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An Integrated Approach for Teaching Professionals IT Management and IT Consulting

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ABSTRACT

In this paper, we develop an integrated approach for teaching professionals IT management and IT consulting (ITMC). With the help of a design science research methodology, we aim to facilitate and improve the collaboration between research and practice. After a comprehensive literature study we conduct interviews in order to identify problems and requirements for an integrated teaching approach. Furthermore, we analyze existing offerings from universities all over the world. Based on this, we present the framework for our approach and describe an exemplary module. Finally, we evaluate the concept and its applicability. By reviewing our approach one can say that all derived requirements are fulfilled and the feasibility can be shown.

Keywords

Training, Research and Practice Collaboration, Knowledge Transfer, Design Science, Information Technology.

INTRODUCTION

Today's business and information technology (IT) environment is more dynamic and competitive than ever before (LaFrance, 2010; Lee, Koh, Yen and Tang, 2002). This environment requires companies and individuals to cope with rapidly changing technologies as well as unprecedented volatility (Lee et al., 2002; Schambach and Blanton, 2002). Especially information systems (IS) professionals, and in particular those at the beginning of their career, have to strive for permanent personal growth – especially regarding skills and knowledge (Schambach and Blanton, 2002). "Particularly in the information technology industry, knowledge comes and goes so quickly that what IT professionals learned three years ago is already outdated. It is estimated that what students learn in their fresh-man year of college may be irrelevant by the time they graduate as seniors" (LaFrance, 2010). Additionally, companies increasingly search for managerial and interpersonal skills (soft skills) when hiring new IS professionals (Joseph, Ang, Chang and Slaughter, 2010). Hard skills, like coding experience, are still necessary, but companies more and more recognize their interchangeability (Joseph et al., 2010).

The traditional role of universities has been the fostering of critical thinking without adherence to specific approaches (Adams and Zanzi, 2004). Within a specific discipline, such as (management) information systems, the task is to create knowledge (research) and distribute knowledge (teaching) (Gill and Bhattacherjee, 2009). It is reported that a gap exists between IS academia and IS practice – especially concerning knowledge and skills required for IS jobs (Lee et al., 2002). GILL AND BHATTACHERJEE go a step further by claiming that IS research is not sufficiently informing its key stakeholders practitioners, students and researchers in other disciplines (Gill and Bhattacherjee, 2009). Methods and approaches for enabling a better knowledge transfer between practice and academia are said to be required (Wilson and Guzdial, 2010). There are plenty of IS curricula for undergraduate and graduate degrees in Information Systems (Downey, McMurtrey and Zeltmann, 2008; Plice and Reinig, 2009; Topi, Valacich, Wright, Kaiser, Nunamaker Jr., Sipior and de Vreede, 2010), but integrated academic programs for on-the-job training of IS professionals are missing.

To provide a solution for this deficit, this paper is structured as follows. The literature review describes the current state of teaching professionals IT management and IT consulting (ITMC). Within the research methodology section, our procedure is explained. The presentation of the results begins with an illustration of the requirements for an integrated teaching approach. Based on this, our approach is presented. It includes the framework and a description of one module, namely the business process management (BPM) module. After evaluating a first test course, we conclude with a discussion of the main findings, limitations and an outlook.

BACKGROUND

IT Management and IT Consulting (ITMC)

Several IS researchers tried to characterize IT management, but no consistent definition has been given so far (Cragg and Mills, 2009). It covers several different areas like managing IT resources as a competitive advantage or the development and operation of information systems (Luftman, 2004). An important cornerstone of many conceptualizations is the management of IT personnel as a resource (Cragg and Mills, 2009). However, often the fact that this resource consists of a variety of IT professionals, like programmers, analysts, IS managers and others, is neglected (Doke and Williams, 1999). In the following, we therefore focus on analysts and IS managers who concentrate on financial, governance and human resource issues (Luftman, 2004).

The field of (IT) consulting is not just personnel-intensive but even called a "people business", because staff expenses excel capital costs by an order of magnitude (Barber and Strack, 2005). Consultants can be single individuals or multibillion dollar companies (Djavanshir and Agresti, 2007) as anyone can work in this business if someone is listening to his/her advice (Kubr, 1993; Mohe, 2006). In contrast to management consulting which is concerned with immediate business-related issues (Bloomfield and Danieli, 1995), IT consultants focus on building, managing and operating information systems (Jessup and Valacich, 2003). They work as intermediaries between IT and business functions (Bloomfield and Danieli, 1995). YOON AND SUH outlined a model for measuring consulting service quality. Their model is based on the six significant variables reliability, responsiveness, assurance, empathy, processing and education (Yoon and Suh, 2004). The authors therefore highlight the importance of training.

