Abstract: We present a case study of an innovative, technology-supported approach taken within the Kelley School of Business at Indiana University for the launch of a new Accounting MBA (AMBA) degree. The new program is proactive by treating the pending 150 credit-hour requirement as an opportunity for major technology infusion and competitive differentiation among graduate accounting programs. The purpose of this case study is to describe in detail the process and experience of launching the new AMBA degree which incorporated technology-supported learning from its genesis. The case study demonstrates how vision, partnerships with industry, and a myriad of technology choices enabled the successful launch of the new degree. It provides a detailed roadmap for other institutions who may be planning similar technology-supported learning initiatives.

"Unlike many MBA programs that are trying to retrofit their courses and faculty with teaching technologies, our Accounting MBA (AMBA) program was designed with technology immersion in mind from the beginning. We believe this will provide our students with a head start in a profession that is increasingly involved in auditing, consulting and managing information technology."

--- John Hill, Faculty Chairman, Accounting Graduate Programs.

"Proacting" to the Environment

As a result of the growing complexity and knowledge-intensity of the accounting field, over half of the states in the United States have now passed legislation requiring that beginning in the year 2000 anyone sitting for the Certified Public Accountant (CPA) exam must have successfully completed 150 credit hours of relevant university study. As a result, business programs at universities across the country are in the midst of curricular changes in order to deal with this requirement. This paper reports on an innovative, technology-supported approach taken by Indiana University's Kelley School of Business to address the new requirement. The 150 credit-hour requirement was viewed by the faculty as an opportunity for major curricular improvement, technology infusion, and competitive differentiation in the accounting field.

This case study is intended to be descriptive, practical, and useful. We have made every effort to be detailed and precise in the use of actual names, dates, specific technologies, and events surrounding the creation of the AMBA and its choices for technology-supported learning. Source documents and unstructured interviews with faculty, administrators, students, and our own experiences while participating are the sources of information for this case study.

The study is not empirical, and it is not necessarily intended to build or test theory. The purpose of this case study is to describe the launch and first year experience of a new degree program that was designed to incorporate technology-supported learning from its genesis. While many universities -- especially graduate schools of business -- are now seeking ways to increase the use of technology-supported learning in their existing programs, the clean sheet design of the AMBA provided a unique opportunity for designing a degree program with technology in mind. It differs from some other reports on technology-supported learning in that a degree program is the unit of analysis rather than a course. The case study demonstrates how vision, coupled with groupware and related technologies, enables students and faculty to communicate, collaborate, and coordinate better while the process of its use prepares students to thrive in an increasingly wired business world.

The Vision for an Innovative, Technology-Supported Approach

Envisioning the AMBA Degree

Accounting faculty in the Kelley School began brainstorming ways to deal with the 150 credit-hour requirement back in the Fall of 1995. The vision that came out of this planning process was for an innovative, bold approach that would be attractive to students and to recruiters, that made use of advanced technology, and that built upon the already successful, MBA program in the Kelley School. The result was a 3/2 program where accounting students first completed three fairly typical years as undergraduate students and then completed their remaining 2 years as graduate students, with these fourth and fifth years essentially being an Accounting-oriented...
MBA program (AMBA)\(^1\). These new AMBA students would attain the necessary 150 credit hours to sit for the CPA exam and complete an MBA degree as well.

A separate administrative staff with a faculty chair position and a director was created for Accounting Graduate Programs. The structure for the new AMBA program borrowed some of the best practices from the regular MBA Program, including a lock-step, cohort-based, integrated core for the entire first year of the program (the fourth year in school for these AMBA students). Students then have flexibility in choosing major and minor courses in the second year (the fifth year for these students). This first year integrated core is team taught and covers key subjects such as Economics, Statistics, Human Resource Management, Finance, Strategy, Information Systems, Marketing, Operations, and Accounting. Many of the 14 faculty members chosen to teach in the AMBA program were either teaching or had taught in the regular MBA program.

The program design ended the spring semester integrated core at week 12 and included a live consulting project from week 12 until week 16. The project was incorporated to give students additional practical experience. Students then returned to Bloomington just long enough to repack their luggage and embark on their summer internships.

