5-year period.

In summary, the physical tool is getting cheaper and cheaper, and by judiciously using open source software wherever possible, Anytown was able to put a compelling solution together at fairly low cost.

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\(^3\) Moodle, for instance, is a surprisingly full-featured open source learning management system that, among other things, manages calendars, courses, online interactions such as chat, exercises, forums, journals, quizzes, resources, and much, much more. Information: http://moodle.org/

\(^4\) There are a variety of open source student information systems available right now that include powerful features including gradebooks, attendance, scheduling, communication of grades to the home, and much more. Examples: Center: http://www.miller-group.net/ and School Tool: http://www.schooltool.org/
Part IV: Implications for Learning

The scenario discussed in part three is significantly different from the average student’s experience today – and it’s significantly different from the average teacher’s experience. In fact, it would require a changed mode of education.

That change would have to start with school culture. As Elizabeth Hinde says, changes introduced into schools fail “as a result of the reform being counter to this nebulous, yet all-consuming facet – school culture” (Hinde, 2004). School culture today is generally regimented and structured, very industrial or “Fordist” (Bates, 2000). To enable the scenario I detailed, school culture would have to reflect a more learner-centered focus.

Role of Teachers

The role of a teacher would change significantly. As mentioned, it would still include lecture-style dissemination of information. However, much more time would be spent as a facilitator/coach/librarian. Teachers would be experts at accessing, synthesizing, and formulating knowledge, and would be able to help students do the same. Teachers would also use the learning management system to set up individualized goals, assessment criteria, and learning experiences for each student.

With appropriate technology, assessment could be vastly altered as well. Rather than episodic, assessment could much more easily be continuous. Formative assessment occurs when teachers “build in many opportunities to assess how students are learning and then use this information to make beneficial changes in instruction” (Boston, 2002). One-to-one computing, with the proper software on each students’ tablet, would enable formative assessment in ways that are not possible today.

Role of Students

Students’ roles would change as well. While still needing to learn the basics, students would be expected to take a much more active role in learning. Technology can help in this process: as Otto Peters writes, appropriately adding technology to the learning process can “encourage, provoke, and even incite students to self-learning” (Peters, 2003, p. 64).

A fundamental change would occur as teachers use technology to adopt more formative assessment, students are enabled to “gain more control of the learning process, to develop some of the metacognitive aspects noted above, and thus learn how to learn” (Hall & Burke, 2004, p. 14).
Structure of Schools

The very structure of schools would need to change to accommodate the scenario detailed above.

Why, for instance, does school need to begin in August/September and end in May/June? Why must there be rigidly age-segregating classes separating students, instead of more fluid groupings arranged by abilities and interests? Why is school a building, instead of an attitude? There are some good reasons for these structures, but it’s likely that many of them are as old as the agrarian school schedule. Many changes could be considered, particularly with technology.

Things as omnipresent and therefore invisible as grade levels, for instance, may not make sense when you consider that learning is not necessarily as bound by age as we may think. Role call and attendance should certainly take on new aspects in a digital age. Report cards coming out at regular pre-defined intervals is a needed feature of a pre-technological age (teachers cannot forever be calculating and recalculating) but don’t necessarily make sense when technology makes assessment and progress reports continuous and cumulative.
Conclusion

Few things are as easy as they look when it comes to technology, and as far as education goes, change is often – and with reason – viewed as a Sisyphean task.

But the pieces are coming together. And when teachers see something that works, they get interested. As Wicker and Boyd note, “Regardless of what program or initiative is in place, it is important to remember that when faculty members see their colleagues using technology, they become more open to trying new things” (Wicker & Boyd, 2003).

It’s not just money. It’s attitude, and school culture. If we can change those, we can change the teacher, the student, the experiences of learning and teaching … and perhaps the entire meaning of school.
Bibliography


Wicker, Steven and Boyd, Beth. “Promoting Faculty Adoption of Technology at Wake Forest University.” Faculty and Staff Development, Nov./Dec. 2003 <ts.mivu.org—default.asp>