Technological Inclusion: Translating Embedded Assumptions in Courseware Programs for Effective Integration

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Technological integration is synonymous with education these days. Courseware management systems, like Blackboard, WebCT, Sakai, and E-folio, are ubiquitous. While the instructor may not choose the particular program or software that is used, they are ultimately responsible for its integration in their course, and the effect or impact it has. Courseware programs are powerful organizational and managerial tools that come embedded with assumptions about teaching, learning, and effective use. They are not neutral entities that can be introduced into existing courses or curriculum without having a significant impact on methodology and operating procedures. For instructors seeking to effectively integrate new technology into established courses, a process of inclusion should be implemented, whereby the existing pedagogy is evaluated in light of the new possibilities inherent with the new technology. New technology can also bring new roles and responsibilities, introduce new parties, and challenge or contradict traditional assumptions about involvement, participation, and information processing. When integrating new technology into an existing curriculum it is up to the instructor to translate the developer's expectations for use of the tool in a way that will ultimately be most effective with the established pedagogy, methods, and aims of the course.

For the past 7 years I have been involved in the development and use of a courseware management system based on integrated electronic portfolios, called E-folio, to create, implement, and evaluate classes. Integrating technology into the classroom is important, however, to be effective the process of inclusion has to be considered and governed carefully, and the instructor has to evaluate the components of their existing pedagogy in light of the potential and actual ramifications of introducing new tools into their course and classroom. In a study I did at the University of Virginia, lasting more than 4 years, I trained and monitored instructor's use of computer courseware management programs like E-folio (Holtzman, 2006). E-folio was designed to be teacher-centered technology, meaning its intention was to return the power of design choice, mode of implementation and use, to the instructor through a process of active decision-making. Across the board the concept of evaluation and reflection appeared, sometimes referring to instructors and the process of technological integration, other times focusing on encouraging the practice by students through carefully constructed curriculum and pedagogies.

No matter how carefully constructed a tool is, its integration into courses and alignment with instructors' pedagogies takes time. Some tools, like E-folio, are designed to promote 'ownership' and encourage exploration of functions, allowing instructors the most opportunity to make the tool reflect their intentions. However, no matter how explicit the expectations for use are, the process of technological inclusion into existing courses and curriculum is ultimately the responsibility of individual instructors. Their role, and the expertise they bring to academic environments should be acknowledged and respected.

Instructors who approached technological integration as a process and employed constructivist pedagogies often had the best results (effective use and seamless integration) when including new technology. Viewed over time, evaluated, assessed, and adjusted, these instructors, out of several observed,

had positive experiences because they often used tools in a manner that was most effective with their existing pedagogy. As the tool became integrated the pedagogy and course itself began to evolve because of the new possibilities inherent with the new technology. This is a process of synthesis and inclusion that precedes and promotes effective technological integration.

In a traditional university environment, the administration may select tools to purchase, however, the teacher manipulates and introduces the courseware program or tool being used in a specific course. Instructors need to be at the forefront of technological development to ensure pertinence and ultimately effectiveness. This requires concerned teachers to become both instructors and researchers. This is not a novel idea, since 1975 there have been arguments for teachers' involvement in all aspects of educational development, from research to implementation (Stenhouse, 1975). Current iterations of educational tools are far more advanced in many ways than their predecessors, making Stenhouse's reference to the essential need for educators to be involved in educational research and development more then relevant.

> In a concerted effort to improve the curriculum in the British educational system, Lawrence Stenhouse (Stenhouse, 1975) argued that teachers need to be directly involved in any research process focused on teaching. Stenhouse defined the ideal teacher-researcher as one having "a capacity for autonomous professional self-development through systematic self-study, through the study of the work of other teachers, and through the testing of ideas by classroom research procedures" (Firdyiwek, 2000, p. 41).

Studying the pedagogy of technological inclusion into an existing curriculum is a fairly new field, but a very important one. As an instructor, technology and tools fill my horizons with endless possibilities. Each tool is unique and was developed for a reason. This is especially true of academic tools, specifically computer programs that are used, but often not designed, by teachers. Every tool introduced to students in an educational setting has a purpose. They were designed by developers to be used in certain ways by instructors for specific things. The instructor's 'Pedagogy' can often be different from the associated pedagogy or 'expectations for use', that are at the foundation of a courseware program's design and determined by the developer. When considering the impact of a tool's integration and its ultimate effect, it is important for instructors to differentiate between the expectations for use, and the way it might be most effective in their classroom, course, or curriculum.

