A Study of the Differences between Educational Standards and Vocational Demands in the MIS Field

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Abstract

The rapid pace change and growth of Management Information Systems in recent years has apparently created a gap between employer and educational institution. The research question to be addressed in this paper is what are the differences between the educational standards and vocational demands in the MIS field. More specifically, colleges and universities teach lessons to their students. Once in the working environment, however, these new employees often find themselves in unfamiliar territory. One reason is because schools normally concentrate on the theoretical side of education. Quantitatively, this analysis compares what a number of newly graduated students in the information systems field know with what they needed to learn after they were able to secure employment. Qualitative analysis of the above questions involved creating and distributing open-ended surveys to investigate some of the differences between the demands made by employers as to what they require from their starting employees and what various schools are currently providing. This is a pilot study that could be expanded to included instructors, employers and other professionals in the area.

Keywords: MIS graduate curriculum, employer requirements,

1. INTRODUCTION

The purpose of this report is to investigate the usefulness of the current curriculum being taught in the MIS field in the educational institutions of the United States. Are the schools preparing students properly? This means, are the schools giving their students the right knowledge that will serve both them and their employees in their professional career. The work place is a dynamic, constantly changing environment. School curriculum must change as well to meet the changing demands made by the MIS industry in the future. By addressing those directly concerned with this industry, starting with the students, this study will provide a clearer understanding of this issue. Furthermore, since the rapid pace of technology is expected to quicken over the next years, such a study becomes even more critical.

Being a one time only study, this research suffers from not being able to ascertain the rate of change of employer and employee demands. In addition, to accurately investigate these trend, it would be necessary to interview literally hundreds of students and professionals, to determine the full spectrum of academic demands, facilities and training available. If different areas of the country could be examined, it would be possible to see if different areas are affected differently in their perception and employer demand.

2. LITERATURE REVIEW

The general impetus of a study by Ahmadi and Brabston (1997) was to investigate to what extent the various business schools in the U.S. have kept pace with the demands that employers have placed on the employee knowledge base prior to hiring, particularly in the field of MIS. With the rapid growth of the MIS field, this has not been entirely possible. The school's expectation of the future demand for business students shapes its curriculum. There are differing opinions among professionals as to what the schools should be teaching. the opinions of several MIS professionals are explored.

An article by Enbar (1998) reports on an interview with the chief recruiting officer for the Business school at Stanford University. She outlines what the recruiters she talks to are looking for in a business graduate and this information is used when Stanford selects its applicants.

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(Stanford University normally selects less than 10% of those people that apply.) Stanford Business school is constantly getting feedback from both students and recruiters that is both qualitative as well as quantitative about how to change and innovate. At the same time, as part of trying to be a visionary organization, they are doing research to try to understand the changing landscape of the marketplace with respect to recruiters.

A publication by Guthrie (1999) covered the demands that an interviewer makes of the interviewee not normally discussed openly. One of the most important questions that an interviewer will be thinking, according to this article, is *can you do the job?* For this, they will look at the educational background and skills of the applicant and decide if they are capable. Here is a classic example of the result of any division between what schools teach and what employers are looking for. If an applicant lacks the necessary skills, this will hamper chances for getting the job.

A paper by Lu and coworkers (1998) reports on a survey of Hong Kong employers concerning the knowledge and skills of their IS graduates. Both needed and actual knowledge levels possessed by the graduates were studied. The differences were used as a guideline to improve the teaching of future IS students. The results were compared to similar studies conducted in other Asian countries. They found that greater emphasis should be placed on communication skills, especially written and oral English and written Chinese. Advances in technology have to be kept up with, and students are given the most up-to-date training. They also suggest that students receive more training in PC related skills and less emphasis on programming languages. As with other studies done in Asian countries, it was felt that systems analysis and design were generally lacking in all countries studied.

Maier and Gambill (1997) investigated what the rapid pace of technology has meant to educational institutions in the IT field, particularly Computer Information Systems and Management Information Systems areas. They concentrated on the curriculum at the graduate level. Their goal was to use the results as a means of tracking current and future trends in defining what knowledge is taught to graduate students and how useful it will be in the professional world.

