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Offshoring/Nearshoring and the Requirements for Higher Education in Information Systems in Germany and the United States

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Meinung/Dialog

Offshoring/Nearshoring and the Requirements for Higher Education in Information Systems in Germany and the United States

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Following up the dialogue on opportunities for the software development industry in international value networks in the special issue 2007, we present in this issue's column 'Viewpoint & Dialogue' a discussion on the topic *"Offshoring/Nearshoring and the Requirements for Higher Education in Information Systems in Germany and the United States"*.

Considering the evolution of enrollment figures for computer science and information systems in Germany, e. g. between the years 1998/99 and 2003/04, a decline of 20% must be ascertained for computer science, while those for information systems increased by the same percentage [MeGW05]. Since 2004 the situation for computer science tightened by further decreasing numbers. In information systems a stagnating or only slightly decreasing tendency is observable [Stat06].

This trend is worth mentioning, as Germany has been lacking qualified IT employees since a couple of years. Statistics are further indicating increasing demand in the near future despite offshoring/nearshoring of software and IT services. A similar situation holds for the United States where e.g. three IT occupations will be among the ten fastest growing occupations over the next ten years [USDe05].

With such a predicted shortage of IT manpower it is not surprising that IT is still propagated as a viable career choice, even though the qualification requirements have changed. In addition to gaining a good foundational education it is nowadays necessary (e.g.) to keep up with current technology permanently and to improve soft and teamwork skills. Especially domain specific know-how of functions and processes becomes more and more important in the future [ACM06].

But what can be done to attract more young people to computer science and related studies again? Today many of them are mainly afraid of their chances on local job markets due to offshoring/nearshoring as a result of globalization.

A first approach to meet this challenge could be to increase the attractiveness of computer science studies. It is proposed to achieve that e.g. by promotion in form of attractive and influential brochures in close cooperation with the IT industry [Gall06] or by 'bumper stickers' predicating "Got IT? Get an information systems specialist!" [Wats06]. In the long run interdisciplinary designed studies like information systems or industrial engineering that offers graduates a wide variety of opportunities might help out of the dilemma.

For the discussion on this topic we present contributions by (in alphabetical order):

- Prof. Dr. Armin Heinzl (University of Mannheim, Department of Business Administration and Information Systems),
- Prof. Dr. Dr. h.c. Rudy Hirschheim (Louisiana State University, Baton Rouge, Information Systems and Decision Sciences Department),
- Prof. Dr. Karl Kurbel (European University Viadrina Frankfurt/Oder, Chair of Business Informatics),
- Prof. Dr. Norman Matloff (University of California, Davis, Department of Computer Science),
- Prof. em. Dr. Dr. h.c. mult. Peter Mertens (University of Erlangen-Nuremberg, Department of Information Systems I).

The comments highlight in particular, whether offshoring/nearshoring really threatens higher education in computer science and if it will also lead to enrollment decline in information systems. Going further, the required educational solutions for information systems are proposed and the prospects of new interdisciplinary IT studies within European universities triggered by the Bologna Declaration are discussed. Summing-up, the perspectives of information systems in the US and 'Wirtschaftsinformatik' in Germany are pointed out and a comparison between both disciplines' future is drawn.

If you would like to present your point of view on this matter, please submit your article (max. 2 pages) to the editor-in-chief: Prof. Dr. Hans Ulrich Buhl, University of Augsburg, email: Hans-Ulrich.Buhl@wiwi.uni-augsburg.de.

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Opportunities from Offshoring and Nearshoring for Academia

Armin Heinzl

Offshoring and nearshoring are repeatedly identified to be responsible for declining enrollment figures for computer science. I do not agree, however, that offshoring threatens higher education. Offshoring might be a symptom but not the cause. I consider offshoring as a phenomenon of global labour division and an opportunity for both our economy and academia. The project Interdig (http://interdig.berlecon.de) has revealed that Germany has almost a balanced trade relationship with India regarding IT services and that Germany is one of the big four exporters of IT services worldwide. Thus, we are not as bad but a few others are still doing better.