**Envisioning the Technology Requirements**

Given the relatively applied nature of the Kelley School and the close ties between faculty and executives via Executive Education and other external linkages, the accounting faculty realized that both accounting and accounting education were being reinvented by technology. The faculty knew that they would have to rely heavily on the use of technology within the new program as both content and vehicle for learning. The also realized that to do this well they would have to form several strong partnerships with industry.

The faculty knew that not only had much of the work of accounting become computerized, but that people throughout the accounting field also used a variety of technologies to communicate, collaborate, and coordinate with each other. In addition, the trend in industry was toward the use of portable, notebook-sized personal computers that could be used in the field. They wanted to use technology in similar ways within the new AMBA program to experientially train students to work with the same technologies and in the same ways that they would be expected to out in the field.

By the fall of 1996, both the degree program and technology vision were taking shape.

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1 Thus, when we speak of the AMBA students first and second year in the program, we are referring to their fourth and fifth years as business students in the Kelley School.

**Partnerships with Industry**

Three industry partnerships were essential in launching the AMBA. Like all good partnerships, each of these offered some symmetry of risks and potential rewards to each partner.

**A New Wired Classroom**

Mikel Tiller, then Chair of the Accounting and Information Systems Department, formed a partnership with Larry Scott, Managing Director for National College Relations, and others at Price Waterhouse (PW) to design and build a state-of-the-art technology classroom. Price Waterhouse ultimately donated $300,000, which was matched by the Kelley School of Business, to renovate an existing classroom and transform it into a technologically advanced classroom optimized for the use of notebook computers and groupware. A team of faculty members and others within the Kelley School worked with PW to design and build this high-tech, special-use classroom that became the Price Waterhouse Technology Center. Figure 1 shows the design schematic for the room, and Figure 2 shows photographs of students using the classroom. Finished cost for the room was just over $670,000 which included significant costs for physical renovation of the room along with new air handling and electrical systems. $130,000 was direct technology investment.

The Technology Center provides power and data ports for 80 students with notebook computers. The room has Category 5 twisted pair cabling from each desktop to a wiring closet - each port is a 10Mbs switched Ethernet connection. The mobile instructor station was tailor-made by Reza Barkhi, an audio/visual technician employed by the university. He essentially took a piece of equipment typically used in hospitals and adapted it. The instructor station contains a document camera, keyboard, mouse and computer monitor, a connection for a notebook compute
in receptacles were purchased from KI in Green Bay, Wisconsin.

**Notebook Computers**

The second partnership was with a notebook computer vendor. A strategy of selecting a single manufacturer with specific models was deemed essential to contain support costs. After considering several notebook computer brands, Jim Anderson, Director of Technology Services in the Kelley School, working with Len Jessup, Associate Professor and Chair of the School’s Technology Committee and several faculty members developed a partnership with Mark Elliot, Vice President, and Jerry Hahn, University Relations Liaison, and others from IBM. IBM agreed to provide two models of notebook computers to students and faculty at significantly discounted prices. Students were required to purchase one of two IBM Thinkpad computers.

The deal with IBM was struck in late Spring 1997 and two notebook purchase options were made available. The first was an IBM ThinkPad 365XD with 133MHz Pentium Processor, 40MBs of RAM, 3.5” 1.44MB external floppy drive, 6X internal CD-ROM, 1.35GB hard drive, 1M video memory, 11.3” dual scan display NiMH battery with 2 hour life, A adaptor, PCMCIA expansion slots, 3 year warranty, PCMCIA Ethernet card, 33.6Kbps data/fax PCMCIA modem, a Thinkpad carrying case, and various software for $2,394.25 before tax. The second was an IBM ThinkPad 380D with 150MHz MMX Pentium Processor, 32MBs of RAM, 3.5” 1.44MB internal floppy drive, 8X internal CD-ROM, 2.1GB hard drive, 1M video memory, 12.1” active matrix color display, Lithium ion battery with 2.6 hour life, A adaptor, PCMCIA expansion slots, 3 year warranty, PCMCIA Ethernet card, 33.6Kbps data/fax PCMCIA modem, a Thinkpad carrying case, and various software for $3,613.50 before tax. At the time, this was an excellent price for the students. Students were evenly split with about half purchasing the first option and half purchasing the second option. The School purchased one of the high-end notebook computers as a "loaner" for students whose computer was being worked on and several faculty members purchased high-end models for their own use.