An article was written by Pease (1999) to help those people thinking about getting an IT education online. The author lists 10 things to look for in such an institution. The number two feature is accreditation, the number one feature is the reputation the school has. An up to date school will supply the student with knowledge that a company needs. Another feature that is important is to investigate what the school's graduates are currently doing. Are they in demand? Did they learn relevant material?

The researchers of a paper published recently (Richards *et al.*, 1998), themselves experts in the field of IS, collected together a list of IS related skills they considered to be important, based on their own experience and after a thorough search of the literature. They then formed a panel of 20 experts in the IS field. The experts were deemed to be so by virtue of the fact that they were employed by national and global firms based on such businesses as computer manufacturing, IS consulting, software development, insurance and retailing chains. The questionnaire that was developed was used to determine what it was that professionals felt was important for IS graduates to know. The researches modified each question to better reflect the situation in the professional industry. The questionnaire was designed for ease of answering my asking respondents to answer the importance of subject area on a scale of 1 to 5. They were only able to retrieve 47 questionnaires out of 150 sent out to professionals in the field.

Many commentators today recommend that companies increase the educational level of their staff (Siglo, 1999), but little attention has been paid to the effect that higher education may have on performance. The purpose of Siglo's work was to examine one aspect, namely differences in the information source contacts of staff with varying educational levels. The results of an extensive survey of more than 100 business professionals showed that more highly educated staff report similar levels of use of interpersonal sources of information, but use certain formal print sources of information (such as libraries) significantly more. Some implications of this finding are that schools may want to concentrate on their library resources as much as their educative staff.

Computer software has, for the last 25 years changed rapidly. This pace of change is not likely to decrease any time soon. With this in mind, Vincent and Ross (1998) decided to check to see which office suites, of the main competitors in the field, are being used by businesses. They conducted a survey of 100 businesses in Lafayette, Louisiana. They should have made their survey geographically, more broad based. They sent to representatives of each of the companies a 22 question survey. They received a 57% response rate, which is considerably better than that of the paper discussed immediately above. What they generally found was that businesses are using the latest in software, mostly from Corel and Microsoft. They only keep the older software applications if they still remain useful. The authors' recommendation to schools is to keep abreast of software developments, because this is where industry concentrates.

The internationalization of software has meant that developers are being increasingly forced to obtain multi-cultural communication and problem solving skills. Shoemaker and Jovanovic (1997) developed an educational approach to training Computer and

Management Information Systems students in colleges to be able to be effective in global markets. The problems stem from the fact that most schools train for an American market for workers who are usually expected to stay in America. The authors then laboriously lay out the required curriculum for a course offering just this. They list the types of lectures, their topics and a possible timeline for their delivery. Failure to respond to this diversity will have tremendous impact on the economic horizon of everybody. It is important for American schools be able to teach international capabilities in its students.

In a related article (Leidner and Jarvenpaa 1995), the use information technology as a means to improve learning processes was addressed. The pedagogical assumptions underlying the design of information technology for educational purposes were assumed to be necessary before making such a study. The authors reviewed different models of learning, surface assumptions of electronic teaching technology, and related those assumptions to the differing models of learning. Their analysis suggested that initial attempts to bring information technology to management education follow a classic story of automating rather than transforming. IT is primarily used to automate the information delivery function in classrooms. In the absence of fundamental changes to the teaching and learning process, such classrooms may do little but speed up ineffective processes and methods of teaching. The authors' attempt to map technologies to learning models identified sets of technologies in which management schools should invest in order to transform the educational environment and processes. The research provided a foundation for people interested in the use of information technology to improve learning processes. The only problem with this paper was the lack of diversity of their study. They did not, for example, study enough professionals and other people to determine if their ideas were valid. In addition, they did not do a follow-up to verify their findings.

One of the biggest challenges facing information systems departments in universities is curriculum design. While there is certainly a place in academia to study new upcoming technologies, these technologies should not be given top billing over more prevalent industry accepted technologies. Thus, one purpose of a paper by Athey and Plotnicki (1998) was to ascertain the current level of technology use there is in the IT industry. At the same time, there is no sense in a company holding on to a technology that is old. As such neither should a school hold such a technology in its curriculum. The second point they were trying to study was what constitutes a time when a technology or application has become dated. What they essentially did was to survey a number of want ads to determine what skills employers are looking for and then compared these to the curriculum taught at a number of national schools.

