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Meeting new challenges in higher education: Two educational activities and an interdisciplinary competency framework

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Abstract

This article explores how educational institutions are faced with changes in the modern global business environment, and how this leads to a need for changes in curricula for business schools and information systems schools. Most of academia still uses a strict disciplinary model of education resulting in a high degree of specialization within each discipline while the modern business environments require knowledge workers who can address problems that cut across disciplines on an increasingly global scale. Research papers and governmental reports call for more emphasis on particularly three interdisciplinary topics; 1) competencies in globalization issues, 2) communication/working in team, and 3) information literacy. The academic disciplines of business education and information systems education in particular have received much attention in this respect with several calls for change. How to bring about such a change is, however, still an open question. Currently many universities are looking into their educational offerings in order to adapt to the new situation. This paper proposes to address this issue in two ways; by suggesting two new educational activities and by proposing a new educational interdisciplinary competency framework to guide curriculum development when including interdisciplinary topics.

Introduction and literature review

There has been a call for university programs that are more applied, more professionally oriented and of more international character (Harvard 2008; e-Skills Demand 2009). In Harvard (2008) the author reports on a comprehensive joint work by ivory league business colleges in USA examining critics claiming MBA programs put too much emphasis on theory and in-depth knowledge in specific disciplines. They conclude that there is a need for curriculums to be strengthened in the three areas; globalization, the integrated nature of business processes, and experiential learning. The e-Skills Demand Developments and Challenges (2009) by the European Union explore the demand for different types of ICT-related qualifications (“e-skills”) in companies. It is a continuation of the work of the e-Business W@tch conducted since 2002 for European enterprises. Their study is based on case studies in 5 companies and statistical data from 1027 enterprise surveys. In addition to these primary sources they used secondary sources from other EU studies, market studies and publications like white papers and position papers and

articles in the ICT press. Their 2009 studies reveal that at the aggregate level the demand for personnel is in balance with supply in terms of quantity of candidates. But they found a mismatch between what competencies the companies needed and what curricula of ICT studies offer. In particular, they found a demand for communication skills, project management skills, a thorough understanding of business processes, and practical skills in business software systems (see Key findings p.5). The Joint ACM/AIS Undergraduate Curriculum Revision Task Force (ACM/AIS 2008) has given recommendations for new courses including a Business Process Management course about which they said: “The demonstration of leading ERP systems such as SAP and their use in business process management is highly recommended.”

A convergence of these demands is evident. It is a call for more emphasis on particularly three interdisciplinary topics; 1) globalization, 2) collaboration in teams, and 3) information literacy. How to incorporate these interdisciplinary issues in standard curriculums that have a strong disciplinary focus is an open question. Many universities are looking into their curriculums in order to adapt to the demand. There is a large body of literature related to curriculum development and disciplines by the academia themselves of which some wide ranging examples are Willi Petersen and Wehmeyer (2009), Targowski and Tarn (2007), Winterton (2005) and Kolb (1981). The universities, being the supply side, have a long tradition of developing strong disciplines. Academic departments are organized according to subjects that do not match well with the increasing demand for interdisciplinary competencies. Thus, in this paper we base our suggestions mostly on the demand side, i.e. the needs by industries, businesses, organizations and the society at large for competencies as emphasized by e-Skills Demand (2009) and Harvard (2008).

In doing so we seek a general, holistic model that captures the major areas of our organized society. The structuring of organizations is used as a foundation that we relate technology issues and new educational activities to. We recognize that the current state of university curriculums are by large well developed and in good shape to address the needs of the society. They address the need for specialization and in-depth knowledge on complex issues in each field particularly well. Our aim is to add a small, but crucial element; the integration of competencies from several fields that the students have already learned in business, economics and information systems classes.

The mechanisms by which organizations coordinate their activities are closely related to the competencies of the work force. There is a huge variance in competencies required for the

various categories of the work force. Thus, we suggest that interdisciplinary educational activities should be related to organizational levels.