What really threatens higher education is demography as well as the erosion of our education system and the prevailing design and engineering values in our society. The baby bust will offset proven quality and selection mechanisms. Few people are really aware of the implications. The treatment of elementary schools and high schools as a cost factor rather than an investment will reinforce the declining quantities of national talents. And since large parts of our society consider mathematics and engineering as a necessary evil, not a virtue, the role of software engineers and solution architects gets more and more underexposed in our society. Why should a young national talent take up the challenge to become a (software) engineer if the opportunities of this choice are not well explained and if it is not valued by his family? This reflects both a cultural and a communication challenge.

Since we cannot affect demography in the short run, Germany needs to attract more students from other countries and must bet-

ter communicate the opportunities and core competencies which it certainly has. Our core competencies are systemic thinking and the ability to deal with complex business processes. Good software is built in India but good solutions are built in Germany. In order to stay competitive, we need to significantly increase the number of software engineers, requirements engineers, and solution architects graduating from our universities. We need to address these points in our high schools as well as in other countries. Since tuition fees are comparatively low in Germany and teaching quality is high, we can make something out of it if we really want to.

In order to be coherent, our industry has to hire international students whether they have been studying in Germany or not. Today, only a few companies invite international students for job interviews. Many foreign students move on to other countries for resuming their careers after graduating in Germany. Likewise, the green card campaign did not fulfil the expectations. Thus, the industry should be more open and agile as well. Furthermore, the cooperation between universities and industry has to go beyond a few bachelor and master theses. Joint curricula development efforts as well as company-university alliances which integrate good high schools are valid options.

Questions arise, whether established curricula have to be amended to respond properly to rapidly changing market conditions, e.g. triggered by offshoring. Since culture is an integral part of IS, and offshoring is nothing else than IT outsourcing on a global scale, our curricula *have been* enriched with offshoring/nearshoring related topics. As an export nation, we have learned to deal with other cultures, and, therefore, we are able to achieve this in the offshoring context as well.

You can read a lot about culture. But at Mannheim, we are convinced that culture must be experienced. Thus, our students should further continue to study one or two semesters abroad. Internships accompany this exposure in other parts of the world. Furthermore, attracting talents from other countries to Germany will bring cultural diversity onshore. Multi-cultural teams study and work together at our university. This philosophy has been successfully implemented at the Mannheim Business School and is now extended in our IS programs. We are currently conducting joint lectures and seminars with universities abroad where we utilize and improve new methods and tools for distributed software engineering. Therefore, we already promote some of the skills needed for offshore and nearshore projects. However, we need to come up with additional elements in our curricula which concentrate on process innovations regarding software engineering practices and aspects of global software development. I personally see further potential in topics like solution architecture design and project management.

Some people say that the Bologna Process has stimulated new interdisciplinary studies which seem promising for the future. I do not see the Bologna Process in here. Germany has been leading edge in developing and pursuing interdisciplinary studies for more than three decades. What Bologna has triggered is the renunciation of protected academic titles in my country. Before Bologna, German academic degrees were called 'Diplom'. As it was a national degree, it has been rewarded between Kiel and Konstanz respectively Aachen and Frankfurt/Oder. Thus, we operated in a protected environment. After Bologna, the B.Sc. and the M.Sc. degrees in IS are offered from Oslo to Cape Town and Manila to Mannheim. Thus, we are in global competition. Every university or school has to define its own strategic targets. Some will focus on core competencies like Business Administration or Computer Science as traditional disciplines; others will go for interdisciplinary studies like IS, Business Informatics, and the like. Much will be influenced by the resource base. In this context, I see academic institutions in my country underexposed.

However, since we have a head start from the past regarding the interdisciplinary nature, we really can make something out of it. For instance, the Indian government has recently announced a widespread launch of interdisciplinary studies like IS or Industrial Engineering which have been around in Germany for more than 30 years. The Bologna Process will create further opportunities for interdisciplinary studies. It will foster new interdisciplinary career trajectories within and between programs for national and international students. Therefore, rapid program development and adaptation in cooperation with the software industry is paramount for exploiting these potentials.

