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Empowering Healthcare Professionals by IS Education: Enhancing Reflective Empowerment

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Abstract

The paper presents findings from a research study of an information systems master program in Sweden, targeting healthcare professionals. The aim of the study was to explore if and how mechanisms of empowerment and reflective practice can be evoked in healthcare professionals by participating in a master program in information systems. A mixed research methodology was applied, including participant observation, document analysis and a learning style inventory. The findings of the study showed signs of the students achieving a higher degree of empowerment in their professional roles, as well as beginning to actively use reflective practice as a means of professional development. The findings are summarised in a tentative framework of reflective empowerment. The findings call for further research on how IT-centred master programs targeting healthcare professional could enhance professional development.

Keywords: IT to empower, Health informatics/health information systems/medical informatics, IS Education, Learning models/theory

1 INTRODUCTION

Healthcare organizations are knowledge-intensive organizations, where the need for professional development and knowledge sharing is considerable. Rapid changes in treatment techniques, pharmaceutical products and legal requirements necessitate an ongoing professional development of healthcare professionals (Chu and Robey 2008). Innovations in healthcare organizations could be e.g. new treatment, new work practices and quality improvement as well as the introduction of new information systems. The Joint Commission on Accreditation in the United States testify of a problem in the relevance in existing professional education strategies, deployment of resources across disciplines and that important competencies are patient-centred care, work in interdisciplinary teams, employment of evidence-based practices, application of quality improvement concepts and use of informatics (Joint Commission 2008). The importance of information and information systems in the development of healthcare is emphasized by many (e.g. IOM 2001, Nelson et al. 2003, Nelson et al. 2007, The National Board of Health and Welfare 2007). Communication and techniques for collaboration, coordination and communication, are all very central concepts of informatics and information provision, also identified as one of six key competence areas in healthcare It is also stated that nursing faculty are uncertain about what and how to teach in the topic of informatics (Cronenwett et al. 2007).

As a result, healthcare staff need a readiness and ability to handle organisational change, which frequently includes introduction to and use of information systems. As change management more and more includes healthcare staff on all organisational levels (Martin 2003), it is important to enhance the development of empowerment and ability to reflect on everyday practice. To answer this call for professional development, a master program in Information Logistics targeting healthcare staff was launched during 2005 by incentives from county councils and regions in southern Sweden, covering approximately 3 million citizen).

At the core of Information Systems (IS) is its definition as a bridge between the business processes and information technology, and viewing IS as technology enabled business development (Topi et al. 2009). This refers to the use of IT in business processes in a development perspective. This paper has a focus on conditions and mechanisms for use of IT in developing business processes, where learning, reflection, and understanding IT is fundamental. High-level IS capabilities concern improving organizational processes, exploiting opportunities created by technology innovations, understanding and addressing information requirements, designing and managing enterprise architecture, identifying and evaluating solution and sourcing alternatives, securing data and infrastructure, and understanding, managing and controlling IT risks (Topi et al. 2009).

The aim of the research-in-progress presented in this paper is to explore how mechanisms of empowerment and reflective practice can be evoked in healthcare professionals by participating in a master program in information systems. In a wider perspective the paper is about the value of IS and IS education for other professions (i.e. not IS professions). This paper contributes to the work on mechanisms empowering reflective practice, and overcoming barriers for empowerment in organizations by focusing on students/practitioners learning and action in a context of IS use and process development.

The paper is organised in the following way: First, the research approach is presented. Second the concepts of empowerment, reflective practice and learning styles are introduced in the theoretical framework. Third, findings from the empirical study are presented and analysed. Finally, conclusions from the study and suggestions for further research are put forward.

2 RESEARCH APPROACH

2.1 Research methodology

The study was performed during the first two years of the master program. A mixed research methodology was used including participant observation, document analysis and a questionnaire. Participant observation refers to *"...research that involves social interaction between the researcher and informants in the milieu of the latter, during which data are systematically and unobtrusively collected."* (Taylor & Bogdan 1998, p. 24). Participant observations were made by the authors, who also served as course managers, during introductory sessions, lectures, supervisions and seminars of the courses. Data from observations were documented as field notes and analysed for preliminary units and categories of information (Lincoln & Guba, 1985). Text from documents, such as course evaluations, students' course assignments, and text-based online seminareswas listed in summary forms and categorized into themes by means of content analysis (Miles & Huberman, 1994; Krippendorff 2004).