A publication by Avgerou and coworkers (1999) was essentially a review of the current conditions of the field of information systems in various European countries. The authors contacted various schools to inquire about their curriculum in eight European countries. What they essentially found was that the usefulness of the curriculum was based on the overall wealth of the country. Countries like Germany and the U.K. had highly accurate and up to date information systems curricula in their schools, while other countries such as Spain and Portugal were noticeably lagging behind.

The main purpose of a paper by Sahraoui (1998) was to investigate, first hand, the problems with the determinants of the rationalist approach to systems development. The author found that it was IS educational systems and their organizational environments that were the cause of the problem. She showed that it is the lack of sufficient education in employees, right from school, that is responsible for the resistance to implementation of new software technologies. In many schools there was too much emphasis on technical and economic value of systems development. A closer look at the curriculum taught in most MIS courses confirmed this. A better solution would be to combine technical and nontechnical courses to offer what the author refers to as socio-technical curriulum. These concepts can be extended to the workplace to cover IS developmental practice. The main problem with the current practice of systems development is its limitation to formal aspects of IS development. It tends to leave out informal phenomena such as the inevitable politics that accompany the process of systems development.

Research done by Todd and coworkers (1995) made a very interesting discovery when examining the want ads over a period of years. In this work the authors analyzed the changes in the knowledge and skill requirements of information systems (IS) positions via an examination of the content of advertisements for IS professionals placed in four major newspapers over a 20-year period (1970-1990). Three types of jobs were examined: programmers, systems analysts, and IS managers. The analysis of the frequency of phrases in these advertisements suggests that job ads for programmers have changed very little -- technical requirements remain high, and business and systems knowledge requirements remain relatively low. IS management positions have also been relatively stable from the standpoint that business knowledge requirements have remained high, with technical and systems requirements specified less frequently. The greatest transition in specified job requirements over the study period occurred for systems analysts. Contrary to expectations, the relative frequency and proportion of stated technical knowledge requirements in ads have increased dramatically, while the relative frequency of business and systems knowledge requirements has actually

decreased slightly. These results raised questions concerning the implicit understanding by academics and practitioners alike of the need for business knowledge on the part of systems analysts and other IS professionals. As much as this study found interesting findings, it seemed to lack depth. Simply studying the want ads in a few newspapers does not really say much and is subject to the fact that their method of looking for keyword matches may not find all of the advertisements they were looking for, or all of the potential types of relevant want ads.

In work done by Chrysler and Auken (1999), the authors sent out a survey to MIS graduates to gauge their attitude regarding the courses they took while in school. The alumni were asked to evaluate each course according to its usefulness in their present situation. The results were related to both the course, and the time period between when the course was taken and how much of the information was either considered useful or even remembered. In this way, the authors were able to identify which courses retained their initial value. The purpose of the study was to attempt to develop a methodology by which an MIS faculty can evaluate the effectiveness of their program and its individual courses. They were also interested in finding a global attitude, if one existed, toward whether a student's attitude to the program was related to his or her perception of its utility. The results suggested that if an MIS area wishes to continue to produces students with knowledge, skills and techniques that will be highly valued by the workforce, it needs to obtain frequent feedback from its students to assure that it is offering the best it can. The method developed by the researchers in this paper allow a school to do this, even with individual courses.

Brown and coworkers (1998) were trying to investigate how attitudes, feelings, thoughts and behaviors influence business professionals decisions about computer use when conducting their trades. Previous work has found that attitudes toward computers are influenced by a variety of variables. This paper used a survey of 20 questions to ascertain the attitudes toward computers shown by business professionals from China, Japan and the U.S. The analysis involved a comparison of individual items and total attitude scores. Significant differences in attitude scores were discovered. The Chinese responded most positively to computer use, while the Japanese responded most negatively. The results were found to be highly influenced by the change in attitude among the business respondents when new computer technology was introduced into the workforce.