In many ways it is easy to divide a discussion of technological integration into an existing course or classroom into two parts: the specific technology used and the pedagogy employed. The ubiquitous nature of courseware programs in educational environments raises many issues about the tools, technological inclusion and appropriate pedagogy. Because courseware programs are rapidly being installed in most colleges and universities it is important to define these programs and study their inclusion. There is a simultaneous need to instruct faculty in the best ways to use Course Management Systems (CMS), like E-folio. In some instances the problem identified with technological inclusion is not the program itself, but the rapid influx of new technology needing to be integrated properly into an existing academic structure.

> The 2003 campus computing survey reveals that about one-third of all college courses make some use of a CMS, up from 15 percent in 2000. Equally significant in tracking the rise of CMS: fully four-fifths (82 percent) of the colleges and universities participating in the 2003 campus computing survey report that their institution has established a "single product standard" for the campus CMS... CMS emerged in response to an institutional need: how do we "make it easy" for faculty to use the Web in instruction? While CMS may not be the mythical "killer app" of the internet, CMS products have certainly become an integral component of campus IT offerings (Green, 2004, p. 18).

A Computer Courseware program is an educational tool used to help instructors facilitate online education. What defines these tools are the features they posses and the intentions for their use by developers. Tools have an associated pedagogy, or 'expected use' that instructors need to be aware of to select the appropriate tool, integrate it effectively, and use it in a manner that will not conflict with the methodology of the course and curriculum.

Technology is not neutral; layers of purpose and intention are embedded within every tool. It is important that teachers seeking to properly integrate tools into established classrooms be conscious of the innate designs and functions of the tools in question. For example, E-folio is teacher-centered technology. Its ideal use is as a digital studio space to create curricula. It is not designed to handle certain administrative affairs therefore can be less effective if used by teachers in ways not intended. E-folio developer Dr. Yitna Firdyiwek, offers this insight into effective technological integration:

> You start by acknowledging the fact that one of the ways technology eludes us is because it is sort of by nature something that isn't really itself, it is a very deceptive thing, it is always for something else, and so it is very easy if we are not astute and careful of it to not see it, we are constantly being effected by it. It is constantly eluding us because it is never for itself (Holtzman, 2005, 00:17:45).

Dr. Firdyiwek argues (Holtzman, 2005) that probing the discrepancy between actual use and expected use ultimately leads to an understanding of what constitutes effective use of E-folio, and courseware programs in general. The definition of effective use of tools should be viewed like a work in progress, which is ultimately determined by users, not tool creators, developers, or marketers. Other scholars in the field (Lecourt, 2001) corroborate Dr. Firdyiwek's sentiments; that tools are not neutral, and so many have been integrated unwittingly into our systems of education.

> The uses of technology in classroom settings have been limited mainly to augmenting instruction in content areas or to teaching the technical skills necessary for employment in an increasingly technological world. Technology has, in short, been 'imported' into classrooms as yet another ideologically neutral tool to support the teaching of 'skills' deemed central to professional certification (Lecourt, 2001, p. 84).

The overarching problem with technological integration is the issue of neutrality. From appearance to content management, communication and evaluation, certain choices are made which gives authority to one and takes away power from another of the involved parties. There are really four involved parties in this discussion of pedagogy and technological inclusion: developers, administrators, instructors, and students. They can be separated by their proximity to tools in terms of use and function. Traditionally, developers are on one side of tools with administrators, instructors, and students, on the other. Linearly, the power moves from developers to administrators in terms of technology, and from instructors to students when considering pedagogy (personal use philosophy). This occurs with most educational developments, but especially so when considering technological integration or tool inclusion.

> Shifts in roles should be anticipated in portfolios in general. However, the technology accelerates the process by introducing new audiences (such as the technology assistant in the classroom and the Web-based audiences around the world). In the final analysis, the electronic portfolio offers a rich but difficult mix of challenges. These reports from actual classroom experience with portfolios and technology call for simplification of tools used as well as close examination of the challenges brought on by the technology in the areas of pedagogy and assessment (Firdyiwek, 2000, p. 44).