Students differ in their ability to process information, construct meaning from information, and apply information to new situations. The concept of learning styles describes students' preferences for towards different types of learning and instruction (Jonassen & Grabowski 1993). To conclude if individual learning styles influenced students' application of course content to their working contexts, students were put through a learning style inventory developed by Honey and Mumford (1985). The learning style inventory was supplemented with a questionnaire with open questions asking the students to state advantages and disadvantages of synchronous and asynchronous seminars performed during the courses.

2.2 Research setting

2.2.1 The master program

The Center for Information Logistics in Ljungby, Sweden, is a unique joint educational project between universities, local trade and industry and the local government. At present, a bachelor program in Information Logistics (180 credits), a master program in Information Logistics, (60 credits) and a master program in Information Logistics in Health and Social Care, 60 credits are offered (Center for Information Logistics 2009a).

The master program is delivered as distance education, in a blended learning setting with seminars on campus at the start and finish of each course, and online seminars in between. This enhances the opportunities for professionals working full-time jobs to participate in the program. The program aims at giving competence and analytical ability to structure and make information handling more efficient, within organizations and teams, in communication with other organizations and on a personal level. Another aim is to prepare students to work actively as change agents: *"Ultimately, this is about developing the interaction between healthcare as a whole and its parts and being able to manage rapid changes. …[You could manage change] on one hand by raising the right requirements and taking part in the changes, on the other hand by developing your own work tasks. The master program in Information Logistics provides you with an excellent academic degree, a source of competences and a readiness for change."* (Center for Information Logistics 2009b, p. 2, the authors' translation). The courses of the master programs are presented in table 1.

Information Logistics in Health and Social Care, 60 credits	**Information Logistics, 60 credits**
Change and Knowledge Management, 15 credits	
Strategic Information Management, 7.5 credits	
Healthcare Logistics, 7.5 credits	Supply Chain Management, 7.5 credits
Information Provision in Healthcare Processes, 7.5 credits	Information Provision in Processes, 7.5 credits
Research Methods and Theories, 15 credits	
Master Thesis, 15 credits	Master Thesis, 15 credits

Table 1. Overview of the master programs in Information Logistics at Center of Information Logistics in Ljungby, Sweden.

2.2.2 The courses

The course "Change and Knowledge Management" is the first course of the master program. The course focused theories and models for change management, project management and knowledge management. Theories and models were presented in lectures and literature and further discussed in online seminars, synchronously and asynchronously. The aim of the online seminars was to enhance further analysis and collaborative learning among students by contrasting the theories and models from the literature with students' experiences from professional life. Besides the online seminars, the students submitted two assignments in change management and knowledge management. The final course examination was a group assignment, presenting and analysing a significant change in the professional life of the students. Supervision of the reports were delivered online by the teachers.

The course "Healthcare Logistics", is the last course of the first year of the program. Conceptual tools in the course were partly drawn from nine articles on quality improvement in healthcare from the Journal on Quality and Safety 2002 and 2003. The articles contain perspectives on microsystems in healthcare such as the management of rich information environments, planning for patient-centred services and care, and safety. Also conceptual tools come from information logistics, with process description and analysis, and information provision in communication, collaboration and coordination.

In both the courses the students were examined by course reports; theses focusing a problem or phenomenon within change management, healthcare logistics and information provision in healthcare processes.

2.2.3 The students

The nineteen students of the master program were aged between 28 and 56 years, with a mean age of 43 years. Fourteen of the students were women. Ten out of nineteen students were employed in the healthcare sector, three were educators of information technology or logistics related subjects, two were systems analysts, and three students were employed as information officers. Students, places of residence ranged from north of Stockholm to the very south of Sweden, a distance of about 700 kilometres. Seven students participated in the healthcare logistics course, all of them employed in the healthcare sector. Five of these students were women.