Characteristics ITMC professionals should offer are (Kubr, 1993):

- Technical competence: Something the client is lacking but wishes to acquire in various areas of business and management knowledge, expertise, experience or know-how.
- Consulting know-how: How to work with clients in helping to identify and solve their problems.
- Independence: Giving self-determined and objective advice.
- Professional integrity: Compliance with a professional code of ethics and conduct.

Teaching Approaches

According to FITZGERALD training can be defined as the acquisition of knowledge and skills for present tasks. It is a tool to help individuals contribute to the organization and to be successful in their current positions. Therefore, it is a means to an end (Fitzgerald, 1992). One can further distinguish general training and specific (on-the-job) training (Nguyen, Truong and Buyens, 2010). In any case, training should result in changed behavior and actual application of the newly acquired knowledge or skills (Fitzgerald, 1992).

Literature describes various training programs for different purposes (cf. Table 1). A common characteristic is the separation of required knowledge and competencies into two different segments. On the one side are technical skills, such as business and IT skills. Those should be taught. On the other side are personal skills, like the interpersonal skill of collaboration. It is noticeable that foundational IT skills and interpersonal skills are named most. These approaches can help to get a first idea of the relevant skills. However, they lack a distinctive description of the required knowledge and competencies.

Lists of IS modules in literature (cf. for example (Kim, Hsu and Stern, 2006; Smith and McKeen, 2006; Topi et al., 2010)) suggest modules on information management, corporate (IT) governance, IS strategy, security and other soft skills. Unfortunately, they are mostly targeted at undergraduate or graduate programs. GORMAN criticizes that many approaches create a gap between "hard" IT training and "soft" HR skills training (Gorman, 2010). In order to overcome this problem, PLICE AND REINIG investigated the requirements of an IS program (for undergraduate or graduate students) from an IT professionals point of view (Plice and Reinig, 2009):

- Opportunities for the development of interpersonal communication skills.
- Covering a broad range of technical topics rather than in-depth coverage of specific hardware or software environments or programming languages.
- Acquisition of a core competency in systems development, project management as well as business and managerial skills.

Authors	Technical skills				Personal skills				
	Business skills	Foundational IT skills	IS analysis and design	Methodological know-how	Analytical ability	Interpersonal skills	Project management	Problem-based thinking	Learning techniques
Smid (2001)	x		x	x				x	x
Mohe (2006)		x		x	x	x	x	x	
Plice and Reinig (2009)		x				x			
Luftman and Ben-Zvi (2010)	x	x				x			
Pratt, Hauser and Ross (2010)		x		x	x	x			x
Gallagher, Kaiser, Simon, Beath and Goles (2010)		x	x			x	x	x	

Table 1. Selected Teaching Approaches in Literature

Problems of Practice-Academia Collaboration

Management and IT consultants constantly have to search for learning opportunities (Smid, 2001). Companies cannot rely solely on internal training programs but also have to refer to training partners (Adams and Zanzi, 2004). Universities can serve as such. However, they need to be aware of practitioners' specific requirements (Smid, 2001). In 1998, GILL AND HU found out that only 15 percent of the investigated universities in the United States offer courses targeted at IS executives; whilst 80 percent provide undergraduate IS programs (Gill and Hu, 1998). As many of today's IT professionals did not graduate in IS, the problem is reinforced, because they might lack some skills in the first place (Gorman, 2010). It is the duty of academia to handle this issue and to create programs for IT professionals (Pratt, Hauser and Ross, 2010). Currently, this task is not fulfilled properly, because insights into the needs of the practice are missing (Mohe, 2006; Smid, 2001).

There is a gap between technical skill training and leadership training (Gorman, 2010). IS academics rate interpersonal communication lower than IS practitioners whereas IS academics see the IT area more important than IS practitioners do (Lee et al., 2002). In another study, project management is ranked top by IS professionals and only third place by the non-IS ones (Kim et al., 2006).