Of course, IS e. g in North America regularly means something different than IS (Wirtschaftsinformatik) in Central Europe. I do not want to draw a comparison between Wirtschaftsinformatik in Germany and IS education in the US. It is hard to speculate about one's own future, especially if there is a risk of self-fulfilling prophecies. Thus, I would like to leave these answers to stakeholders outside the Wirtschaftsinformatik and IS community. Global academic competition will provide the answers. From my side, I will do everything to make our vision happen. Wirtschaftsinformatik should not merely talk about the innovation of others but rather continue to be part of the innovation which needs to be adopted in practice! Neglecting innovation and practice will lead straight into the ivory tower.

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The Looming Crisis for the IS Field: Where have all the students gone?

Rudy Hirschheim

In 2005, Blake Ives (former President of the AIS) asked a number of senior faculty of leading IS schools in the US to report on the state of IS majors in their institutions. The concern was whether the number of IS majors was continuing to drop, whether it had reached some steady state, whether anyone had seen any increase in IS majors, and what was happening in the area of job recruiting for these IS graduates. What he found should give all of us some cause for concern. He says [Ives05]: "The good news, if there is any, is that our problem appears to be evolving from one of too few jobs to one of too few students. Student disinterest appears to be increasingly caused by the perception, rather than the reality, of too few jobs. While offshoring might have been a factor in the loss of jobs it now runs the risk of being the consequence of the lack of graduates to fill available jobs."

In essence, the problem for the field is the lack of IS students; but the reason may be shifting from one of no IT jobs due to offshoring, to the false belief that there are no IT jobs. And if there are no IS students graduating to take these jobs this will force companies to go offshore to fill their IT needs.

It is my belief there are a number of root causes for the significant drop in IS students, most of which are based on misguided conceptions about the field and its products. Offshoring is indeed a driver for much of the misconceptions. Whilst offshoring has led to many IT jobs being moved to countries like India, nevertheless, the market for IS skills in the West[1] is becoming increasingly buoyant. Indeed, according the US Bureau of Labor Statistics, IT employment in the US is at an all time high (almost 3.5 million workers), and IT unemployment is down to 2.5% which is only marginally higher than the lowest all time level of 2.3% in 2001. But this message seems to be lost by the population at large. The IS field needs to take some urgent corrective actions – in terms of what we teach and how we market ourselves – to return to a healthy existence. In particular, we must change the public's belief about offshoring and its impact on IT jobs.

How Should the IS Field Respond?

Our premise is that the IS field needs to change. Although much has been made of the 'offshoring threat', the situation is more complex. Offshoring of IT work is happening, and will continue to happen. But this does not necessarily spell the demise of the field. Indeed, some would argue IS is more critical to today's organizations than ever before. And its importance is unlikely to disappear. However, IS is changing, and we in the academic discipline need to change too. The field needs to produce IS graduates who possess the skills necessary for tomorrow's organizations. In the West, these skills involve business modeling, IT enabling of business processes, and project management. So what has to happen?

First, the IS field has to evolve. It needs to recognize that most coding, support, infrastructure and operations jobs will be offshored to the East[2]. Because of labor arbitrage and the abundance of quality talent to perform these tasks, it simply makes sense for these types of jobs to be there. Yet the key area where Western IS can still prosper is in the IT-enablement of organization-business processes or business process modeling. These are the so-called 'customer-facing' jobs. Indeed, it is hard to imagine that given the movement of coding and support jobs offshore, that this would not lead to even more emphasis being placed on getting the requirements right. After all, the offshore developers can only code what requirements they are given which means that 'customer-facing' skills (e.g. IT business analysts/process modellers) being even more critical than ever before. This then appears to be a fruitful avenue for IS academics in the West to focus on as it might help differentiate Western IS from that which develops in the East, at least in the short term. In the longer term, this may change. To be sure, there are those who suggest there really is little if any difference in what IS students in the East and West study, and thus ultimately what functions and tasks they can and can not perform. But at least in the short term, it appears that most organizations in the West will likely rely on local talent to undertake such IT process enablement.