All involved parties need to be aware of changing roles and responsibilities and adjust accordingly. In this new age of online education, courseware program developers have influence on pedagogy and the educational environment as well as instructors. Teachers who chose to use textbooks with teacher's editions and coordinated exams have long turned over a portion of the overall design and functions of their classroom to a third party. With the proper application, an online course can return the power of design and content transmission to instructors in a way that will allow students to maximize access and interaction with course material, especially if integrated in a critical and reflective manner.

Different styles of learners can find ways to communicate and participate within systems that allow for a wider array of possibilities than normally found in traditional classrooms. The process of technological inclusion encourages new practices and pedagogies to emerge that are beginning to form the benchmark for education in the digital age. Teachers must begin to consider the overall pedagogy of the online courseware program they are using if they wish their technological inclusion to have a positive impact. Courseware programs are not merely tools, and certainly not neutral products given life only when manipulated by instructors and students.

Questions about proper pedagogy probe the difference between 'expected use' and 'actual use'. 'Expected use' of a tool comes from developers. 'Actual use' is by instructors in academic environments. But what is effective use? Effective use of courseware programs by instructors occurs in the fusion between the prescribed pedagogy for tools as determined by tool developers and the instructor's established pedagogy, curricular choices, and methodology. This fusion, generated through the process of inclusion is especially essential for the field of education, where tools imported into the classroom are often developed in other contexts for different purposes, have different pedagogies and operating principles, and therefore different expectations for effective use.

> Researchers warn against the tendency to apply the tools without consideration for the rhetorical context and the needs of individual writers. Klem and Moran point to the false sense of security such programs might engender, including the sense that working at this level makes for a significant improvement in writing. They point to Bridwell, Noncarrow and Ross' (Bridwell, et all. 1984) research that associated the interest in such tools with the origins of word processing in industry and business where the concerns were quite different from those in the educational environment (Firdyiwek, 2000, p. 53).

Tools are designed and developed by a person or group for a purpose. Very often that purpose can be contradictory to educational ideals or standards and often comes from outside the immediate educational community of instructors, administrators, and students. Accompanying these tools are guidelines for implementation and expectations for effective use. Instructors need to be aware of the assumptions embedded in any educational media about the nature of teaching and learning. Proper training in the use and function of specific technology, as well as becoming literate in the language and history of media and technology integration issues is a good way to prepare faculty for the inevitable changes that are happening so rapidly around them. Training of this nature is essential because so often new technology is imported to accomplish specific, pre-existing goals that do not take into account individual students' needs, or the changing atmosphere around education, but continue to propagate an outdated methodology in new ways. It is important when working with tools to recognize that there are values, ideals and beliefs embedded in technology that ultimately come from developers and tool creators (Frechette, 2005). Regardless of the source, be it software designer or marketer, tools are inherently reflective of certain assumptions about the nature of teaching, learning, and the workings of the mind.

> As Rozak (1994) remarks, most educators treat the computer primarily as a means of instruction: 'What they may overlook is the way in which the computer brings with it a hidden curriculum that impinges upon the ideals they would teach. For this is indeed a powerful teaching tool, a smart machine that brings with it certain deep assumptions about the nature of mentality. Embodied in the machine there is an idea of what the mind is and how it works. The idea is there because scientists who purport to understand cognition and intelligence have put it there. No other teaching tool has ever brought intellectual luggage of so consequential a kind with it. A conception of mind - even if it is no better than a caricature - easily carries over into a prescription for character and value. When we grant anyone the power to teach us how to think, we may also be granting them the chance to teach us what to think, where to begin thinking, where to stop (Frechette, 2005, p. 111).

The danger to teaching and the principles of education that this blind acceptance of technology brings lies in the concept that these tools were very often not constructed or designed to operate within the same pedagogical model employed by instructors. They are rooted in foundations and operating principles from an entirely different sector then the world of education, therefore, were often created for entirely different purposes. Most tools carry with them what Rozak (Frechette, 2005) calls a 'hidden curriculum'. The term, hidden curriculum, refers to the goals and ideals embedded within tools that perpetuate the beliefs and standards of creators, designers, and developers. This does not always carry negative connotations, but anytime decisions about education, teaching and learning are made by a third party, it becomes necessary as a matter of good practice to examine that party's motivations, beliefs, and political/economic interests.