Time, understanding and investment are critical attributes which are needed for a successful collaboration between academia and practice (LaFrance, 2010). Universities have to establish a flexible learning environment. Practitioners have to consider knowledge as a process and not only as a product (Smid, 2001), thus research-practice collaboration will take its time but be fruitful in future (LaFrance, 2010).

METHODOLOGY

Design science research (DSR) aims at improving the environment with help of creating innovative artifacts which can be constructs, models, methods and instantiations (Hevner, March, Park and Ram, 2004). Well-designed DSR starts with identifying and presenting problems in application domains (Hevner, 2007). The two key research activities are the proposition and refinement of design theory and its testing (Carlsson, Henningsson, Hrastinski and Keller, 2008). First, artifacts or design theories are built to solve problems innovatively. Second, the problem solving ability is evaluated (Hevner et al., 2004). If this test of the fulfillment of requirements and restrictions is not met, the process has to be iterated again (Hevner, 2007). Our research methodology is fully described in the following while the process currently is in its third iteration (cf. Figure 1).

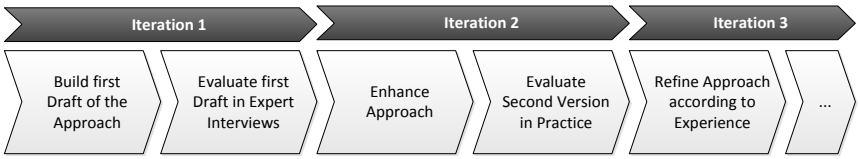

Figure 1. Development Process of our Approach

In the background section, the problem statement has been given by depicting current teaching approaches and their shortcomings as well as the problems in practice-academia collaboration. Out of this, the question appeared how to design an integrated teaching approach that overcomes these problems. Therefore, we build a first draft which is based on a comprehensive literature review. We systematically searched for and reviewed prior and relevant literature (Webster and Watson, 2002).

Then, this first draft was evaluated in interviews by discussing problems of existing approaches. Interviews are a method from the field of empirical social research (Bryman and Bell, 2007). They can be subdivided into quantitative and qualitative research, whose approaches differ in their way of dealing with the reality of experience: in quantitative research, the reality of experience is described numerically whilst in qualitative research it is verbalized first (qualitative, verbal data). Qualitative methods can be applied for the empirical identification of casual connections and their subsequent generalization (Bryman and Bell, 2007). Therefore, we conducted qualitative expert interviews with six practitioners from international consulting companies and representatives of five universities during a workshop in February 2010. Several problems and requirements related to on-the-job training have been reported here.

Based on the gained results, we conducted an analysis of existing courses covering IS-related topics in December 2010 and January 2011. Neither undergraduate courses nor consecutive master programs have been searched for because the focus is on on-the-job training. The offerings have been selected by searching major IS institutions. In total, 116 programs have been investigated. We examined their focus, characteristics, certifications, target group, fees and especially their curriculum. Together with the previously identified problems our approach is enhanced and evaluated by means of a test course. Although research on the program has not yet been finished completely, the preliminary results indicate the high viability of the designed artifact (namely the procedure, framework and module structure).

REQUIREMENTS FOR TEACHING ITMC

From our qualitative discussions, several results can be drawn. The interviews with the academics and practitioners are summarized in Figure 2.

Academia Perspective	Practice Perspective
• Cooperation between universities and (consulting) companies is deemed necessary. • Continuous education in universities should not aim at replacing in-company training, but augment it and disseminate the latest research results into practice. • Training should focus on the services offered by private companies and also include the teaching of soft skills.	• Candidates lack practical skills and working efficiency. • The ideal employee has a wide spectrum of technical and methodological knowledge, a mature personality and the ability to adapt quickly to a changing environment. • Group work, for example in form of case studies (incl. presentation, moderation etc.), is an ideal method for facilitation of soft skills.

Figure 2. Findings of the Interviews

Based on these findings, our approach has been enhanced in the second iteration (cf. Figure 1) and further evaluated by means of a comparison with other offerings. There is a wide range of courses covering topics on ITMC. Altogether 116 programs have been identified. Though all encompass the same area, the organization, content as well as targets are diverging. On the one side, graduates are said to be able to plan, sell and implement complex IT projects or determine the organizational setting. In other courses, the focus is more on the technical and data processing level. However, most aim at qualifying future managers and entrepreneurs to successfully lead businesses. A selection of some variables on the investigated offerings can be found in Table 2. It becomes obvious that in the United States (US) and United Kingdom (UK)

the programs are mainly targeted to graduates with one to five years of professional experience; whilst in German-speaking countries one third of is offered for professionals. While the fees are highest in the US, they are medium in German-speaking countries and lowest in the UK. In all countries, the tutors are basically professors. Only in a few cases there are also practitioners involved. Finally, in all countries the courses are mainly classical MBA or master programs with well-established academic records. Only in the UK the focus is shifted more to presentations, group work and other participation. From this first analysis, one can recognize the necessity to offer a program for professionals that is undertaken by professors and practitioners. There is also room for other kinds of examination and certification.