This begs the question as to whether the notion of business process modeling is an overlooked IS core competence or whether other functional units couldn't also perform this function. To me, this is – or should be – an IS core competence. It thus seems logical for Western IS academics to focus their attention on this key core competence.

Second, the IS discipline (in the West) needs to adjust its courses and degrees to the new realities. IS programs need to focus more on business process modeling rather than programming. Project management skills especially those involving cultural differences between offshore IT vendors and onshore clients must take center stage. The international aspects (legal, language, etc.) of offshoring agreements need to be incorporated in the IS curriculum. Both cultural differences and languages should be included. Perhaps we should even send our IS students on internships to India.

It is important for Western-world universities to step up to the challenge and prepare their IS graduates for working in the new IT-enabled global economy both onshore and offshore. This would be an environment that is clearly different from the one we have enjoyed until now, but nevertheless one with which the field could relish if it anticipates the likely changes and grasps the opportunities that it offers. A number of IS academics have already stepped up to the challenge and offered recommendations. Some institutions have developed outsourcing courses to help undergraduate and graduate Business students understand the myriad issues surrounding outsourcing and offshoring. At Indiana University, for example, they offer a business process management course where the content is intermingled with a similar course at the University of Brandenburg in Germany requiring the students from both universities to work together.

Revising IS programs so as to be more attuned to the changing global nature of the discipline and the new realities of offshoring would make our students more relevant and employable, and could help reverse the trend of declining enrolments in the US. Additionally, by preparing our students for the offshoring world, we would in effect be 'taking the lead'. This might be something the field could build upon and use in teaching students from other disciplines about the nature of offshoring (which presumably will affect them in whatever business functional area they are majoring in). In essence, just as IT outsourcing was the precursor to business process outsourcing, IT offshoring is the precursor to business process offshoring. The field has an ostensible 'first mover' advantage which it can readily capitalize on. We should capitalize on our early adopter status and apply our learning in other disciplines.

Third, in addition to changing the IS curriculum, the field needs to recognize that it has a significant perception problem that it needs to overcome. Especially in the US, students are no longer majoring in IS because they think there are no jobs in IT anymore. McGee writes [McGe06a]: "Contrary to nasty rumors, the IT profession isn't dead in the United States What could kill it, though, is if bright young minds steer clear of the profession. It's time for business and technology leadership to treat this as a serious, long-term problem and work with employers, educators, and policy-makers to encourage young people to step up."

By 'educators', she means our community. She notes that according to the US Bureau of Labor Statistics estimates, by 2014 the IT industry will create close to 1 million new jobs and, with retirements, will have more than 1.3 million job openings. The question is: where will organizations find the people to take these jobs? Unless something is done to reverse the trend of shrinking IS enrolments, the US will find itself in a serious predicament[3]. So strong is the concern that the July 17, 2006 issue of *InformationWeek* had as its cover story "IT Needs Gen Z". But sounding alarm bells wasn't the only purpose of the article. It offered strategies for attracting students such as offering more and better internships, changing curricula to better reflect global realities, and catching kids early with 'bright shiny objects' that we in the IS field might try to embrace. George *et al.* [GeVV05] suggest that more attention should be paid to selecting the introductory IS course professor and content. They contend that this introductory course is the key to attracting IS majors and the field must make sure the content is exciting and relevant, and taught by enthusiastic and entertaining professors.

In summary, I believe the IS discipline has a serious problem to contend with: it appears the general public believes that there are 'no jobs in IT' due to offshoring. They see the offshoring of IT jobs as an inevitable consequence of economic and competitive pressures to drive down labor costs which leads them to conclude there is no future in IT. It is therefore entirely rational for students to turn their backs on IS major programs. If there is no future in IT, why major in IS? But perhaps even more worrying than this general public's belief, is that even IT professionals themselves believe that IT is not a good career move. McGee writes [McGe06b]: "For the most part, IT pros paint a picture of uncertain and intensely demanding existence . . . one that they might not wish on their kids, but one which they themselves expect to ride out nicely". She also notes that outsourcing-offshoring is hurting the morale of IT workers. If IT professionals wouldn't recommend IT to their own kids, what hope does IS have of reaching the general public? Clearly, we have a problem, and we need to address it head on. It is *not* going to go away.