3. LIMITATION AND DESCRIPTION OF THE STUDY

The purpose of this study was to investigate the possible difference (and if there is a difference, its extent) between what employers in the MIS field are looking for

in a new employee and what training the various graduate learning institutions give their students that is useful for later employment. Schools must constantly check with professionals in the MIS business to see that they are properly preparing their students to meet the demands of the industry. Doing so not only ensures that the graduates would be competitive and able to carry out their functions in a job setting, but proper training among students ensures that the businesses that hire them remain competitive with highly trained staff.

The method of comparison used involved the creation of a survey with questions designed to evaluate the needs of professionals in the MIS industry and the training received by students. Two groups of respondents were sought, students currently enrolled in MIS curriculum and professionals working in MIS firms. The questions were both qualitative, asking for opinions and suggestions from both professionals and students, and quantitative, asking respondents to rank various categories of MIS study for their usefulness in preparing MIS graduates for the working world. Student responses were obtained by randomly selecting students from various classes and asking them if they would like to participate in the study. Professionals were identified from company profiles on the Internet and contacted either by phone or by email to obtain their permission to conduct the survey with them. They were then sent the survey by mail, with return mailing and postage provided. Professionals were chosen at random, and as many of them as possible were contacted, to get a good cross-section of the industry. Since choice of respondents was limited to those willing to respond, the survey population lacked individuals, with certainly valid opinions, who were unwilling or unable to conduct the survey. Their data, missing, from this study, could not obviously be recovered and represents a limitation of this work. Evaluation of the survey results was done by pooling information from each qualitative question. The quantitative data was best suited for displaying in a graphic form, to make trends and conditions easily visible.

A direct comparison between student and professional responses to the survey were used to assess what gap, if any, exists between student training and professional expectations in the MIS field. Recommendations were then made as to what should be changed in student curriculum to bring it more toward the requirements made by professionals. Professional requirements were not just taken on blind faith, they themselves were examined to see if their recommendations were reasonable and actually capable of being implemented within schools in a cost-effective way.
This study, like any study similar to it, suffers from some limitations. Firstly, MIS is a constantly changing field. Thus, it is not possible to get an accurate picture of what is going on in the field at any one time. Even the professionals interviewed in the current study may themselves not be fully cognizant of the direction their

field is headed or the current level of knowledge, training and technology available or needed. Even if the current study turns out to be timely. How will it be possible to tell? Furthermore, even if it is timely, it will not stay that way. This means that no matter how useful the results of a survey of this type are, within a few months it has become obsolete, given the rapid pace of technology and change.

Both the sampling method and the small number of people interviewed are the most obvious limitations of this study. The sample of students is a convenience sample. The students were all from the same urban area, although they were from different classes and represented two Universities. The small sample size means that inferences about a good cross section of the population are severely limited. Furthermore, because the people interviewed for the current study are located in only one part of the country, it was not possible to use the data to get a 'feel' for the whole country. This is to say that the attitudes of professionals and/or students in the area where the study was conducted may be quite different from other areas of the country or the average attitude of all relevant people in the country.

Yet another limitation to the study is the number of questions asked. Given that each respondent was only willing to give a limited amount of their time to answering the questions, the questions had to be chosen to be able to address as much information, and accurately, as possible. Thus, the amount of information that could be generated from the interviews and the questionnaires is limited by desirability of response from the respondents. In addition, gaps in the data were generated when respondents failed to answer all questions. This led to unevenness in response numbers and also contributed to some irregularities in data analysis.

4. QUANTITATIVE ANALYSIS OF QUESTIONNAIRE RESPONSES

Of the 61 questionnaires sent to various MIS and IS professionals and students, 16 students and 12 professionals returned them. For parts one and two, the results are summarized in the table below. Numerical data shown is the average response with the calculated standard deviation beside it in parentheses. How do you rank the academic usefulness of the following (sample size is 22).

Spreadsheet programs	4.5 (1.2)
Advanced Modeling	4.1 (1.0)
Word Processing	4.6 (1.2)
Database Design	4.2 (1.2)
PC Networks	3.9 (1.3)
Graphics Software	3.1 (1.3)
Data Communication	4.1 (1.0)
Statistical Packages	3.0 (1.4)
General Systems Theory	3.6 (1.2)
Systems Model of Firm	3.9 (1.2)
MIS Conceptuality	4.4 (1.1)
MIS Analysis and Design	4.5 (1.4)
Marketing IS	3.8 (1.3)
Manufacturing IS	3.2 (0.9)
Financial IS	4.5 (1.1)

How do you rank the professional usefulness of the following (sample size is 12).