Variable	Value	United States (n=27)		United Kingdom (n=56)		Germany, Austria, Switzerland (n=33)	
		#	%	#	%	#	%
Target group	Graduates with 1-5 years of professional experience	22	81.5%	48	85.7%	19	57.6%
	Professionals (middle management)	5	18.5%	8	14.3%	12	36.4%
	n/a	0	0.0%	0	0.0%	2	6.1%
Fee	less than $10,000	0	0.0%	16	28.6%	6	18.2%
	$10,001-$20,000	2	7.4%	6	10.7%	7	21.2%
	$20,001-$30,000	6	22.2%	2	3.6%	7	21.2%
	$30,001-$40,000	2	7.4%	2	3.6%	0	0.0%
	$40,001-$50,000	1	3.7%	0	0.0%	2	6.1%
	more than $50,000	1	3.7%	4	7.1%	1	3.0%
	n/a	15	55.6%	26	46.4%	10	30.3%
Tutor	Professors	23	85.2%	54	96.4%	24	72.7%
	Professors and practitioners	4	14.8%	2	3.6%	2	6.1%
	n/a	0	0.0%	0	0.0%	7	21.2%
Certificate	Master (of Science or of Arts)	24	88.9%	47	83.9%	23	69.7%
	MBA	3	11.1%	8	14.3%	7	21.2%
	Other certificate	0	0.0%	0	0.0%	3	9.1%
Academic record	Written examination	5	18.5%	17	30.4%	23	69.7%
	Presentation, group work	5	18.5%	16	28.6%	3	9.1%
	Participation	0	0.0%	13	23.2%	1	3.0%
	n/a	17	63.0%	38	67.9%	6	18.2%

Legend: # = absolute, % = percent, $ in USD

Table 2. Overview of the Investigated Offerings

More than 200 different modules have been found in the 116 investigated curricula. As many of them cover similar topics and issues, each unit has been investigated according to its content, outline and objectives. Finally, the two kinds of modules (methodology and personal skills) already described in literature, were also discovered in this study. The methodological modules can be grouped further into seven units, namely Management in the Information Age, IS Fundamentals, IT Consulting, Enterprise Architecture Management, Business Process Management, Managing Security, Compliance and Risk as well as Sustainability and Ethics. The identified personal skill modules are grouped into Interpersonal skills and Project Management skills.

Based on these findings, one can derive requirements for an integrated teaching approach. The following points serving as the basis for our approach have to be covered:

- Academia and practice knowledge exchange: Knowledge transfer from academia into practice and vice versa proves significant for any training, but especially courses within a highly dynamic environment like ITMC. Therefore, practitioners also have to be invited to teach scientists as well as other practitioners on special topics.
- Structured procedure: Because of the diversity of offerings, certificates and organizational issues, IT training offerings have to be structured according to widely accepted procedures in order to ensure a useful and practicable training effect.
- Concentration on relevant issues: Based on defined objectives and target groups, the selection of relevant modules is vital.

INTEGRATED APPROACH FOR TEACHING ITMC

Procedure

The aim of our approach is to derive and implement a program capturing a holistic view on relevant issues within the field of ITMC. Most important is the interaction between academia and practice in order to ensure theoretical foundation and practical application of the material taught. For this objective, we use the model shown in Figure 3, which follows the ideas of collaborative practice research (Mathiassen, 2002). Accordingly, practitioners and researches work together in order to share their information with the participants while both receive feedback on their actions. From the perspective of the participants, they do not only receive information on current technology and trends, but they also get to know others who are in similar situations like them. Networking between them is therefore a side effect of our approach. Hence, this model ensures the knowledge transfer between academia and practice.