3 THEORETICAL FRAMEWORK

3.1 Empowerment

Empowerment is a term used in many ways by different people (Thompson 2007). The concept was introduces in the United States during the 1960s, and has become a general notion of liberation of socially or culturally oppressed individuals and groups, as well as being used in the sectors of social care and public health (Askheim & Starrin 2007). Empowerment is a complex strategy that sits within

complex environments. The World Bank has defined empowerment as *"the process of increasing capacity of individuals or groups to make choices and to transform those choices into desired actions and outcomes"* (Wallerstein 2006 p 17) to build individual and collective assets, and to improve the efficiency and fairness of the organizational and institutional context. Empowerment is an action-oriented concept with a focus on removal of formal or informal barriers. Empowerment is culture, society, and population-specific and therefore requires action within the local context, with psychological empowerment being people's self-efficacy, and organizational empowerment the ability of an agency to influence change and community empowerment the ability to change real conditions. Empowerment is a dynamic interplay between gaining internal skills and overcoming external structural barriers to accessing resources (Wallerstein 2006). Regarding empowerment in the work role of individuals, Thomas and Velthous (1990) defined empowerment as *"intrinsic motivation manifested in four cognitions... meaning, competence, self-determination, and impact."* (Spreitzer 1996, p. 484). Meaning involves a fit between the requirements of a work role and a person's beliefs, values and behaviours. Competence refers to self-efficacy specific to work, more specifically the belief of one's ability to perform work activities with skill. Self-determination is a sense of choice in initiating and regulating actions. Finally, impact is the perceived degree to which a person can influence strategic, administrative or operating outcomes at work (Spreizer 1996). According to Thompson and Thompson (2008), empowerment can be seen as a part of critical reflective practice, in the sense that critical reflective practice can be very empowering to the individual.

In our study, we searched for elements of empowerment defined as meaning, competence, self-determination and impact in students' behaviour, course evaluations and assignments.

3.2 Reflective practice

A practice is an institutionalized way of performing work (Berger & Luckman 1967). According to Montgomery (2006), the practice of medicine is characterized by a combination of a body of scientific knowledge and a collection of well-practiced skills. The concept of reflective practice has its origins in different professional disciplines: *"The work on reflection in the context of practice – reflective practice – originated mainly in the professions of teaching and nursing, but there is little integration of these two sources, and relatively few professional educators have crossed boundaries, even if they have been attempting to develop similar attributes in their novices or their trained professionals. It is as if reflection has been viewed through a series of narrow frames of reference, with little overlap."* (Moon 1999, pp. vi-vii). Reflective practice is not only something which is limited to education and training programs, but also a part of everyday practice of working life (Thompson & Thompson 2008).

According to one of the founders of reflective practice, Donald Schön (1983), a professional knowledge base is not sufficient, as it seldom gives direct practice guidance on what to do and how to do it in real situations. In the reality of professional practice, fixed ways of working and "established answers" often do not work. Schön's notion of reflective practice is a way of bridging the gap between professional knowledge (theories) and practice: *"That is, we cannot expect professional knowledge to provide "off-the-peg" solutions, like a garment in a clothes shop. Rather, it is a matter of the knowledge base serving as a resource (a set of insights and understandings) that needs to be adapted to suit the circumstances."* (Thompson & Thompson 2008, p. 15). *Reflection-in-action* and *reflection-on action* are two fundamental concepts in reflective practice: Reflection-in-action is thinking that we do while actually practicing. Reflection-on-action is thinking after the actual experience, to make sense of it and trying to learning from it. Reflection-in-action and reflection on action should ideally interconnect (Schön 1983). Outside of Schön's framework exists the concept of *reflection-for-action,* which means to plan and being able to think ahead about what might happen in a certain situation, to be able to foresee e.g. a risk of aggression, and adjust to the situation in practice (Thompson & Thompson 2008). Reflection-on-action has a strong connection the concept of sensemaking. Sensemaking is a retrospective development of a plausible story to explain what people have done and the reasons for their actions (Weick 1979). Use of IS is where the individual makes sense of IT in relation to the work process, as in sensemaking (Weick 1995, Weick, Sutcliffe and Obstfeld 2005), and as in the notion of technological frames, that artifacts (e.g. IS) may be interpreted in different

ways among different social groups, whether they "work" or "don't work", depending on who uses them and for what (Bijker 1995, Orlikowski 2000, Orlikowski and Gash 1994). It could be described as *"the reciprocal interaction of information seeking, meaning ascription, and action"* (Thomas, Clark & Goia 1993, p. 240) and has been found to play an important part in organizational change (see e.g. Gioia & Chittipeddi 1991).