Spreadsheet programs	4.4 (1.6)
Advanced Modeling	4.0 (1.5)
Word Processing	4.7 (1.5)
Database Design	4.3 (1.3)
PC Networks	3.8 (1.2)
Graphics Software	3.0 (1.2)
Data Communication	4.4 (0.9)
Statistical Packages	3.5 (1.2)
General Systems Theory	3.2 (1.1)
Systems Model of Firm	3.8 (1.4)
MIS Conceptuality	4.2 (1.6)
MIS Analysis and Design	4.6 (1.6)
Marketing IS	3.9 (1.3)
Manufacturing IS	3.1 (0.9)
Financial IS	4.3 (1.2)

Generally, the professionals tended to agree with the students as to the potential usefulness of computer software programs and MIS analysis and design and financial systems. Data communications were also ranked as important. Ranked as unimportant in both cases were manufacturing concepts, general systems theory and graphics software packages. These trends are not surprising given the importance of being able to collect and process data (done through office software packages) and the relative unimportance of graphics (which are normally just used for display purposes). Variability was significantly higher among the responses from professionals. This is probably due to the
fact that the professionals come from many different companies, each with its own emphasis. Students, who generally study the same concepts regardless of their institution appeared to agree more with each other (less variability). Again, this is not surprising given the cohesiveness of school curricula and lack of professional experience among the students. Professional experience tends to generate different viewpoints, based on different professional experiences.

5. QUALITATIVE ANALYSIS OF QUESTIONNAIRE RESPONSES

The answers to the written questions, some of which were not fully completed were collected and the trends and concepts they displayed are summarized below for each question.

How many years of education do you think MIS students should have before entering the workforce?

Many respondents differed on what they thought was a sufficient amount of time to spend in school. Some felt no specific number, that experience is what counted in the workforce. They felt that no education level would really prepare one for what they would be doing in the workforce. Experience is the only factor that will really show how good you are and can be. Others felt that four years of college was a satisfactory amount of time if the student majored in the IS curriculum. If a student has minder in the field an additional year of school solely in IS was strongly recommended.

Do you think that your education is preparing you to meet potential international employment or international business demands?

Again, opinions varied widely, some felt that their current education was providing them with the tools and methodologies that would allow them to execute the responsibilities as mandated by a company, while others felt the opposite since in their curriculum, there was not even one international IS course.

How prepared are newly graduated MIS students to meet the challenges of today's business place?

Similar to the first question, most respondents felt that newly graduated MIS students could not meet the challenges in today's business arena unless they had previously performed the functions in their current jobs (i.e. had previous work experience). One respondent stated that even after two years of graduate school they did not expect the students to be able to "keep heads above water with the new technologies coming out by the month." This remark suggests that the pace of technology is too fast for school curriculum to ever catch up. One professional said that they did not believe that education alone could prepare anyone for what they will be required to do at there day to day job. They thought that education was a good starting place to get 'you in the door', but things were much different in the workforce. In school, students are taught the correct way to do things. In a controlled environment, this was fine. In the workforce, the worker has to be able to adapt and think of new ways to do things outside of the way that it was taught in school.

Other professionals agreed with this opinion. Many felt that school does not really teach students the real aspects of working in the business place. It takes real life experience to really learn all that is needed to be successful. But, school does give a foundation for understanding concepts and theories that can be applied to work situations.

How prepared are newly graduated MIS students today going to be if they were to be recruited into the workforce 5 years from now (make an assumption as to the conditions 5 years from now)?

This was an interesting question, designed to gauge how fast the MIS field will change in the future. Most respondents, professionals and students alike felt that in five years, without any further training, students would essentially be out of the market. Their skills would provide no value and they would not survive in any IS field. To summarize the feelings of the respondents, MIS is probably the most volatile and ever-changing sector of the job market and anything can happen in five years. Although a degree today can be useful in 5 years to understand theory and management, up to date skills that are required in 5 years would have to be learned.

How prepared were newly MIS graduated students for the business environment 5 years ago?