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Endnotes

[1] By "West", I am referring to first-world countries, in particular the US and Canada, but also the countries of Western Europe, New Zealand and Australia.
[2] And even if these jobs are offshored, would it not still be necessary for students to have some knowledge of these areas so that they may interface with the vendors and manage these activities? How can one manage something that one knows little about? Indeed, it can be argued that students need more technology knowledge, not less. This also suggests that the key will be to instill an attitude and desire for life-long learning and to ensure the discipline possesses the capability to support this. Technology and the need to teach technology skills are not going away.
[3] At a more general level, there is concern not just with the potential shortage of IT talent, but with the broad STEM (science, technology, engineering and mathematics) areas as well.

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IS/BI/CS Education in the Flat World

Karl Kurbel

A significant advantage of IS majors – talking about Germans, I should rather say, business informatics ('Wirtschaftsinformatik') majors – over computer science (CS) majors is apparently that they have some knowledge of the business domain. I assume that most participants in the discussion will agree on this. In addition, German CS education is said to be one-sided – heavy on math and formal concepts but weak on the application side. Maybe fewer people agree with this statement. I will question the relevance of the CS/IS distinction myself later.

Does IS/business informatics (BI) react better and faster to changing market conditions than CS? I don't think so. Let me give two examples: Some days ago I was asked by the local CEO of a global IT firm: "I want to hire 200 NetWeaver developers. Can your university provide them?" I said: "No, but maybe I can find one or two." Even if I had 200 BI graduates coming up, would they know how to use NetWeaver? No, because we don't teach that (without discussing here the reasons why). At least, I am confident that my CS colleagues wouldn't have performed any better in answering the CEO's question.

The other example is IS development. Our textbooks and courses explain nicely how to proceed – from planning to analysis to design … to operation, according to this or that process model – and which methods to use. They explain it in a way as if the world had stood still for the past 20 years: We (i.e. our company) are doing the job, we do the requirements engineering, the design, the coding, the testing, the integration, etc. (and, by the way, we are doing it from scratch. We nicely model processes, functions, or data as if we were creating a business in the open countryside).

Now what about the Tata's, Infosys's, Wipro's & Co.? Isn't it really they who are doing the job, or at least part of it? Maybe we are still involved in some stages, elaborating the requirements, for example, or writing specifications. But who of my academic colleagues teaches IS development as a distributed process between Frankfurt, Bangalore, Zhongguancun, and Lima, where the traditional ISD activities are at best a necessary condition for project success but not a sufficient one? No indication that BI or IS programs are any better than CS programs from this point of view!

The question which type of studies is preparing students better for the upcoming challenges – IS or BI – is easy to answer: Neither one. Maybe the German type (BI) is a little ahead because it is more engineering-like than the US type (IS). Most German BI academics see BI as having a strong constructive component, so students receive a more solution-oriented education. My perception of the US academic tradition is that IS is more explanation-oriented. Students learn to appreciate why things are as they are. However, this advantage is marginal considering upcoming requirements in the global world.

It may come as a surprise looking at the world's largest software companies, Infosys Technologies and Tata Consultancy Services (TCS), and their human-resources strategies. Both companies hire about 25,000 new employees per year, mostly software developers at all levels. Although both companies are strongly involved in business process outsourcing and developing business information systems, their first priority in hiring are engineering graduates!

I understood that due to high labor demand and a shortage of CS graduates, these companies had to seek alternatives, but why in engineering and not in IS or BI? When I asked Infosys and TCS managers this question, their answers were disillusioning. Basically they said that the degree doesn't matter, but engineers are preferred because "… they have the best analytical skills and anyone with good analytical skills can learn programming fast." Sometimes I had the impression that they didn't even know that the IS & BI disciplines existed. Being engineers themselves, they didn't take IS and BI seriously into consideration. Not even my argument that BI graduates possess domain knowledge which engineers do not have showed much effect. "Anyone who has worked on business problems for some time, even as a programmer, gathers enough business knowledge to work successfully in that domain."