In our study, we searched for elements of reflective practice defined as reflection-in-action, reflection-on-action and reflection-for-action in students' behaviour, course evaluations and assignments.

3.3 Learning styles

Kolb's learning theory (Kolb 1984) sets out four distinct learning styles, or preferences. Kolb's model offers both a way to understand individual people's different learning styles, and an explanation of a cycle of experiential learning. *Convergers* combine abstract conceptualization and active experimentation. The *divergent* learning style emphasizes concrete experience and reflective observation. The dominant learning abilities of *assimilators* are abstract conceptualization and reflective observation, while *accomodators* focus on concrete experience and active experimentation. Inspired by Kolb (1984), Honey and Mumford (1985) proposed four learning styles: *activist, reflector, theorist* and *pragmatist*. *Activists* are open-minded and involve themselves fully in new experiences. They are weaker in implementation and consolidation, and are highly sociable. Their days are filled with activity and they are easily bored. *Reflectors* are thoughtful and cautious, and collect as much information as possible before taking action. They prefer to take a back seat in meetings and discussions, and enjoy observing other people in action. *Theorists* approach problems logically, and integrate their observations into theories. They tend to be perfectionists, and like to analyze and synthesize. They favour rationality and logic. *Pragmatists t*hrive on new ideas and like to put them into practice. They seek out new ideas and take every opportunity to experiment with applications. They are practical, down-to-earth people who like making decisions and solving problems (Honey & Mumford 1985, Downing & Chim 2004).

According to Kolb, there is an increasing process in specialization that deepens in undergraduate education which suggests that peoples' learning styles and their educational discipline can be linked. This correlation shows e.g. that students in nursing are so-called convergers, who use active experimentation as a dominant learning mode. There are reasons to believe that students of various learning styles react differently to different modes of delivering education, e.g. online. Shaw and Marlow (1999) classified 99 undergraduate students learning styles according to Honey and Mumford and found a significant, though weak correlation between being a theorist, and perceiving a lack of interaction and a lack of personal touch in online learning. As a result, theorist learners displayed a more negative attitude to the use of ICT in the educational context, than the rest of the students. Downing and Chim (2004) performed a study of student satisfaction in two online learning applied psychology courses. Reflectors were found to show a highly significant preference for the model of online learning used in the courses. Moreover, while reflectors might be regarded as introverts in the traditional classroom, the additional time for reflection offered by the online medium made them contribute more to the discussions. As a result, they behaved more like extravert students when using the asynchronous communication medium.

In our study, students were put through a learning style inventory according to Honey and Mumford (1985) in order to conclude if individual learning styles influenced students application of course context to their professional context.

4 FINDINGS AND ANALYSIS

4.1 Courses and outcomes

Perceived expectations among students on outcomes and impact were high as taking the program really took a lot of their time and effort to pursue. Expectations were not only high on courses, but also on teachers and the education infrastructure, although students realized that the main effort was to be

made by themselves. Expectations from students were not initially concerning outcomes and impact in a direct way on healthcare processes, but more of personal development for raising competence to be able to understand and cope with new challenges more in general. During the program there was a change in expectations towards more of practice and concrete usability.

Supervising sessions took place in several ways, in meeting with the individual author (-s) in the same room, communication via WebCT and mail, and in seminars together with the other authors. Supervision was given by supervisors from the university and from the supervisors at the site of study. Supervision had an important role of discussing ideas and handling problems in the different projects, but more as an input for ideas into the students own thinking and planning. They all worked very independently with their projects.