The classical book on business strategy by Quinn, Mintzberg and James (1988) describe the basics of organizational structure. From this we pick the three core levels of most organizations; the operational core, the middle line (tactical) and the strategic apex as illustrated in Figure 1. The operational core produces the organization's products and services. The middle line comprises all managers who stand in direct relationship between the operational core and the strategic apex. The strategic apex is where the organization is managed from a general perspective.



Figure 1: The tree core levels of the structure of organizations

Relation to ICT

ICT is seen as an infrastructure for all three layers, but ICT also affects an organization from a strategic point of view since ICT has a transformative power with potential to change the existing models, theories and practices. The transformative power of ICT is often omitted from educational frameworks, but the need for three competencies asked for originates from the rapid development of ICT and the ubiquitous use of ICT as a general purpose technology in the society. Thus we incorporate ICT in two ways in the framework; ICT as Infrastructure and the transformative power of ICT.

ICT as Infrastructure

We define the term infrastructure as *the basic, underlying structure of a system or organization, it is compulsory, or something an employee can or should take as granted*. All employees will typically use ICT as an infrastructure in their daily work to fulfill their responsibilities. This can be illustrated as in Figure 2.

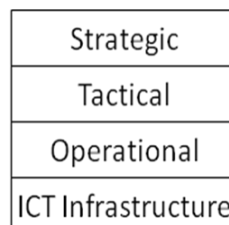


Figure 2: ICT as an infrastructure

The transformative power of ICT

The transformational power of ICT has an effect on the entire society. As technology evolves, new ICT systems push the limits of what is being possible. This leads to complex new situations where technical, economic, social and political factors interact to change established practices, models and theories. We add a *transformative* layer to capture the need for competencies regarding this in the framework as illustrated in Figure 3.

Transformative
Strategic
Tactical
Operational
ICT Infrastructure

Figure 3 Adding the Transformative layer

New interdisciplinary educational activities

We developed two new collaborative educational activities; one targeting the operational level with students executing business processes in SAP for a global supply chain (Jaeger et al 2011), and one at the management level where we develop the virtual team role play (Rudra et al 2011).

Activity 1: Teaching Global Supply Chain Management in Cross-Country Collaborative Teams using an ERP-system

The first new activity focus on teaching Global Supply Chain Management concepts by letting the students run an international value chain in cooperation with students at other universities using real data in a real Enterprise Resource Planning System provided by SAP.

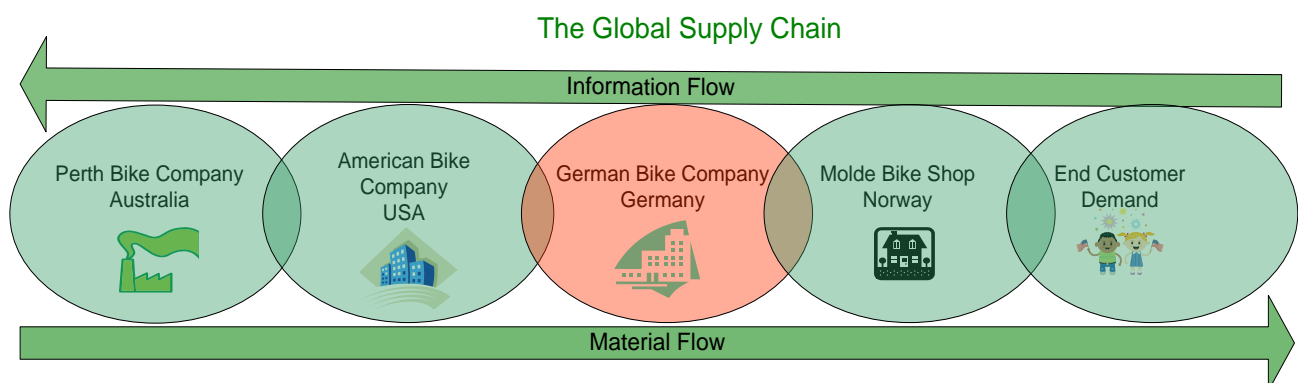


Figure 4 Companies in the Global Supply chain set up for the SAP exercises

Our goal was to develop and evaluate a curriculum that teaches ERP-system concepts and skills using real hands-on practical exercises in a global context. ERP-systems are highly specialized

