

IT Programs in the 21st Century: Techniques to Survive and Thrive in the Changing Environment

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Introduction

Statewide Technology is a structure to deliver Purdue University School of Technology courses and degree programs to locations around the state of Indiana. This program serves approximately 1,500 students at seven locations. Agreements are in place with Indiana University, Ball State University, Anderson University, and IUPUI to serve as host institutions. Purdue offers technical courses and host institutions deliver general education courses. Students enroll as Purdue University students and earn Purdue degrees. Statewide Technology was established to meet Indiana's need for trained technologists and technicians. Associate of Science degrees are offered in nine areas and Bachelor of Science in five areas. Degree areas range from Aeronautical Technology to Mechanical Engineering Technology. Computer and Information Technology (C&IT) is offered at four sites with the BS program offered at two of those sites. Degrees are offered based on the needs of each location. At Columbus, we have approximately 210 students and our host site is Indiana University Purdue University Columbus (IUPUC), a regional campus of IUPUI with approximately 1800 students serving Columbus and eight surrounding counties. C&IT offers an AS and BS at Columbus. Computer and Information Technology prepares students for careers in the application of information systems and technology to plan, analyze, design, construct, maintain, and manage software development, systems integration, data management, and computer networks.

Enrollment Declines

In recent years C&IT have faced declining enrollment at our Columbus site. From a high of 119 students in the first semester of the 2002-2003 year we have declined to 62 students in the second semester of the 2005-2006 academic year. This is a 48% decline. With three full-time faculty and one additional member on leave we have gone from a thriving department to one that is scrambling to survive. With the majority of our students part-time we are not bringing in enough money to break even. The declining enrollment is not just at our department or site. Our program in Columbus has been faced with a loss of 74 students over the past two years. This has led our site to show an operating loss in the past year. Purdue has made it clear that it will not accept these numbers. As stated, one of the goals of a statewide program is to provide technology degree opportunities where the community has demonstrated a need. In the past six months Purdue has had to make tough decisions on programs that are no longer viable. Our South Bend site will no longer offer C&IT degree and our site in Anderson has been given two years to increase enrollment or it will suffer the same fate. If both programs go that would leave sites remaining in Kokomo and Columbus. The question then is will these sites suffer the same fate? In order to answer that question we should first take a look at the cause for the declining enroll-

ments.

Potential Reasons for Decline

The reason for enrollment declines is probably a combination of things. It could be in reaction to the dot com crash, outsourcing, uncertain economy, cost of classes and strong competition. In reality it is probably a combination of all of these things and more. I will briefly discuss some of the likely candidates for our program in Columbus.

Outsourcing continues as an issue for IT programs. The Information Technology Association of America (ITAA), in a recent study states that outsourcing has eliminated nearly 104,000 jobs so far with software engineers being the hardest hit. They also predicted that the demand for U. S. software engineers will shrink through 2008. (Heikens and AP). As I have pointed out in the previous papers I've published in ASCUE in 2004 and 2005 studies by the Gartner Group and others support similar findings. Even with these discouraging numbers there still does not appear to be complete agreement on whether all is gloom and doom with the IT job market. According to the Fastest Growing Occupations Report in the 2006-07 Occupational Outlook Handbook (Bureau of Labor Statistics) three of the top ten and five of the top twenty-five are information technology (IT) jobs. In that same handbook the only IT job on the list of occupations with the largest decline was computer operators which ranked seventh. Even given the information, this good news for IT workers, many Americans seem concerned. A Gallup poll taken during 2004 Presidential campaign found 61% Americans say they are concerned that they (or a friend or a relative of theirs) might lose a job because the employer is moving that job to a foreign country and 41% say they are 'very concerned' about this happening, and another one in five (20%) say they are 'somewhat concerned.' (Rediff)