No need to mention that I disagreed strongly. I am convinced that Infosys and TCS would be even more successful if they hired BI, IS, or CS majors; yet I am not the one who hires.

What can we learn from this? Obviously it does not matter that much in a global world what exactly the subject of study is. The most successful company providing business software (SAP), by the way, was founded and run by physicists. More important than a specific degree are certain skills like being able to analyze precisely, to map requirements to solutions, to communicate effectively across continents, cultures, and time zones, to collaborate in global teams and to manage such teams.

So what can be done to improve the career opportunities and employability of our students? I would like to look at both the students' and the teachers' sides, starting with the first one. Studying behavior in Germany and in other countries is quite different. Our students have to realize that they are increasingly competing for jobs on a global labor market. In the words of Thomas Friedman: "You have to be hungry [for education]" [Frie06] to succeed in this competition.

Quoting a manager of a multinational company: "When I have an interview with a candidate applying for a job in India he will ask me: 'What are my career opportunities? Where will I stand 3 years from now?' In Germany, the candidate will ask: 'Will my moving expenses be reimbursed?' That's the difference." Just to mention, the Indian and the German candidate might be competing for the same job in the globalized world. Societal issues radiating into students' behavior

are largely beyond our influence in higher education, but what we can do is demand commitment to performance, result orientation, and time discipline from the students.

As educators, it is our responsibility to make the students fit for the global competition and to transform our old teaching models just as the world is transforming. Some ideas: We should truly teach students that the IT world is global today, instead of hoping that globalization will go away and we can proceed as before. We have to teach global issues, offshoring, nearshoring, and how to act successfully on a global platform.

The Bologna process has opened up opportunities to create new study programs reflecting new challenges. Why not establish a master's program 'Globally Distributed IT Work' in which our students actually study onshore and offshore? One semester at the University of Frankfurt (Oder or Main), one semester at Tsinghua University in Bejing, and one semester at IIM (Indian Institute of Management) Bangalore or IIT (Indian Institute of Technology) Mumbai. Let students do an internship with SAP Bangalore or Deutsche Bank Manila to gain hands-on experience in foreign cultures and working habits to make them fit for working in and leading global teams. Such a master's program might include

(1) conventional BI courses like e-business, management information systems, information systems architectures, etc.

(2) somewhat less conventional courses like global information systems development, reflecting worldwide work distribution, and definitely

(3) topics like managing global projects, language skills, managing cultural and social differences, international management, planning and managing organizational change, etc.

Not to overload such a program, we should get rid of beloved BI topics which are nice to have but not really indispensable. Knowing my academic colleagues I am aware that they will beat me up if I name any, but do we really need meta-modeling, methods construction, or fuzzy systems in such a master program? I believe not.

The question how we can attract more students for IS and BI programs is closely related with the public perception of globalization and offshoring. Our western business & IT world will neither completely erode nor disappear because of offshoring. It will just change. We must proactively educate our students to perform successfully in that world. BI graduates will not stay on top by default, as some of my German colleagues seem to believe. "While I was sleeping" is the heading of Friedman's first chapter, concluding: "While I was sleeping, the word became flat." We certainly shouldn't sleep as educators. It is our responsibility to prepare the students for their new roles in the flat world.

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Will They Come Back? Dealing with the Enrollment Decline in Computer Science

Norman Matloff

Panic has struck computer science (CS) academia. Enrollment is down by 50% since the height of the dot-com boom in most major American universities.

To CS department chairs and engineering deans, the steep drop is of huge concern. In academia, numbers are power. And while faculty are actually enjoying the smaller class sizes, they too will feel the effects sooner or later. Smaller numbers of undergraduates will ultimately mean reductions in graduate programs as well, and already there is an adverse impact on the quality of the undergraduates.