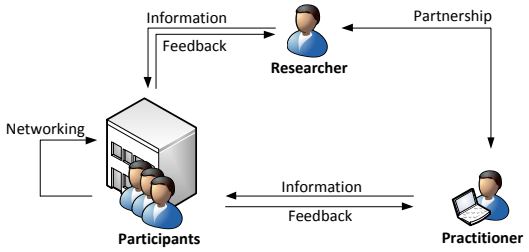

Figure 3. Model of Researcher-Practitioner Collaboration

Framework and Modules

The framework of our approach is structured in form of a building (cf. Figure 4). The essential support functions of infrastructure management and teaching staff management represent the base. Together with strategy at the top, evaluation and evolution as well as the operational management can be found in the roof. These activities ensure the successful implementation and the adherence to legal, political or other external requirements. Within the body of the house the core modules can be found in two groups. First, methodology courses cover functional and technical content related to ITMC. The selection of these seven modules is based on the assessment of the other offerings. Secondly, personal skills modules, including interpersonal skills, leadership and conflict management as well as project management, have to be taught.

These core activities respectively modules are framed with the relevant stakeholders. On the left-hand side, participants and tutors can be seen as the input side. On the right-hand side, companies, especially small and medium sized enterprises (SME), consulting firms and universities profit from the outcome of the training.