Students were very curious and expectant on what use the courses could have for answering questions and contribute to solving problems they had experienced in their working context. Also there was an ambition to supply oneself with competence in order to be able to fulfill new or changing tasks. Outcomes from the courses were rich in reach and range, showing options for application of the new competence within wide areas of healthcare processes.

The outcomes of the student's reports and theses as the substantial occurrence of competence, could be described under the headlines of subjects, questions, aims, key concepts, and results:

- Subjects show a wide variety, covering different areas of healthcare processes
- Questions circle around application of new concepts to problems in well known settings e.g.
    - How do healthcare-staff experience EMR functionality in work with patients in clinical processes, in cooperation between healthcare professions, in meetings with patients, from a perspective of information logistics?
    - What factors cause information overload among nurses in ER? What impact does information overload have on healthcare-quality in ER? And where in the organizations micro, meso or macrosystems are the causes to be found?
- Aims circle around describing situations, and problems – the focus in most of the texts are on describing for understanding and explanation, but some take a step further to design solutions or come up with recommended action to handle the problem situation.
- Key concepts, or conceptual tools for describing healthcare logistics and information provision that are taken in by the students are
    - Process as in kernel process, clinical process, or information process,
    - Microsystem together with meso- and macrosystems
    - Information provision
    - Implementation
    - Change
    - EMR
    - Usability
- Results are descriptions of clinical processes in varying detail, in about half of the texts there are recommendations for action, and suggestions for design of solutions. So results contain descriptions for understanding and in some cases as conditions for design. Main focus is on description and understanding.

4.2 Elements of empowerment

When it comes to the concept of *meaning,* the fit between the requirements of a work role and a person's beliefs, values and behaviours, students stated that the course content increased the ability of students to critically evaluate their work organization and suggest alternative ways of working. This was specifically evident in the course "Change and Knowledge Management", where online seminars mainly dealt with change and knowledge management in authentic situations: *"During the course, I*

have learnt to categorize what happens at work, such as knowledge exchange, codification etc. It was very useful and I will use it daily in my work routines" (student).

Regarding *competence,* the students showed an increased belief their capability to perform work activities with skill. The outcomes of the student's reports and theses as the substantial occurrence of competence, showed a wide variety, covering a multitude of areas of healthcare processes, such as experiences of electronic medical records, information overload and implementation of electronic medical records: *"The program has given me insights in the role of identifying healthcare processes and information provision in them."* (student). Furthermore, implementation of electronic health records, and quality development by means of e.g. balanced scorecard were described and analysed focusing on change management and knowledge management. The reports described and analysed the application of new concepts to problems in well known settings, and clinical processes. The students describe the course content as very relevant to their professional context: *"I've had a lot of useful ideas, which I will apply in the management of my department. I have reached some insights on change management and knowledge management which will be very applicable."* (student). Outcomes from the courses were rich in reach and range, showing options for application of the new competence within wide areas of healthcare processes and change management.

The content of the courses seemed to generally increase the *self-determination* of the students by making theories and models of change management, knowledge management and information provision known to the students: *"This will make me better at my job and make me take on new tasks, I hope."* (student). The student's comment "I hope" was, in our opinion, a sign of that organisational culture of working-places sometimes brings constraints that not allow students to take on new tasks or to show new knowledge. When it comes to *impact*, our perception is that the master program gave the students the conceptual tools for analyzing their work context. It gave them the capability of putting words to experiences, thoughts and activities. Reflected in the students' own professional experiences they have been able to evaluate the relevance of the new tools and techniques, and as they have accomplished the courses while working, most of them have also tried or tested design ideas and solutions in their clinical processes.

In conclusion, there were clear indications of *competence* in change management, information provision and healthcare logistics, being the strongest element of empowerment. There were also indications of increased capacity for analysis and action, as important elements in empowerment (Spreitzer 1996, Wallerstein 2006). The courses and their contents corresponded to a need of competence, which made the students inclined to apply for the program, and state the relevance of the course content in course evaluations. This finding is in accordance with empowerment in terms of competence and self-determination and to a lesser extent to impact in the meaning of a person's ability to influence strategic, administrative and operating outcomes in work routines (Spreitzer 1996).