This is already having an effect on computer programs at universities in the United States. A study published in May 2004 shows the number of declared majors plunged by 23% in the 2002-2003 school year. This is alarming considering the enrollments continued to increase after the dot-com bubble burst earlier in the decade (Schoenberger). In my role of advisor and recruiter I talk with current and prospective students and parents on a regular basis. The conversation of jobs typically comes up. In the first seven or eight years the talk was of potential employers in the area and starting salaries. In the last two or three years the first question is about jobs but now it is will there be a job when they graduate. During my first years with Purdue the C&IT placement statistics were always 100% and salaries in the top two or three in the School of Technology. In the most recent survey which is indicative of the last several surveys, placement was still respectable in the high eighties but not the guarantee it once was. This was a time when bonuses were common and students had job offers well in advance of graduation. A fellow colleague noted that the perception is that all of the jobs are going away. Besides the reports appearing in the media he tells the story of a parent that approached him with evidence of jobs going away by noting that the newspapers were once filled with pages of IT jobs and now it is just a fraction of that. The parent was appeased when my associate explained that many jobs are now listed on websites like Monster.com as opposed to advertising in local papers.

Outsourcing is a major concern for IT programs. Another reason for decline can be attributed to increased competition. As I mentioned most of the C&IT programs until recently were Associate of Science programs. Columbus was the first statewide site to offer the Bachelor of Science in C&IT and last year Kokomo was granted permission to offer the BS. A major source of com-

petition is Ivy Tech Community College. Ivy Tech is a statewide community college that has grown into the second-largest post-secondary institution in Indiana. Their programs lead to two-year associate's degrees and one-year technical certificates. They have over twenty campuses in the state and in Columbus they are literally next door to our host university IUPUC. Their enrollment has increased 75% over the last ten years. Why is a nationally known university having trouble competing with a community college? Our main campus does not compete directly because they are generally out of the business of AS degrees but that is not true for statewide sites. AS degrees have been the bread and butter for statewide sites catering to non-traditional students and traditional students preferring to stay in the area for a variety of reasons. The state of Indiana has pushed the community college system with strong financial support in the past few years. Some of the things have led to Ivy Tech advertising heavily on TV, radio and newspapers. What is a larger blow is the tuition at Ivy Tech is less than one-half of the IUPUC campus (\$83 vs. \$187 per credit hour). We are not doing a good enough job of differentiating our product from theirs. In some cases their classes will transfer into our program so it is hard to argue with paying \$250 instead of \$560 for a class that will count the same in our program. Ivy Tech is also far ahead in the number of distance education classes offered along with their efforts in providing industrial training and preparation classes for many of the certifications in networking and Microsoft products.

Besides Ivy Tech in the Columbus area we are in recent years getting more competition from our host university IUPUC. The campus is a regional campus of the Indianapolis regional campus of Purdue and Indiana University. Although they do not have their Computer and Information Technology program in Columbus they have other programs and classes that compete for students. Several specific items that potentially hurt enrollment include:

- Adding BS in Business with a concentration in Computer Information Systems
- Advertising an Informatics program out of Indianapolis. Although students cannot get their BS in Columbus they can start the program.
- Offering Computer Science classes as support classes for other programs like the School of Science where we have traditionally provided support classes.

Besides these courses IUPUC has made a much more determined effort to increase enrollments by developing a marketing plan, hiring an Enrollment Management Director and providing high school advisors with scholarships to hand out to local high schools. Also, IUPUC has agreements in place for six of Ivy Tech's programs (C&IT does not have an articulation agreement in place).

CHANGES NEEDED TO COMBAT DECLINE

As evident from the previous section the decline in C&IT can be attributed to factors that many small universities with programs like ours face. The globalization of our economy with US firms engaging in outsourcing will affect programs across the country. Also increased competition among universities is a certainty.

Some ideas that have been started or discussed include: our dean is hoping to get permission from the Higher Education Commission to become more "nimble." In other words some programs are being dismantled (as is the case with our C&IT in South Bend) while other programs may grow. As Dean Michael O'Hair, Associate Dean of Statewide Technology and Engagement stated we need to get the right products for each area. He also feels the Dean's and Director's

need to “break down the doors” with industry so that we can get our faculty in to engage industry. We are cutting costs, by eliminating adjuncts and location directors. Purdue has made several efforts to increase publicity, press releases, and the associate dean hosted directors and staff on tactics for improved publicity. Purdue has also paid a firm to work up a campaign.