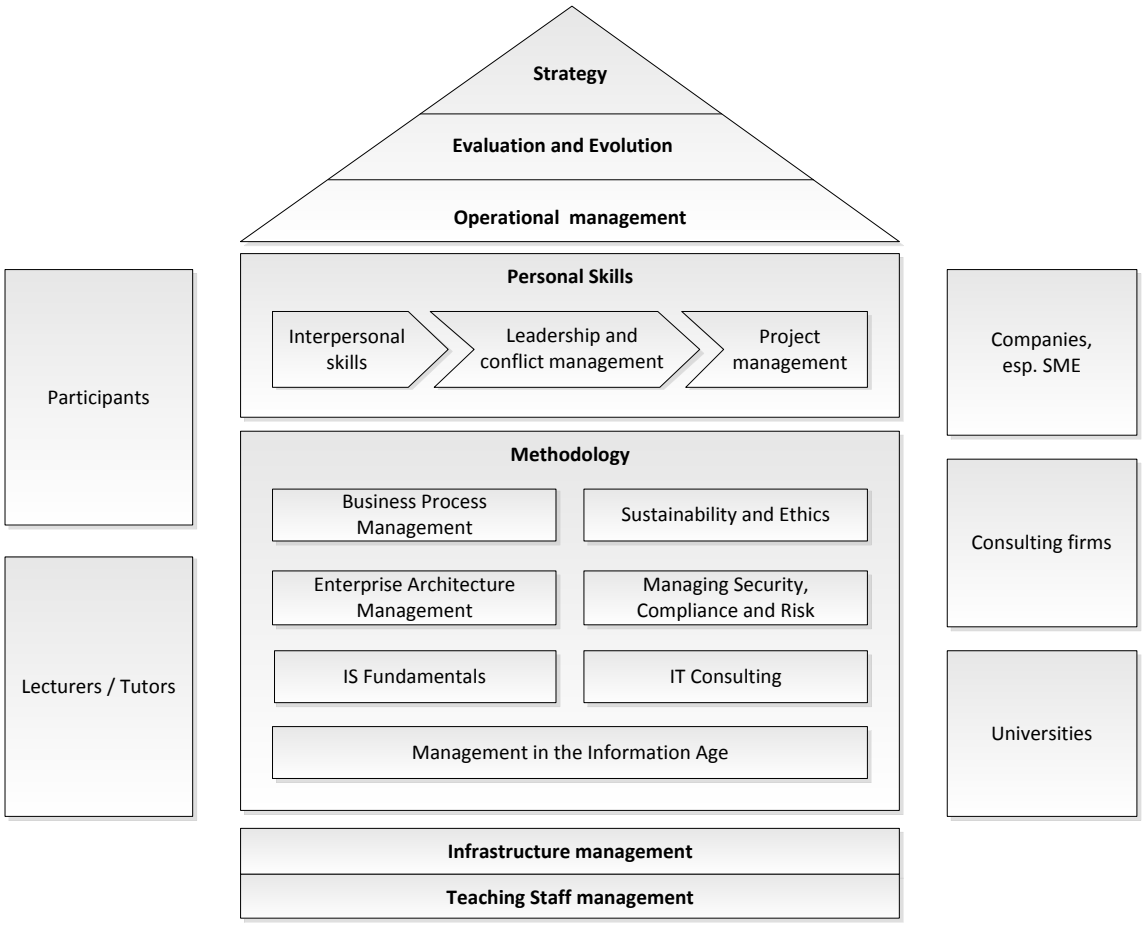

Figure 4. Framework of the Integrated Approach

In order to get a deeper insight into the actual content that is taught within the course, Figure 5 gives an overview of the content of the methodology modules. Per module, a specific set of didactic methods, like for example case studies, presentations and individual literature studies, is required (Beard and McPherson, 1996; Heim, Meile, Tease, Glass, Laher, Rowan and Comerford, 2005). The assignment of methods for modules is depicted in Figure 6. For each module (x-axis) specific methods (y-axis) have been chosen which facilitate learning best (Beard and McPherson, 1996).

Module (Abbr.)	Content
Management in the Information Age (MIA)	• Internet economics • Management basics and introduction to consulting methods and approaches • English business language skills
IS Fundamentals (ISF)	• IT basics and IT controlling • Enterprise software, like for example enterprise resource planning (ERP) tools • Foundations of knowledge management, business intelligence and data warehouses, operations research, data analytics and enterprise application integration
Enterprise Architecture Management (EAM)	• IT governance and IT strategy • Business-IT alignment • IT service management • Change management
Business Process Management (BPM)	• Approaches • Methods
IT Consulting (ITC)	• Business foundations: marketing, organization, accounting, founding and investment • Collaborative business, mergers and acquisitions • Customer relationship management (CRM) • IT cost management
Managing Security, Compliance and Risk (MSCR)	• IT security • IT legislation and IT contracts • IT risk management
Sustainability and Ethics (SE)	• Green IT • Management ethics and social aspects of information management • Intercultural studies

Figure 5. Overview of the Methodology Modules

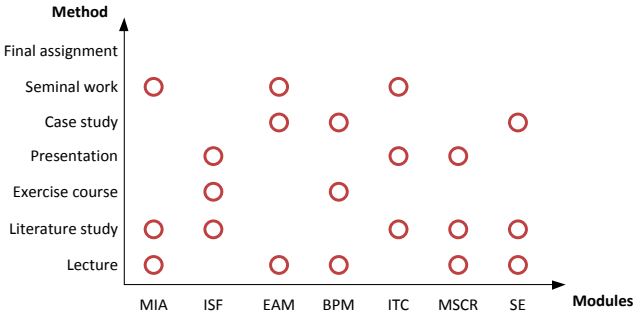

Figure 6. Teaching Methods for each Methodology Module

Before discussing the methodological BPM module, the personal skills modules should be briefly explained. A module for project management has to be included when teaching ITMC because projects are the main form of organization in this context. The interpersonal skills module teaches techniques for presentation and moderation. Although the leadership and conflict management module has not been found explicitly in literature, we think that speech and negotiation techniques are crucial for IT managers or IT consultants. In opposite to the methodological modules, the personal skills modules are taught in block seminars accompanied by two trainers for two days while a maximum of fourteen participants is allowed to attain one seminar. This practice ensures that every participant will learn as much as possible from the seminar.

Description of the BPM Module

In order to cope with other descriptions of IS curricula (cf. for example (Topi et al., 2010)), we now present an exemplary description of one module, namely the BPM module. Figure 7 describes the module in detail, including a course outline, learning objectives and suggested readings. In the following, the content of session 4 ("Speaking BPM using BPMN") is used to evaluate our approach.

Module: Business Process Management (BPM)	
Description	Since the early works of Taylor (1911, 1914, 1919) generations of managers tried to boost productivity by dividing work into ever-smaller pieces. In today's globalized business environment this led to an over-separation of concerns wherein the holistic view for the flow of a product or service inside a company got lost. Through the techniques, methods and approaches of modern BPM these limitations should be overcome without neglecting the efficiency gains from specialization. BPM enables managers to measure ("what gets measured gets done") and steer their operations end-to-end. One of the central approaches of BPM is the use of semi-formalized so-called models to represent processes. These models are used in management and consulting settings to facilitate discussion about how things should be done, and at the same time they can be directly executed by specialized software (business process engines). In this course we cover the motivation for BPM, the most important approaches and finally the global standard modeling language Business Process Model and Notation (BPMN).
Course outline	1 - Why business process management? 2 - Approaches to BPM 3 - Methods of BPM 4 - Speaking BPM using BPMN 5 - Applying approaches, methods and BPMN altogether 6 - Wrap-Up
Learning objectives	• Putting process-oriented organizational design into context • Being able to apply process-oriented approaches and methods • Learning how to use BPMN as a tool to capture, analyze, design and improve business processes • Understand the limits and shortcomings of different approaches, languages and methods
Suggested resources	• http://www.workflowpatterns.com • http://prom.win.tue.nl/research/wiki/ • http://www.bpmn.org • http://www.informationweek.com/whitepaper/Business-Intelligence/Business-Process-Management/