**Courseware**

The third partnership was formed by Brad Wheeler, Assistant Professor of Information Systems, with Alan Minard, Director of Academic Markets for Lotus Development Corporation. Lotus granted seed licenses of Lotus Notes software to the Kelley School and adopted the Kelley School as a beta-test site for LearningSpace, Lotus' new suite of tailored Notes templates used to support teaching and learning. After some evaluation in the spring of 1997, a decision was made to adopt an off-the-shelf
commercial product rather than try to custom write course delivery software. Lotus Notes and LearningSpace became the foundation for content delivery of the AMB program, and the Kelley School enrolled in the Lotus Passport program to license the software.

LearningSpace (see Figure 3) provides five components: Schedule, Media Center, Course Room, Profiles, and Assessments.

- The Schedule includes the day-by-day orientation notes for each session and syllabus.
- The Media Center is a place for faculty and students to swap files, software, web links, and class notes.
- The Course Room is an on-line discussion forum.
- The Profiles module includes biographical information and photographs for each student and faculty member.
- The Assessment module, a separate component, enables on-line quizzes and exams.

In addition, Notes replication capabilities of keeping course content synchronized on both the server and students' notebook computers provides for student productivity even when not connected to a network. To support the intense use of technology within the AMBA program, the Kelley School hired a half-time Notes Assistant Notes Administrator and committed to hiring a full-time Notes administrator with a half-dozen graduate assistants to support Notes and the new Technology Center. This group would also support teaching uses of Notes in the traditional Indiana MBA program.

Launching Technology-Supported Teaching and Learning in the AMBA Program

The launch of the new degree program involved significant efforts and adjustments from faculty, students, and staff. In this section, we highlight some of the experiences for each group.

The Faculty Experience

For most faculty, the AMBA represented their first serious step into technology-supported learning. Only a few had maintained a course-related website in the past and none had taught regularly scheduled classes where each student had a computer (except for a few special lab sessions). The faculty startup experience was further complicated by the newness of LearningSpace and Lotus Notes in the school, lack of an effective training program, and the coordination matters of planning an integrated curriculum with their teaching team.

Decisions had to be made regarding whether one LearningSpace course should be created for all the disciplines taught within each semester (e.g., Economics, Accounting, Quantitative Decision Making, etc.) or separate courses should be created for each discipline. After some experimentation and a need for an integrated course schedule across disciplines, the faculty decided on a single LearningSpace course with precise guidelines for formatting each day’s schedule entries. For example, “A540: ” preceded all accounting schedule entries which provided for additional sorting possibilities in the schedule.

Each faculty member then posted each of his/her planned course events in the LearningSpace Schedule module (Figure 4). Most faculty found this to be a new and daunting task at first. The structure required more precise course planning for topics, learning objectives,
class dates, and reading materials than they had done in
the past. Use of the on-line schedule module, however,
allowed each faculty membe to clearly see the teaching
topics and objectives of other faculty and to self-adjust
content as needed. After some nervous discussion,
the faculty decided and committed to a strictly electronic
syllabus plan. No paper copies of the syllabus or schedule
were distributed to students. The on-line nature of the
LearningSpace Schedule and Notes’ automatic updating
of each students’ notebook computer made this a practical
decision.

Once the semester commenced, there was significant
variance among the faculty in their use of LearningSpace
features. Some made extensive use of the Media Center
for posting course exercises and class notes. Others
planned on-line case discussions in the Course Room
module for use both during and after class. The integrated
nature of the course allowed the facult to readily learn
from each other as they observed how their colleagues
were using the technology.

Faculty often used the Course Room discussion forum
for real-time, on-line collaboration in class (e.g., the
discussion of business cases). Faculty also demonstrated
and taught many other types of software in addition to
Notes. For example, faculty used Microsoft's NetMeeting
desktop video conferencing software, taught students a
variety of statistical and simulation packages, and had
students downloading data from financial databases via
the Web.