Following I will briefly discuss some of the efforts that have occurred or discussed. One of the changes mentioned in my paper at last year’s ASCUE conference deals with a change in curriculum specifically to our C&IT 180 (formerly CPT 180) Introduction to Systems Development. C&IT 180 is a class our normally taken by freshman in their first semester. For years this class focused on the programming side. The class was completely revamped and more time was spent on topics of Use Case, UML, Activity Diagrams, Class Diagrams, and Context Data Flow Diagrams along with Entity Relationship Diagrams. There is still use of Microsoft Access to develop and use databases. More time is also spent on communication whether it is the traditional “soft skill” or some of the tools just mentioned. As I mentioned in the 2005 paper the C&IT 180 topics are very similar to topics covered in a program that was developed in conjunction with Purdue faculty, Cummins employees and Cummins offshore contractors (although the dept of the material covered is greater for the Cummins program). That program developed and delivered for Cummins in the United States and United Kingdom is called the Business Analyst program. The purpose was to retrain staff, typically programmers to become Business Analyst. Cummins goal was to retrain as opposed to laying off programmers when the programming positions were outsourced. Evaluations from students have generally been positive. Besides C&IT students we have worked with the Organizational Leadership and Supervision (OLS) Department and they are now encouraging their students to take that class. Also, we have been in discussion with the Business Department in an effort to see if there is a place in their curriculum for the class (their CIS students take C&IT classes for their program).

A second thing that we are working on is articulation. Last fall Ivy Tech and Purdue’s OLS Department signed an articulation agreement. This spring we have resumed negotiations again between Ivy Tech and C&IT. In an interview Michael O’Hair, Associate Dean of Statewide Technology and Engagement stated articulation is a priority for Columbus. His view is that we need to be out of the business of providing AS degrees and concentrate on BS and graduate degrees. There have been talks in the past that have stopped because of political issues. In the past Ivy Tech has wanted a 2+2 meaning Ivy Tech students with an AS would come in as a junior. Purdue’s stance has been they will look at articulation in a class by class example. Currently, there are only a few classes in their program that will transfer in (English, Communications but typically not their information technology classes). We are in the process of reviewing classes at Ivy Tech and Purdue. Although, this may seem to cause additional decline and it may at the freshman and sophomore level because students will just go to Ivy Tech. What we are hoping to do is get some of their students to continue on for the BS. They currently have over one hundred students in their program. If we can build a relationship with Ivy Tech an articulation agreement it could be a win-win scenario. Ivy Tech advertises heavily and to be able to say that their program articulates with Purdue should be a plus from them. For Purdue we can recruit from Ivy Tech our next door neighbor (we actually have a shared building now called the Columbus Learning Center where all three institutions, offer services) and to some degree piggyback on their strong advertising campaign to get them in the door and then recruit students to continue on with their degree. This will only be successful if we get an articulation agreement that will allow Ivy Tech students to use most of their credits at Purdue.

One of the issues we in C&IT (and Columbus programs in general) are trying to address is cater-

ing to our students needs. We have a dichotomy of traditional and non-traditional students and many times their needs are different. Our traditional students prefer their classes C&IT classes be scheduled during the day because many of the classes provided by IUPUC are also scheduled during the day and this means one trip to campus and time for part-time jobs during the evening. In the past we have for the most part ignored this and offered most classes in the evening. In the past year we have attempted to put more of our classes in the three to five p.m. time period to catch traditional students at the end of the day and get some of the non-traditional students early. Some of the larger employers seem to be a little more flexible in allowing students to leave a little early a couple days a week but it still presents a problem for some of our non-traditional students with less flexible work schedules. In some cases we have been able to pull some of the third shift employees into the daytime classes. At this point it is probably too early to see if this is a success because in a couple instances we have had to run classes below our normal limits to let the class run.