> We need to question the ways in which education literature and schools of education prepare teachers to evaluate, critique, and contextualize educational materials. In the press to integrate technology into classroom instruction, teachers may adopt an uncritical stance toward curricular materials found on the Web. What works may be defined as what is readily available for quick, mass consumption... technology is once again being used to circumvent the expertise of the teacher and introduce an agenda, this time involving content, that is independent of the teaching and learning styles of the classroom (Blasi, L., Heinicke, W. F., 2000, p. 86).

Intrinsic to tools are the choices made by designers, which can limit certain possibilities for use and promote others. Because of the complex nature of the technology and its components, instructors are often incapable of designing or building their own tools, and lacking the time and expertise are often excluded from the developmental process. One of the results is that pedagogical decisions, embedded within the functions of tools, are now being made by designers and developers who more often than not are far removed from the classroom and current pedagogical practices and theories. It is up to teachers (Snyder, 2001) to consider the desired impact and mode of implementation of technological integration, and to model the process of inquiry and adjustment for students.

> As new communication and information technologies are used more and more widely, teachers need to think critically about their use and provide their students with the skills to do likewise. If large numbers of teachers continue to dismiss new technologies simply as tools, using them to do what earlier technologies did, only faster and more efficiently, then they perpetuate acceptance of a limited notion of their cultural significance: they overlook the technologies' material bases and the expanding global economic dependence on them (Snyder, 2001, p. 43).

With the implementation and integration of commercially designed and developed educational tools

comes a shift from the ideals of education to the goals of a market economy. Motivated by commercial interests and guided by the spirit of usury, schools are becoming markets, tools are products, and the students are consumers. One of the dangers implicit in this view occurs when what is popular sells, and begins to replace what works.

> As we have shown, technology is frequently presented both to teachers and to parents as the solution to a whole range of social and educational problems; and yet it is a solution that, under present circumstances, is provided largely by the commercial market. In the process, both the problem and the solution are inevitably being defined in particular ways. What counts as a valid education use of technology is, it would seem inextricable from what sells (Buckingham, 2001, p. 39).

This example partly illustrates why the concept of tool neutrality is so important for instructors to acknowledge. Tools are inanimate learning objects, given life and character through use by instructors. However, once set in motion, courseware tools need to be monitored, evaluated, and consciously made to reflect instructors' intentions. This process of ownership subsumes the intrinsic properties of a tool, and reinforces, strengthens, and evolves, instructors' established pedagogies. Reflection and gradual implementation can lead to change, but the process has to be initiated by instructors themselves.

The idea of neutrality is considered when instructors define tools in syllabi. Neutrality is dismissed when a tool and its purpose are presented to the class. As the tool becomes integrated into the curriculum, no one is left out of the process. In an academic environment these two issues are very important, inclusion in all parts of the process for all parties involved, and recognition of conscious decisions, especially by instructors in the manner and mode with which they choose and address different topics.

Tool neutrality is not a negative concept. Instructors need to recognize that tools come embedded with ideas about teaching and learning, often developed in an arena other then academia or education. Upon recognizing that, instructors can more easily choose appropriate tools, or align their existing pedagogies with certain programs, to avoid conflict and increase the impact of integration. The concern is that instructors who fail to adapt or evolve their pedagogy when integrating new tools may find many of their pedagogical decisions being made arbitrarily, or determined by the functions and operating principles of the tool itself.

Inclusion is the marriage of the expectations for use of a tool with instructors' established pedagogies. In current literature this type of instruction is called 'integrated e-learning' (Jochems, 2005) and is conducted by participants who display 'technological fearlessness' (Good, 2001). Technological inclusion, or synthesis, is the process of moving from tool integration, through actual use to impact. When conducted effectively, existing pedagogies are evaluated and evolved because of the possibilities inherent in new technology.