The Student Experience

The first cohort of 37 students in the AMBA program
purchased their notebook computers during the summer of
1997 and enrolled in the Fall of 1997. To prepare students
for the use of technology in the program they were first
given a "jump start" course just before classes began in
which they were trained in the proper "care and feeding"
of their new notebook computer. Students were given
Lotus Notes version 4.5 pre-loaded on their notebook
computers. Then, many class sessions during the first
week of classes were devoted to training the students in
the use of Notes and LearningSpace. Students used Notes
for email, on-line discussion forums, and calendaring/scheduling. Students then entered the
Schedule and the Profiles modules on-line to familiarize
themselves with the upcoming courses, the faculty, and
the other students.

In addition, during the first eight weeks of the fall
semester in the first year of the program, students were
given a 1.5 credit hour Collaborative Computing course as
part of their integrated core. In this course students were
trained not only in advanced user topics, but they also
received beginning and intermediate Notes application
development training. The course required students to
build a Notes application for a business problem and client
of their choosing. In short, all students become power
users, many attained at least a beginning level develop
expertise, and several achieved intermediate level
developer expertise.

During class sessions, faculty and students used the
notebook computers, Notes, and LearningSpace in a
variety of ways. Students nearly always took notes on
computer, and when available they downloaded Microsoft
PowerPoint slides from the Media Center and used their
computer to take notes directly on the slides that the
faculty member was lecturing from on the large projection
screens. Faculty would also often post a shareware
software program or a spreadsheet file in the Media Center
and have students download them in class and use them
for in-class exercises.

To support the use of the technology outside of the
class sessions, the Technology Center was left open in the
evenings and on weekends (under supervision) so that
students were free to use it. In addition, notebook
connections for data and power were added to the library
and other areas throughout the business building. Students
could also make an Internet PPP connection at
home or on the road and access any of the Notes and
LearningSpace applications being used either from the
Notes client software or from any Web browser. Outside
of class sessions students were required to participate in
on-line discussions in the Course Room module, which
extended class discussions. In addition, students were free
to build their own on-line Notes discussion forums and
other applications (and nearly all of them did) to suppor
their studying and team projects. Several facult
members' offices were also wired for notebook data and
power connections so that students could plug in their
notebook computers in faculty members' offices during
office visits.

"One of the main benefits of the AMBA program
is that it was compulsory to have an up-to-date
laptop with a reasonable level of horsepower and
good software. I never knew how dependent I
could become on my PC (email slave and Learning
Space addict). Getting to know the ins and outs of
our operating environment, something of modern
hardware, big picture knowledge about the
telecommunications and Internet infrastructure, as
well as the limitations of our particular PCs was
very valuable to me." -- Nathan Meyers, AMBA
Student.

In short, the technology was used extensively in and
out of the classroom to support teaching and learning.
Nearly everything happened through or was supported by
Notes. The technology became particularly useful when
students were off working in teams on their consulting
projects. In addition to using Notes to communicate with
each other and their professors, students also worked on
Notes projects. For example, a team of students
completing their consulting project at Ford Moto Corporation in Detroit worked on-line with Len Jessup, their Information Systems professor, to build a Web-based on-line survey in Notes for their project.

While Notes was the primary tool used in the AMBA program, other technologies played a key role. For example, the Technology Center and other rooms in the business building were wired with ISDN lines for video conferencing. During the school year the Kelley School bought a VTEL video conferencing unit that was used in the AMBA program. For example, one team of students conducted a meeting using the VTEL unit with the Chief Financial Officer of Corporate Express in Denver in preparation for their consulting project there.

The Technology Services Experience

The school had been experimenting with Notes on a test server during the 1996-97 academic year and it was used for some summer of 1997 LearningSpace course development. Due to unanticipated delays, the production Notes server for the AMBA program did not arrive until three weeks prior to the launch of the fall 1997 semester. The process of successfully setting up the new server, learning to administer a new server network operating system and groupware platform, and populating a consistent image (e.g., applications and network drivers) on each student notebook computer were very taxing on the Kelley School’s Technology Services unit. The Notes server ran Windows NT version 4.0 (the school had used all Novell servers in the past) and Notes version 4.6 beta release 3. The server also ran version 2.0 of the LearningSpace templates. Support issues for the student notebook computers proved taxing but manageable after consistent processes were established for certain types of problems.