So what can be done to restore these enrollments? First we must fully recognize the root of the problem – jobs. The meteoric rise in CS enrollments of the late 1990s was due to the jobs boom of the period. The later drop in enrollments came in response to the dot-com bust, and even more saliently, to the perception that CS jobs were increasingly being outsourced to India. Though most faculties are vaguely aware of these trends, most departments do not track how their graduates fare in the job market, and do not completely realize the extent of the problem.

Second, we must be honest with the students. Officials of the Association for Computing Machinery (ACM) are frequently quoted in the American press with the message, "Jobs in the computing field are plentiful; don't worry about offshoring." These are often half truths at best. The ACM study, openly undertaken with the goal of convincing students that offshoring will not reduce their job prospects, was not a careful academic investigation. It engaged in statistical sleight-of-hand, and the atmosphere was such that anyone dissenting from the pro-outsourcing line was gently marginalized, according to one member of the team, Rob Ramer. And it said nothing about the hundreds of thousands of foreign programmers working in the U.S. under the H-1B work visa program. Due to a combination of both types of globalization – export of work and import of workers – the number of software development jobs available to U.S. citizens and permanent residents is much reduced relative to the past.

In any case, ACM is missing the point: Even if the job market today has rebounded to the height of the dot-com boom, as they claim, the students know that the CS job market has undergone extreme oscillations over the years. I have found that it is this oscillatory aspect of the CS job market that worries the students the most, much more than the state of the market at this instant in time. Many of them have seen their parents, relatives or family friends laid off and forced to leave the field. CS is simply not seen as a career with long-term viability.

There is also the issue of wages. In the U.S., the average new Bachelor's graduate makes about $ 50,000. Compare that to the field of law, in which new law school graduates are now making $ 150,000. The two fields, CS and law, require similar skills – logical thinking, the ability to analyze complex problems, attention to detail and so on. So why not take the path with triple the salary? The same argument holds for career opportunities for those holding a Master's in Business Administration (MBA) degree.

In that light, it is important to note that even the ACM admits that the jobs for CS graduates these days are increasingly of the type that MBAs do, rather than software development or other purely technical work. A typical example which is cited is that of a 'deal maker' for a consultancy firm. The CS graduate evaluates a client's computing needs, formulates a solution, and estimates the duration and cost of the project. The CS graduate is drawing on his or her technical background, but does not participate in the actual development of the software. (That, in fact, is likely to go to India.) As one student put it to me as he was leaving our department, "If I'm going to end up with an economics-type job, I might as well major in economics." His point was, why not enjoy his college years rather than spending them debugging programs for his CS courses at 2 a.m., if he won't find work as a software engineer in the end?

Thus we CS academics have an extremely difficult task here, and the solutions being offered these days are likely to fail, at least in the long term. Overly rosy portrayals of the job market will be looked on with skepticism by many students, increasingly so as word gets around among students in the next

few years. Moves toward specialization, such as developing a computer games design curriculum, have had some initial success in a few U.S. universities but this cannot work on a large scale; there would not be sufficient student demand (nor demand from industry) for all universities to take such measures. Gimmicks, such as proposals that students use 'clickers' during lecture for a more interactive experience, clearly would do very little to attract students.

Well, then, what can work? We must explain to the students that the job market for CS graduates is in fact fairly good, and even rather stable – providing one understands that the nature of the work has changed dramatically from what they have observed in the past. Students must understand that instead of aiming solely for careers with IBM, Google or the latest software startup, their computing skills will also be valuable if they work for 'non-CS employers' such as Merck, Bechtel or Disney. We must further explain to them that in working for non-CS employers, their CS background will typically play a supporting role, rather than the central one. The deal makers mentioned above derive much of their value from their knowledge of programming, but they are not writing any code.

In other words, CS is an excellent preparation for careers as "generalists who happen to know computing." Actually, many savvy students are far ahead of us academics in recognizing this. A survey of CS and electrical engineering (EE) students at the Massachusetts Institute of Technology found that one-third of them regard CS and EE as 'liberal arts' majors, preparing them for generalist jobs much as English or history majors would.