For non-traditional students the key from talking to students and student services is flexibility in scheduling. These students generally work full time jobs during the day and have kids to run to soccer, basketball, band, etc. The day classes that work well for the traditional students are not an option for many of the non-traditional students. In some cases it is difficult to commit to a couple times a week on campus. We have experimented with different formats in scheduling over the years from having classes meet one night a week (instead of the general two day week – one lecture and one lab) to running weekend classes that meet the entire semester and classes that meet for eight weeks. To varying degrees these classes have been successful. They provide alternatives that the non-traditional students need.

An area where we have not kept in step at Columbus and specifically in C&IT is distance education. Although many automatically think internet, other methods include one-way and two-way videoconferencing, and videotape and cable. We have several alternatives to provide this to our students. One way is to utilize the Indiana College Network (ICN) and another is development of our own distance education classes. In the past year we have increasingly utilized the Indiana College Network. The ICN is a cooperative service of Indiana's colleges and universities. It's operated by the Indiana Higher Education Telecommunication System (IHETS), and is a "virtual university consortium" of public and private universities in the state of Indiana with a goal of providing technology supported course alternatives to students around the state. The growth of the ICN deliveries is impressive and enlightening. It appears to be a trend that is not limited to Indiana. Figure 1 is a look at enrollment growth of different types of distance learning in ICN:

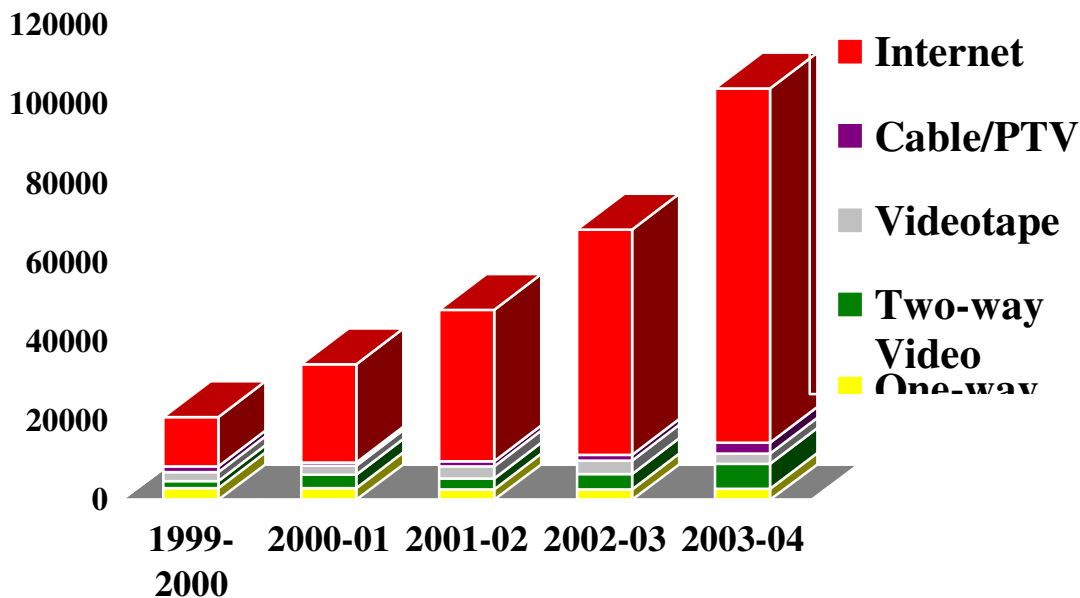


Figure 1

courtesy of IHETS

According to ICN’s 2003-04 Enrollment Report, enrollments for Internet based classes were up 57% and two way video classes were up 65%. 83% of the classes were Internet classes which come to over 103,000 enrollments over the year (IHETS). Looking at the enrollments at the major participants in the state of Indiana in Figure 2 you notice that Purdue University while showing good growth being up 15% over 2002-03 (and that figure is up 60% over the 2001-02 year) is still a relatively small player in the state (Scott). Our neighbors and largest competitors in Columbus, Ivy Tech and Indiana (IUPUC) are part of institutions that represent the two largest participants in Indiana (IHETS) An interesting note about ICN enrollment from the 2003-04 report is that only 9% of enrollments are in the Technology/IT courses with the majority in General Education (35%) and Business (22%). Unofficially, in the past year approximately 10% of our C&IT students have utilized ICN distance education courses and although there are no statistics available to document this, that is up from previous years.