Assessment: The Value of a Technology-Intensive Program

The first class of AMBA students has just completed their first year and is now out on their summer internships. Enough time has passed for us to reflect on our use of technology-supported teaching and learning in the AMBA program and to draw some preliminary conclusions. The technology helped in three ways -- efficiency, enhanced learning, and improved process skills for thriving in a wired world.

Efficiency

First, our use of notebook computers, Notes and LearningSpace, and the newly renovated classroom enabled students, faculty, and program administrators to communicate, collaborate, and coordinate much more efficiently than they would have been able to without the technology. For example, simple activities such as looking up another person’s schedule to arrange a meeting, posting a spreadsheet file in the Media Center for in-class use or for homework, or scanning an article and then posting it for discussion in the Course Room were useful time and paper savers.

Enhanced Learning

Second, we believe that our use of technology in this way enhanced learning by connecting students to world of resources. For example, prior to class, AMBA students were directed to gather popular press articles from the web regarding a scheduled case. During class they were directed to visit the web site of the firm under study and find information relevant to the case discussion. After class, they continued their discussion of the case in an on-line discussion in the Course Room. Another example is the use of spreadsheet templates in the Accounting component of the core. On-line access to the files and spreadsheets during the lecture enabled hands-on experimentation with various costing concepts and their implications on financial statements. Students could work on the problems individually on their notebooks, pass them around electronically to other students during class, and then turn them in to the instructor for public projection to the class as a whole. LearningSpace provided an organized learning context, notebook computers for each student provided a place to experiment and communicate, and network connectivity to a world of resources enabled faculty to focus on coaching students as they worked through material rather than just lecturing.

The technology also made it easier to adjust and innovate on the fly. For example, if during a class session the students and instructor saw the need for a change in the syllabus or in the schedule, the instructor simply went into the Schedule module and made the changes. If a change created a conflict with the schedule of another instructor in the integrated core, an email message could be sent to that instructor on the spot requesting a swap of class sessions. The process of adapting and rescheduling occurred in a matter of minutes with everyone sharing a common schedule rather than hours with lots of email messages. Other examples of innovating on the fly came during class sessions where students would find information on the Web relevant to the class discussion, post it to the Course Room for all to see, and the instructor would then incorporate this new information into the session in real time.

Process Skills for a Wired World

The third way that our use of the technology was useful is that it enabled us to better prepare the AMBA students with the process skills needed to thrive in a wired world.
We had all realized that computer skills would be critical to the students’ future success in the business world. More important, however, would be their skills in adapting technologies to solve problems effectively and manage knowledge well. In effect, their use of the technologies in and out of the classroom was perfect training for being successful in business in the networked era of computing. How do we know we were successful in doing this?

One way that we know this is that we can compare the AMBA students with the MBA students as to the extent that they are knowledgeable, skilled, and comfortable with personal computers, client/server computing, and with the use of groupware to interact and solve problems. Across the entire class, the AMBA students clearly excelled on these measures.

“The students weren’t at all intimidated by anything with their computers. They were very aggressive in their use of LearningSpace and the new classroom and were often pulling the faculty along.” -- Chris Albright, Professor of Operations and Decision Technologies.

We also are hearing from each of the relevant stakeholders that the students are prepared to thrive. John Hill, Chairman of Accounting Graduate Programs, believes that what is special about the AMBA program is that it enables the students to develop skills in the “mastery of critical information,” and that the students’ use of the technology in managing knowledge is their competitive advantage.

Student feedback echoes this belief. One student’s response to the program at the end of the first year summarizes well the general feelings of the students about their preparation for a wired world. He stated:

"The use of technology has definitely been a bonus. I think, from what I have seen so far, that we are ahead of the curve in relation to a lot of the things we will see when we graduate, and that can only be an asset to us. For example, most accounting firms have gone to the use of Lotus Notes-type tools, especially in auditing. We will be very comfortable in these environments, giving us an edge over those who are just starting to learn how to use this type of technology."