systems for capturing business transactions in a real-time environment. It is a challenging task to use such real-life systems in teaching since by their nature there are no undo possibilities and no way to try out functions several times for learning purposes. It is a business system, not an educational system. What such systems lack in pedagogic functions, they gain in providing highly relevant real-life experience in systems used by most modern organizations. The curriculum employs Kolb's experiential learning cycle to facilitate student learning about the issues associated with internationalization and globalization of business operations and the use of ERP systems. A study was undertaken with students from Australia and Norway forming teams performing collaborative business operations in a global supply chain implemented in SAP. The study included SAP hands-on exercises for operating a Global Supply Chain including handling of all import and export operations. The survey instrument used asked students to report perceived pre- and post-course knowledge and skills across five dimensions. Both Norwegian and Australian students showed a significant gain in perceived knowledge, and students involved in the inter-group international role play showed better understanding of the transactional aspects of business operations than those who did not.

Activity 2: Virtual Team Role Play Using Second Life for Teaching Business Process

Concepts

The second proposed activity is a virtual team role play using a 3D virtual world to teach team and collaboration skills in addition to concepts on business information systems. This work describes the use of a virtual world environment to facilitate a role play assignment for buying and selling Enterprise Resource Planning (ERP) software solutions in a distributed environment. The exercise involved the use of Second Life for the virtual presentation and meeting among vendors and a purchaser of ERP-software. Students playing vendor and purchaser roles were organized into teams who meet, collaborate, and negotiate business transactions in the virtual environment. The aim of the experiment was to introduce students to properties of ERP-systems since these are the most common software systems used by businesses, and at the same time introduce tools for virtual team collaboration in an international setting between students in Norway and Australia. This work reports the experiences from the students' and teachers' perspectives and we give recommendations regarding the use of virtual worlds in role-playing exercises.

The activities and the Framework

The two new collaborative educational activities address the need for competencies at primarily two organizational levels, the operational level and the tactical level as illustrated in Figure 5. Activities for the other levels are currently being developed. For the ICT Infrastructure level we introduce a lab based course for developing the main components of a mini ERP system. This is done using application generators requiring no procedural programming since the target students are business and IS students. The students first try to develop the mini-ERP system using Microsoft Excel. They soon discover the limitations of Excel. Then they try to build more by using Microsoft Access to develop a functional system supporting the sales and procurement processes. The last part of this activity is to use and study the Microsoft Dynamics Great Plains ERP system to see how the components are implemented in a professional ERP system.

Transformative	Transformative Competence Activity to be defined
Strategic	Strategic Competence to be defined
Tactical	Activity 1: Virtual Teams
Operational	Activity 2: Global SC in SAP
ICT Infrastructure	ICT competence to be defined

Figure 5 Activities related to the Interdisciplinary Competency Framework

For the Strategic level we are developing a Business Intelligence activity in which the students use SAP's Business Warehouse and Business Intelligence modules to extract and analyze data. For the top level, the transformative level, a management seminar series is planned for reading relevant literature and discussing previous business cases along the lines of the Harvard Case method.

Conclusions

Initial evaluation results from Activity 1 and 2 shows that the students think this is valuable activities and that they have gained interdisciplinary skills by participating. Initial responses from peer review at conferences have also been positive to our initiative. More work is needed to streamline educational activities at each layer and, not the least, to organize interdisciplinary topics across boundaries at each university and between universities

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