4.3 Elements of reflective practice

To *reflect-in-action*, while performing work tasks, is virtually impossible while attending a university course. On the other hand, numerous signs of *reflection-on-action* were discerned in the course assignments. The assignments described real professional situations and problems. Most assignments aimed to describe, understand and explain, while others designed solutions or made recommendations for solving professional problems. Key concepts, or conceptual tools for describing healthcare logistics and information provision, described and analysed by the students were clinical processes, information processes, microsystem together with meso- and macrosystems, information provision, change and implementation processes, electronic medical records, and usability.

From the participant observations and the document analysis, it is evident that a lot of the impact of the courses stemmed from the course assignments reflecting on everyday practice of students' professional lives (Thompson & Thompson 2008). Students' reflection-on-action had a strong focus on problem solving, where the course content served as a knowledge repository for new perspectives on organisational problems. This means that the assignments have been anchored and applied in practice, i.e. the theory and models from the courses have met with real life in a substantially and

fruitfully. In connection to the reflection-on-action, there is evidence of sensemaking from both an individual and organizational perspective (Weick 1979, Gioia & Chittipeddi 1991, Thomas, Clark & Gioia 1993). A comment from one of the students illustrates this finding:*"A very rewarding completion of the two years, many pieces has fallen into its place"*.

There are also elements of *reflection-for-action* discernible in students' assignments as pro-active recommendations for problem solving are frequent. This is summarised by one of the students in the following way: *"this is long lasting knowledge that I will use every day"*. The courses illustrate how reflective practice bridge the gap between theories and practice into professional knowledge. Theory serve as a resource for insights and understanding in sensemaking processes when adapted to students working life and experiences in their own local contexts.

4.4 Learning styles

The learning inventory of Honey and Mumford (1985) showed that a majority of the students displayed the learning styles of activists and pragmatists. Eight students displayed the learning style of activists, while four proved to be pragmatists. Still two more students showed a combination of active and pragmatic learning styles. Three students had mixed learning styles. As proposed by Kolb (1984), a vast majority of students with a degree in healthcare (eight) displayed the activist learning styles, while two were pragmatists.

Most students regarded collaborative learning as the primary advantage of the asynchronous discussions. The flexibility of time and place was identified as the second most important advantage. Finally, students appreciated the threaded structure of the discussions and the ability to read the transcribed discussions later on during the course. The disadvantages of discussion board were mainly due to pedagogical and behavioural factors, not the medium itself. The same course topics were discussed over one week. This led to difficulties in accomplishing postings of perceived quality at the end of the week, as all "important things" had already been written. Postings including too much text, and lack of instructional feedback were also perceived as disadvantages. The advantages of chat were identified as, first, the swiftness of communication and feedback, and second, a sense of community and social presence. Third, the medium gave rise to collaborative learning. Chat sessions were mainly appreciated as being interactive and enabling a sense of community rather than supporting learning. The main disadvantage of chat was the stress of synchronous communication. One group of students considered chat sessions too stressful and unstructured to provide good discussions, while others thrived on the swiftness of the discussions and experienced a sense of social presence. Students with a pragmatic learning style stated slightly more positive opinions about chats than other students. These students were more appreciative of the immediate feedback of the medium, and felt that chat sessions created a sense of community and social presence to a higher degree than students of other learning styles (see also Keller and Hrastinski 2006, 2007).

5 CONCLUSIONS

The findings of our study showed that not all elements of empowerment and reflective practice were equally strong in an educational context of IS use and information provision. Competence was the strongest element of empowerment, while reflection-on-action was the most frequent element of reflective practice. These findings are, of course, due to the educational context were knowledge sharing is in focus and reflection-on-action a conscious strategy of the educators. Which are the relationships between the aspects explored in our study? Thompson and Thompson (2007) argues that critical reflective practice brings empowerment to the individual. We argue that the relationship between empowerment and reflective practice is reciprocal, as reflective practice, in the context of our study, brought elements of empowerment, and empowerment provided a foundation for reflective practice. Learning styles create preferences towards different types of learning and instruction (Jonassen & Grabowski 1993). Students with active or pragmatic learning styles would appreciate a learning context applying knowledge on practice more than theorists or reflectors. Conclusively, we hypothesize that active and pragmatic learning styles provide better prerequisites of reflective practice