We should thus adjust our curricula in such a way that we are indeed preparing generalists. We should encourage and facilitate students' supplementing their CS knowledge by delving into other fields, such as science, economics (!), statistics and business. Though this sounds like the 'CS + X' formula pushed by organizations such as ACM, what I have in mind is somewhat different. Yes, some students might pursue CS + X, say in financial engineering or bioinformatics. But these will always be niche professions, of limited numbers. Thus most CS students should try to gain some knowledge in several different 'Xs' rather than focusing on one.

Let us not deceive ourselves. It is quite unlikely that the heady years of bursting enrollments of the 1990s will return. Nevertheless, there in fact is real value to a CS major, properly defined. Knowledge of computing is useful in almost any kind of economic activity known to man. If we convey this to the students, and set up curricular structures that help them prepare well for their generalist role, we should be able to turn around the current downward spiral, and do the right thing for the students at the same time.

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Offshoring/Nearsourcing: Challenges for the German Education in Wirtschaftsinformatik

Peter Mertens

Up to now Wirtschaftsinformatik in the German speaking countries has less competition by graduates from India and similar countries. The Indian IS curricula seem to be more away from the actual problems of IT in business and moreover they are not so widespread. However, the Indians know this problem and are anxious to solve it within a couple of years. The job opportunities offered by Indian subsidiaries of German firms will give further incentives to organize IS curricula. Students from the German speaking area are more ready to spend some time in foreign countries during their education which is a good presumption for a career in international oriented IT Information Management.

Within the usual courses in Information Management the organization, the processes, the cultural restrictions, the benefits and the drawbacks of offshoring/nearsourcing might gain some additional weight. Internships in India, China and Eastern Europe for IS students should be promoted by universities in Austria, Germany and Switzerland. People and institutions responsible for the legal restrictions of university education should pay attention that students in the German speaking area must work as hard as their competitors in high-ranking schools in foreign countries. E. g. it is rather dangerous to limit the amount of working hours to 1,800 hours a year or to 36 hours per week respectively.

The Bologna Declaration with new interdisciplinary studies e. g. linking together business administration, computer science and engineering science is promising for the future. Preparing students for a career in the triangle between computer science, engineering and management is very important for professionals working for manufacturing firms or in logistics. In several German universities there is a curriculum 'Wirtschaftsingenieurwesen' which may be seen as a synthesis between engineering and management. It comprises a lot of IT courses. Maybe this component should get more attention in some schools. This is another element of academic education that may contribute to the country's global position and competitiveness.

Comparing the perspectives of Wirtschaftsinformatik and IS education, of course Wirtschaftsinformatik is better prepared for the upcoming challenges, because there is more stress on *developing* innovative business systems by scientists whereas IS scientists tend more to analyze existing systems when they have been created by others such as consultants or IT specialists in private firms. So they lose 'speed' and are too much dependent on the success of others.

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Mitteilungen des GI-Fachbereichs Wirtschaftsinformatik

Neuwahlen der Fachbereichsleitung und Gründung eines Arbeitskreises

Der Fachbereich Wirtschaftsinformatik der Gesellschaft für Informatik hat eine neue Leitung gewählt: Prof. Dr. Ulrich Frank (Universität Duisburg-Essen) ist der neue Vorsitzende des Fachbereichs und Prof. Dr. Peter Loos (Universität Saarbrücken) wird sein Stellvertreter. Der Fachbereich gratuliert den beiden sehr herzlich und bedankt sich bei seinem bisherigen Sprecher, Prof. Dr. Christof Weinhardt (Universität Karlsruhe (TH)) und dessen Stellvertreter Prof. Dr. Ulrich Frank.

Die Wahl fand am 1. März 2007 auf einer Sitzung des Leitungsgremiums anlässlich der WI 2007 in Karlsruhe statt. Die neue Amtsperiode beginnt am 1. April 2007 und dauert 3 Jahre.

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