The purpose of this question was to gauge how fast the MIS field has changed over the previous 5 years. Unlike what was answered for the question above, most respondents felt that, based on the curriculum, the students were as prepared then as they are now. Some schools have only made small changes in their curriculums which means that the same professor that taught someone 5 years ago is probably still teaching the new MIS candidates now. This answer is rather vague, it could suggest that the curriculum needed changing but was not, or that it was fine the way it was. One respondent stated that five years ago MIS schools produced students that were in a better position than those today, because they were more better taught. MIS students today only know the management and do not care enough for the IT parts.

Do you think that you are currently receiving the appropriate education to allow you to effectively compete in landing a job after you graduate?

Most respondents, (all students) felt that students were probably being given the appropriate ground level position, and based on their ability to adapt and learn would be able to pick up in a new position very quickly. A student, from their point of view felt that combined with work experience they could get a job. They thought that an education alone would get people in the door, but it would be hard to get a really big job with no experience.

Overall, do you think your training is helpful in teaching you effectively?

Students were divided on this issue. They felt that some classes required them to use tools that may never have to be used in a job, such as MS Access. Some classes were clearly out of date and made the students learn tools that have not been utilized for 5 – 10 years. Some students thought that professors teach right out of the book. They could have picked up the same book and taught themselves. One particularly negative response stated that "some professors are so full of themselves that they think their theories are the end all of the computer

industry and that everything can fit into a cookie-cutter template." The opinions of the professionals clearly have stated this is impossible.

Do you think business professionals and MIS curriculum generators should work together to establish the curriculum of your school or do you think that the place of business professionals is not in schools at all?

Most professionals agreed that the situation was both parties should work together to develop a broader based curriculum more geared towards generic aspects of businesses. Since each company does business in its own generic way, it would be hard to create a complete curriculum that would encompass the business requirements of all of them but, it would create the proper ground level for a person to start leveraging themselves against when they start working. One student believed that cooperation from business was necessary, the MIS curriculum should be changed to emphasize tools used in the real world, and should specialize in the major areas (major areas refers to the fields above where numerical response was high). One professional was right to point out that far too often, the professors are out of touch with the way things are done in business today. They may then teach out-dated topics and theories that are wasting the students' time and money. One student respondent, thinking in an efficient way stated that some of his best
courses were taught by business professionals. He did not want to learn out of a book, because he could do that on his own time. He wanted to learn from real life experiences, so that he would know what to expect when confronted with daily situations that required rapid response.

6. DISCUSSION OF THE RESULTS OF THE PILOT STUDY

If it is true, as some of the questionnaire respondents said (mostly professionals), that the current curriculum of the schools cannot adequately prepare students for the working world and that even if they tried, they could not keep pace with advances in technology, then what is the solution for the future? One possibility is to give the students a cooperative learning environment. This would mean that the students spend some of their time in class and the rest of it working in a real world, business environment. This would require cooperation and partnership from businesses. This was the nature of the last question in the survey. If businesses and schools could work together to educate the students, the students would receive a benefit in the form of a better education, the schools would benefit from having done a better job and business would gain from the fact that they would have more capable potential employees. Cooperation from several businesses would be necessary to make sure the students received a balanced viewpoint. The need for business cooperation was poignantly stated by

one student in the survey when he answered that business professionals should definitely be involved in determining curriculum requirements. The whole point of these programs is to develop the skills needed in the workforce, not theoretic academics. One professional agreed and thought that part of the curriculum should require students that are not working in the industry, to get an internship. This would give them some experience in the workforce to see how things are done. One professional disagreed though, he felt that it would be difficult to bring in real business situations into a classroom and have students try to solve them because each situation is unique to each companies/businesses. So what works for one is not necessarily right for another. There is going to be a conflict as what type of curriculum to bring in from the professional side as the professionals themselves have different opinion of it. Therefore, the better possibility is to only have limited contact with business. He thought that it should be MIS academics should establish the curriculum with only some input from professionals.