than theorising or reflecting learning styles. The relationships between empowerment, reflective practice and learning styles are presented in the framework of *reflective empowerment* depicted in figure 1. The concepts highlighted in bold letters represent the findings of our study. Hence, a perceived increase in competence brought reflection-on-action, which in its turn provided a foundation for an increased competence. The framework for reflective empowerment concerns the IS capabilities (Topi et al. 2009 IS curriculum) of understanding and addressing information requirements, into design and exploitation of opportunities created by technology innovations, and also to evaluate the solutions.

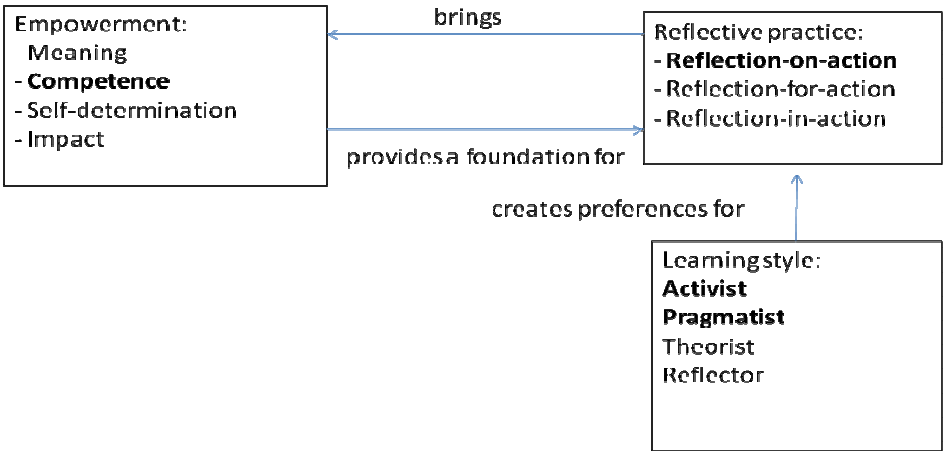

Figure 1. A framework for reflective empowerment in educational contexts of IS use and business process improvement .

The framework relates to the parts of the IS domain that concern IS design and use together with evaluation of IS impacts – in line with bridging IT and business processes. In this, learning and reflection are important mechanisms, and in this respect the paper relates to the capabilities of IS Curriculum 2009 (Topi et al. 2009). As our study is a research-in-progress the findings are still tentative. Another limitation of the study is the small student population. Thus, the hypotheses inherent in the framework of reflective practice needs to be tested further in larger student populations and with students from other healthcare professions. The concepts of reflection-on-action and sensemaking are closely intertwined Thus, sensemaking as a mediator of reflective empowerment is another interesting research topic. Other topics for further research might be to explore if the academic subject of information systems, due to its relevance in current healthcare change management, is more effective in evoking *reflective empowerment* than other academic subjects. We also put forward the hypothesis learning environments offering asynchronous online seminars improves the opportunities of reflection and deep learning. This is in accordance with current research on online learning (Keller & Hrastinski, 2007; US Department of Education, 2009).

According to Schön (1983), we cannot expect knowledge to provide "off-the-peg" solutions to professional problems. Instead, knowledge should be regarded as serving as a resource that needs to be adapted to circumstances. In our opinion, this is exactly what the students accomplished in the context of the studied master courses. The focus on reflection-on-action was strong among the students. As stated by Schön (1983), reflection-on-action and reflection-in-action should ideally interact. This interaction is hard to reach in a purely educational context. The overriding aim of our further research will be to investigate how students move on to apply reflection-in-action in their professional life, actively crossing the line between their educational and professional worlds. In connection with this is the question of what learning styles match different contexts for learning better, and the consequences of this match for empowerment. In healthcare these questions apply for both medical professionals as well as patients and their next of kin.

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