To describe this process the term inclusion is used, referring to the 'inclusion' of the features, functions, and expectations for use of a tool, into an established course, classroom, or curriculum. The term 'integration' can be misleading because it implies equality, and this is not an even exchange. 'Inclusion' better reflects the onus on instructors to include and incorporate technology into existing (though hopefully updated and evolved) pedagogies.

This problem is elucidated when considering issues of scope and scale in the modern classroom. Integrating new technology can increase communication between active participants, and increase the overall number of involved parties. However, just because it can be done, does not always mean it is the most effective thing to do. Increasing the community in a course, now that the traditional classroom has been altered, means that the instructor also has to make sure there are venues and forums for all members. If the scale and scope of a course exceeds the instructors' capacity to evaluate, monitor and

involve all active participants, perhaps the environment has not been constructed in a way that best matches the instructor's pedagogy. This requires a thoughtful process of technological integration whereby the instructor must evaluate her pedagogy in light of a new tool's inclusion. The course is being altered in light of the capacity inherent in the new technology, but the specific technology must not determine the overall design of the course. The instructor's pedagogy is what forms and drives a course, and ultimately what the student's will respond to. A computer cannot teach, and information given does not always equate with material processed.

There are many benefits that new technology brings; greater chances for diversity in modes and means of student participation, increased communication, a re-defining of the traditional classroom and community. However, if not monitored and evaluated, the instructor may find many of the decisions regarding student assessment, or roles and level of participation/interaction being governed by the embedded expectations for use intrinsic to the particular software package.

An effective pedagogy for technological integration is one of inclusion and synthesis. Instructors should actively engage in evaluating pedagogical goals when considering what is possible with new technology. First, instructors should recognize what it can do, and what they want it to do. Then, re-evaluate existing curricular materials and methodology so all learning objects, exercises and activities are aligned within their personal pedagogy. This helps the instructor retain autonomy over aspects of the course. One of the clear impacts of technological integration is that it allows administrators to reach a certain level of conformity concerning use of technology, yet affords instructors the chance to claim ownership over their particular method of inclusion, and sometimes even over tools themselves. When new technology has been selected for integration, and decided on by administrators or community leaders, the expectation exists for instructors to be able to, and have to, decide on the particulars of the transfer to new platforms of courseware systems (VanDerKlink, Jochems, 2005). Very often this transition is assumed to occur, without proper guidance, or the assistance of models to follow.

> Teachers are expected to maximize active learning by creating learning arrangements in which theory and practice are well integrated, and in which e-learning should support the learning arrangements such as tasks and information sources. The result is that a model of learning and instruction that has been preferred is defined at the course level (VanDerKlink, Jochems, 2005, p. 152).

This sort of teaching environment will be new to many instructors who will have to be trained not only for effective integration but to a level of comfort with tools, programs, or courseware (or computer), so they can demonstrate and model familiarity with the product and process for the students. Students are often very adept at using and manipulating technology in ways instructors may not be. Students can often be more capable overall with new technology than instructors, possibly from having used it from an earlier age and in a wider array of areas. When this is the case, instructors who are not familiar with computers or certain courseware programs may not be able to anticipate problems, issues or areas of concern students may generate. This can cause confusion and detract from the overall effectiveness of the course.

> The true value of IEL [integrated e-learning] lies in its potential to reform education in the direction of new pedagogical approaches that promise to be able to meet future challenges such as competency-based education... Striving for more innovative types of education implies an approach in which technological, strategic, pedagogical and organizational views of implementation are integrated... The nature of the integrated approach for large-scale usage of IEL will depend, however, on the faculty's goals concerning the use of IEL (VanDerKlink, et al., 2005, p. 154).

Faculty training, to ascertain a certain degree of comfort and familiarity with new tools, may take a lot of time, but is essential to the process of effective technological integration. It is the role of the instructor when integrating or including new technology into existing curricula to translate the developer's expectations for use into an effective pedagogy. This is not easy, but is essential when including new tools, courseware programs, or technology of any sort. What is more difficult, but so important, is for faculty to move beyond degrees of comfort with computers, to a point where they can begin to experiment, play, innovate, create, and develop truly effective digital courses, curriculum, and pedagogies. When this begins to occur, technological integration ceases to be an ungainly marriage of new tools and established ways, and can be seen as a process of evolution through synthesis and inclusion.

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