Another possibility is to modify the curriculum to make it more 'business friendly'. This could be done, for example, by supplying the students with assignments better geared toward practice instead of theory. Problem solving and case studies are one example. While such assignments are clearly already being done, they should be enhanced as learning tools rather than used simply to generate marks or to give students 'something to do.' They should be geared toward workability and to getting the students to understand their usefulness in the professional world. Most questionnaire respondents also felt that, even if the curriculum is behind, it must grow and change with the industry if the students are going to be able to keep up. The curriculum has to become more dynamic to allow those changes.

Five years ago, most people agreed, that MIS students were probably better prepared than now. The pace at which things are changing in business, quickly makes the curriculum out-dated. What can a graduate do then to maintain their usefulness? One possibility, echoed by a number of interviewed professionals was that since the IT and IS are constantly changing at a fast pace, 5 years from now the software packages that students learned to use or know of would be obsolete. However, the concepts of system and technology will still stay the same. Thus, MIS students should stay up to date with the new technology, but not necessarily with newer concepts.

7. SUMMARY

With the fast pace of change in technology, it is vitally important for schools to keep up with the demands made by employers in terms of proper, up-to-date training for future employees. With the inertia shown by some schools however, this will prove difficult. This problem is also coupled with the fact that many professionals do

not believe that schools are capable of keeping up with or even providing anything other than background basics in their curricula. With regard to specific skills, today's IT students and professionals alike put emphasis on capabilities in office application programs, and in some of the more robust, management directed portions of IT and MIS training. Of particular importance to a number of interviewed professionals is the Internet. They feel that the Internet, like it has for many other areas of study, transformed and will continue to transform the learning environment. The ability to obtain instant information about a wide variety of subjects and the ability to conduct classes from home and from great distances are just two of the possibilities. For schools outside of the U.S. emphasis on language learning is becoming increasingly important. Salient among these is English, although in some areas of the world Japanese and German are also stressed. Less emphasis is placed on computer graphics or computer programming for example. This gives us an indication of where the industry is going and what the IT and MIS professionals of the future will need to learn. Other schools across America also are putting less emphasis on computer programming, particularly in the older languages such as Cobol.

In addition, because of the increasing pace of technology change, the virtual 'shrinking' of the world, and the ease with which communication and data sharing are now carried out, it will become increasingly important for IT and MIS professionals to keep abreast of current developments. They must be able to think in an international, global capacity.

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APPENDIX
MIS CURRICULUM SURVEY

___**Check here if your major is MIS.**
___**Check here if you are a MIS or IT Professional.**
___**Check here if you are Both.**

Questionnaire Questions Rank the first five questions on a scale of 1 to 5, with 1 being unimportant and 5 being very important.

1. Respondents will be asked to each of the following topics is in terms of **academic** usefulness.

__Spreadsheet programs	__General Systems Theory
__Advanced Modeling	__Systems Model of Firm
__Word Processing	__MIS Conceptuality
__Database Design	__MIS Analysis and Design
__PC Networks	__Marketing IS
__Graphics Software	__Manufacturing IS
__Data Communication	__Financial IS
__Statistical Packages	

2. Respondents will be asked to rank (on a scale of 1 to 5, with 1 being unimportant and 5 being very important) each of the following topics is in terms of **professional** usefulness.

__Spreadsheet programs	__General Systems Theory
__Advanced Modeling	__Systems Model of Firm
__Word Processing	__MIS Conceptuality
__Database Design	__MIS Analysis and Design
__PC Networks	__Marketing IS
__Graphics Software	__Manufacturing IS
__Data Communication	__Financial IS
__Statistical Packages	

Interview Questions

3. How many years of education do you think MIS students should have before entering the workforce?

4. Do you think that your education is preparing you to meet potential international employment or international business demands?

5. How prepared are newly graduated MIS students to meet the challenges of today's business place?

6. How prepared are newly graduated MIS students today going to be if they were to be recruited into the workforce 5 years from now (make an assumption as to the conditions 5 years from now)? (50 words or less)

7. How prepared were newly MIS graduated students for the business environment 5 years ago? (50 words or less)

8. Do you think that you are currently receiving the appropriate education to allow you to effectively compete in landing a job after you graduate? (50 words or less)

9. Overall, do you think your training is helpful in teaching you effectively? (50 words or less)

10. Do you think business professionals and MIS curriculum generators should work together to establish the curriculum of your school or do you think that the place of business professionals is not in schools at all? (50 words or less)