Enrollment Increases		
Institution	Enrollments	Increase
Ivy Tech	35,835	+26%
Ball State	3,560	+26%
Indiana	24,275	+35%
Indiana State	7,092	+ 7%
Purdue	2,786	+15%
Southern Indiana	5,928	+19%
Vincennes	10,273	+249%

Figure 2 courtesy of IHETS

The other option for distance education is to develop and deliver distance classes. As demonstrated in Figure 2, Purdue in general is not a major player in the area. Statewide C&IT has developed a few classes in our curriculum to be delivered via distance. In general in the past there has not been a push to utilize distance education. The majority of Purdue students in the School of Technology are on the main campus in West Lafayette and departments have not pushed for distance classes. Recently, there are indications that might be changing. Last year there were a number of faculty given grants to develop and deliver distance classes. Statewide administrators have in general been supportive of development of e-learning. It appears to be a way to share resources by having faculty teaching classes in their area of expertise while giving students more options. There appear to be a few issues to deal with offering classes in our statewide system. The main one is who gets credit (i.e. money) for a student who enrolls in a distance class. Also, sites typically don't want to list a distance education class that might compete with a traditional class offered at the local site and risk having that class cancelled. Finally, what courses are appropriate to be delivered via distance education. Looking at the numbers from the Indiana College Network, technology/IT classes are not delivered nearly as often as other courses. The question has come up among statewide faculty about what classes could we deliver via distance. The main problem being most C&IT classes involve labs. Statewide faculty members met recently to discuss the issue and all C&IT statewide faculty were polled about the classes they teach and if they believed those classes would be good candidates. The result of the informal survey was that many but not all of our classes are possibilities and to do it successfully will require work. This definitely appears to be an area that will help build enrollment numbers if the political issues can be resolved.

Finally, one of the items that will help enrollment is a curriculum that will attract students. The curriculum has to avoid becoming stale and irrelevant. This is particularly true in information technology where changes are occurring daily. In general our department is tweaking the curriculum on a regular basis. In last years ASCUE paper I mentioned the inclusion of classes to the C&IT curriculum. These courses are in areas such as: cyberforensics, biomedical information, IT healthcare, information security and wireless networking. These additions have been made in the last several years and are providing a lot of excitement on the West Lafayette campus. At this time these classes are not being offered at the Columbus site. There has definitely been interest, especially in the cyberforensics, security and IT healthcare courses. If we can find a way to offer some of these classes it would be a boost. The biggest issue for some of the classes is the requirement for specialized equipment in the labs. Certificates are another area that many people believe would help enrollments. They bring in students for classes in a specific area and some times allow you to recruit students into the program. The main issue with formal certificates is that they have to go through a lengthy approval process at the university. Informal certificates would not need to go through that process and if you have a popular one it can be a big boost as evidenced by our Advanced Information Technology Program (AITTP). They had roughly 20% of Cummins information technology employees worldwide participating in a program in which participants enrolled in six C&IT classes.

Conclusion

The Computer and Information Technology Department in Columbus has faced a soft market in enrollment in recent years. This is not unique to our site or our institution as nationwide programs have seen similar declines. Our site has also faced strong competition from a growing community college system in the state of Indiana and our universities. There is no "silver bullet"

to solve the problem. What we feel like we need to do in Columbus is a variety of things that will best serve our diverse clientele. Among the actions that we believe can help is to continue to develop a flexible schedule that will cater to traditional as well as non-traditional students. We must also embrace the technology and not only utilize the Indiana College Network when appropriate but also do a better job to develop and deliver distance education classes. We must also continue re-working old courses so that they are relevant to today's needs and addressing curriculum needs for developing new classes and certificates that will keep our program fresh.

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