In fact, evidence from the field-based consulting projects suggest that students were not only well prepared to thrive in a wired world, they were well prepared to lead others in the use of technology. Feedback from one student upon returning from his consulting project captured this phenomenon nicely. He stated:

"Computer skills are essential today in the business world. For example, the computer training in Budapest, where I did my consulting project, was fairly weak. I ended up training my bosses on how to use Notes more efficiently."

The use of groupware and notebook computers have become nearly standard for consulting firms in the areas of accounting, information systems, and management, and many other business firm in other sectors are following suit. Recruiters from these firms also recognize that the AMBA students have a technological edge. Every student had lined up an excellent, paying summer internship well before the end of the spring semester, with many of the internships in the area of information systems or in areas that required technology expertise. Further, given the favorable response from the recruiters, the students recognized that the technology advantage was paying off. Over one third of the AMBA students selected the IS track for their second year of study in the program and ever student reported that they would enroll in at least one additional IS elective course for their second year of study.

Key Issues and Lessons Learned

There are many interesting and valuable lessons that have emerged from the launch of the new AMBA program. We describe several of them below in three categories: Preparing for the AMBA Program, Living the AMBA Program, and Moving Forward with the AMBA Program.

Preparing for the AMBA Program

Championed Innovation: We believe that the accounting faculty were able to be so innovative in their use of technology for three reasons. First, the Department of Accounting and Information Systems is comprised of 25 accounting professors and ten Information Systems professors. The collaboration on curriculum design and technology advice proved an effective combination. Second, accounting professors Mike Groomer and Jerry Stern were also very knowledgeable and skilled in computer use and were instrumental in the planning for the program and design for the use of technology. Third, John Hill, Chairman of Accounting Graduate Programs, championed a clear, compelling vision for the program that included innovative use of technology.

The use of Lotus Notes and Learning Space has presented both opportunities and challenges for faculty who have previously taught stand-alone courses using individually selected technology platforms. Yet, the faculty has shown both a commendable acceptance of the technology and a remarkable ability to adapt rapidly to the challenges it presents. We could not achieved even a fraction of our success, however, without the
strong support provided by our Information Systems faculty who went to considerable lengths to help educate faculty on the use of Lotus Notes and Learning Space. – John Hill.

Technology Adoption: A longstanding chicken or egg debate in the school questioned which comes first: curricular revision to leverage technology or the technology investments? The fear was that unrealistic expectations for students and faculty would be set by technology investments without significant curricular change yet the heavy work of curriculum change aimed at a moving technology platform was unappealing.

“Notes became the killer application for breaking the school’s chicken or egg debate. It bought time for the school to evolve both technology and curriculum simultaneously. I believe Notes is doing for the wired curriculum what spreadsheets did in legitimizing PCs in the office.” Jim Anderson, Director of Technology Services.

Many people were concerned that the faculty would not adopt all this new technology and make use of it in and out of the classroom. Conversely, other people argued that faculty would adopt the technology and had confidence that even previously low-tech professors would make use of it. The latter arguments won out. The use of the technology by the faculty was extensive and, in fact, the Fall semester was nearly paperless with articles scanned and posted to the Media Center and some of the exams taken on computer.

The choice of a standard technology platform using commercial products is credited for part of this success, though some technology-active faculty did feel constrained by their inability to modify LearningSpace. Web links placed in the LearningSpace schedule provided one remedy for these concerns.

By making a program-level decision about our technology platform for course delivery, we avoided many of the difficulties associated with individual professors making independent and potentially incompatible technology platform decisions. The consistency of using Notes/LearningSpace as our platform allows our faculty to direct their energy at improving each year in the ways we use these tools to accomplish program objective. – John Hill.

Forced Outsourcing: The original intent was for the Kelley School’s Technology Services unit to take possession of the notebook computers and manage directly the process of distributing computers to the students. University and state purchasing rules prohibited this. Instead, the school and IB partnered with Graham MicroAge, a computer vendor in Indianapolis, Indiana. Graham MicroAge configured the computer hardware as needed and sold the units to the students. The students then brought their computers into the School’s Technology Services unit the week before classes and the computers were configured with the necessary applications and networking software.

Living the AMBA Program

Changed Pedagogy: With much of the program delivered with and through the new technology, this has forced a fundamental change in the way professors teach and students learn. Some examples are: 1) Faculty now work together to plan and build the integrated courses online. 2) A great deal of traditional lecture has been either enhanced with student access to slides during class or replaced altogether with hands-on problem solving in class using the computers. 3) A great deal of collaboration between faculty and students and among students now happens on-line in and out of the classroom. By the middle of the first semester, if a faculty member began working out a financial problem on a spreadsheet projected on the large screen, students would insist that they be allowed to work on it themselves on their own computers or at least be able to follow along with a copy of the spreadsheet on their own computers.

The students commented on significant differences in the extent of technology usage by the fall and spring faculty teams. We now recognize that we did not provide adequate mechanisms for knowledge transfer regarding effective use of LearningSpace and Notes between the two teaching teams.

Accelerated and Tailored Learning: Given that every student has his/her own notebook computer and can connect with each other and faculty in the classroom, library, lounges, faculty offices, and at home, the pace of learning is much faster and learning doesn’t stop after class or at the end of the work day. Additionally, student can continue to work on assignments, projects, or in the Course Room as they determine they need to. To take advantage of this opportunity for self-paced learning, many faculty began preparing and delivering more of their notes, examples, and exercises in digital form for those students who needed them. The class place was extended to the course room through the technology.

Classroom Management: Given that students had their own notebook computers in front of them in class, they sometimes surfed the Web for fun, passed notes back and forth via e-mail, or even played networked games such as Doom, Quake, and X-Wing. The faculty soon discovered that they had to devise some new classroom management methods to deal with this new phenomenon, such as periodically walking about the classroom to check computer screens or sometimes asking students to simpl...
close down their computers during activities where the were not needed.

Similarly, with several exams being taken on computers, faculty had to devise new methods for examination. For example, Jeff Green, Associate Dean and Professor of Economics, had students take the Economics exam on their computers. He gave them the exam file on disk; let them consult their book, notes, and computer files; made them disconnect from the network while taking the exam; and had them submit the exam back to him on the original diskettes. One notebook computer did crash during the exam and the "loaner" notebook computer was used in its place. Another interesting example of new classroom management issues arose when a student in the first row pasted into his Windows desktop background some images that were thought to potentially be offensive to corporate guests. He was asked to replace these background images and obliged.

Skilled Students: A by-product of having all the technology available and training students to be technologically savvy is that they often are ready to run when the faculty are teaching them to walk. Len Jessup, the IS professor, demonstrated Microsoft's NetMeeting desktop videoconferencing software one day in class. Before his 30 minute demonstration was complete, several students in the class had already visited the Microsoft Web site, downloaded the NetMeeting software, installed it on their computers and configured it to work properly, and were sending invitations to Professor Jessup through the network to have a videoconference call with them. Professor Jessup's computer was connected to the large projection screen and was visible to everyone in the room. All of a sudden a flurry of conference call invitations kept flashing on his screen, much to his surprise and to the delight of the students and guests.

Low-tech/High-tech: Mid-way through the second semester the faculty had the students participate in a week-long computer-based business simulation game using a pedagogically sound yet fairly antiquated DOS-based simulation software package. Given that state-of-the-art technology was used throughout the program, this antiquated simulation software stuck out like a sore thumb. Students commented that while they learned a lot from the simulation exercise, they felt that the underlying technology needed to be upgraded.

Connection Problems: Student and faculty access to the Notes and LearningSpace applications from home and on the road was sometimes problematic. Gaining a PPP connection through campus dial-up network during peak hours was nearly impossible. Many students and faculty opted to simply procure their own Internet dial-up access through AT&T, IBM, AOL, or other service providers.

Moving Forward with the AMBA Progra

On-going Partnerships: It is clear that the Kelley School will need to continue to work with Price Waterhouse, IBM, Lotus, and Graham to ensure that the technology infrastructure remains state-of-the-art. For example, the notebook computers used this past year are already out of date and a new set of notebook computer is being negotiated for the upcoming school year.

One lesson is that some choice is needed in an notebook adoption. Some students are price sensitive where others are features sensitive. During the program’s first year, some students complained that the low-end notebook computer option, while incredibly affordable, soon became severely under-powered. Many who bought the low-end computer said that they had opted for the high-end machine to prolong the useful life of their computer. We will need to continue to offer students notebook options that give them adequate power, speed, and storage for a good price. The purchase agreement with IBM for 1998-99 specifies five Thinkpad packages varying in price from $2,000 to $3,700.

During the first year, students were allowed to buy one of the two designated notebook computers from any IBM vendor at the contract price. This proved to be a mistake. Two lessons have caused the school to require that all purchases be made from Graham as our single vendor. During the program’s first year, some students complained that the low-end notebook computer option, while incredibly affordable, soon became severely under-powered. Many who bought the low-end computer said that they had opted for the high-end machine to prolong the useful life of their computer. We will need to continue to offer students notebook options that give them adequate power, speed, and storage for a good price. The purchase agreement with IBM for 1998-99 specifies five Thinkpad packages varying in price from $2,000 to $3,700.

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Classroom, but some will not. Faculty and administrators in the Kelley School are grappling with ways to deal with high-tech students with notebook computers possibly having classes in classrooms with no notebook connection. An additional high-technology classroom is being renovated right next door to the Price Waterhouse Technology Center with help from Ernst & Young, and several other classrooms will be outfitted with notebook data and power connections.

Building technology classrooms represents a significant challenge in securing the latest technologies while working within the constraints of a university bureaucracy which may have specifications for older technologies. Paul Robbins, Project Director for the Technology Classrooms adds that, “significant faculty involvement is absolutely critical. Mock-ups of podiums and other technology controls need to be made so faculty can actually see and make recommendations early in the design process.”

Learning With, Through, and About Technology

What is most important about our use of technology to support teaching and learning in the AMBA Program is not that it enabled students and faculty to communicate and coordinate with each other better and faster. Nor was it vital that we saved time and paper by doing things online. To be sure, these efficiencies were realized, but the mask the more important and more fundamental value that our use of the technology provided. We believe that the most important value from our use of the technology was that students learned to work in teams using technology to solve problems. They learned to adopt, adapt, and manage technology. They learned to succeed with and through technology. These are process skills which can only be gained through extended immersion in a wired environment. In short, they learned how to thrive in a wired world.

“...In response to the ever-increasing technology and information demands placed upon business professionals today, we’ve (Price Waterhouse) been thoroughly impressed with the thought leadership provided by the Kelley School of Business (Indiana University) and the accounting faculty in producing an innovative, fast-paced technology-driven curriculum (for the five-year Accounting MBA Program) designed to produce business leaders for the new millennium.

It is my observation from first-hand interaction with the students, faculty and the curriculum that these future business leaders are assimilating the "ready to use" business skills and knowledge at a faster pace than we could have ever envisioned from an academic setting. These students are "wired" for success!” – Scott Beckman, Partner, Price Waterhouse.

The clean sheet design of the new program enabled the launch of the AMBA and its supporting technologies to be done in both a top-down and bottom-up manner. Design choices were made by faculty committees (bottom-up) that were focused by a consistent vision for the new program. Implementation, support, and consistency were led top-down from the AMBA program office. We believe this was a potent combination drawing on the best of both implementation strategies.

Our experience with the technology and with the launch of the AMBA program is short - just one academic year. It will be interesting to see how the second year of the program unfolds, with students opting into specialty areas and taking separate courses in a variety of classrooms in addition to the Technology Center. As students begin interviewing for, accepting, and working in their new full-time jobs after the program, we will also have more evidence to test our assumption that we are preparing students to thrive. Experiences from the AMBA program are being considered for broader adoption in the larger, 600 student, MBA program. A decision to require student notebook computer ownership for the fall of 1999 has already been adopted. At this point, we believe that, while our use of technology in the AMBA program has not been at all easy nor inexpensive, similar approaches will become a competitive necessity in schools of business.