Figure 7. Description of the BPM Module

EVALUATING A TEST COURSE

Before one can start the course it needs to be verified, if structure, content and organization will work in the specific environment. Therefore, we conducted a test course with graduate students of a master's program at a major German university. Nineteen students from business and information systems courses participated in session 4 of the BPM module (cf. Figure 7). The lecturer was a consulting practitioner currently working on a BPMN-based analysis of his client's core processes during an ERP introduction project. Two tutors serving as research assistants at the university supervised the exercise course.

The test course took place on two days in January 2011. Within the first session, the theoretical foundation of speaking BPM with BPMN was laid out. In the following one, two widely used tools for process modeling were introduced from a practical perspective. During this second session, the exercise course, students were asked to model a reference process from the retail industry – the process of stocktaking (Becker, Uhr and Vehring, 2001). Whilst the reference process is laid out as Event-driven Process Chain (Rosemann and van der Aalst, 2007), the students had to model in BPMN and a proprietary modeling language with the two previously presented modeling tools. Upon completion the students evaluated the course by a 15-item-questionnaire.

Students' perspective

The anonymous, final evaluation of the course proved a high relevance and interest in the area (cf. Table 3). While the lecture is viewed a little better than the exercise course, the complete course is almost rated very well. The knowledge gain of the students ranks only medium. However, the standard deviation (SD) is the highest of all variables and therefore the responses have been quite different in this case.

	Average grade (2 = very high, -2 = very low)	SD
Lecture	0.93	0.61
Exercise course	0.63	0.89
Complete course	1.32	0.47
Knowledge gain	0.58	1.01
Relevance of the topic	1.37	0.76
Interest on the topic	1.00	0.57

Table 3. Students' Evaluation of the Test Course

Several students highlighted the practical relevance of the topic and the language BPMN. They appreciated the teaching of new modeling tools and languages at the university. Some also underscored the commitment of the tutors. Suggestions for improvement also have been made. Students remarked that the time (90 minutes for each session) was not enough and especially in the exercise course computer workstations have been missing. Currently, there are only four workstations available in our lab. For future sessions, more computers might be necessary. Furthermore, a better case study design is desired.

Practitioners' perspective

The idea of the test course was to evaluate our approach with students before inviting IS professionals and practitioners. In general, the concept has proven its viability, although there is some room for improvement. More workstations are required and a better case study design. Nevertheless, the BPM module has proven as a valuable component in IS education. The practitioner reported a high perceived interest and adherence of the students and agreed to work as a tutor in the later courses, too.

CONCLUSION, LIMITATIONS AND FUTURE RESEARCH

In our research that has been guided by the DSR paradigm, we developed an integrated approach for teaching professionals ITMC. This approach aims at facilitating and improving the academia and practice information exchange and collaboration. Knowledge shall be transferred from researchers to companies and vice versa. After a comprehensive literature study of related contributions, we conducted expert interviews in order to identify problems and requirements for an integrated teaching approach. Furthermore, we analyzed existing offerings on their strengths and weaknesses. Based on these findings, we developed our approach, presented a framework with its module structure and provided the description of the BPM

module. Finally, we evaluated the concept and its applicability with students. By reviewing our approach one can say that all derived requirements are fulfilled and the feasibility has been shown.

Nevertheless, the fact that only students have evaluated the approach so far represents a limitation which is planned to be overcome by a complete run of the course in later 2011. Issues on the exact mode of organization and other operational problems have to be solved. However, the European Union and its European Regional Development Fund have approved the relevance of the topic and the quality of our idea by supporting our research.

For the future, we aim at constantly evaluating and evolving the approach based on feedback. We are aware of the fact that the depicted results are not conclusive. Nevertheless, our approach currently offers a good opportunity for both research and practice to exchange and extend the body of knowledge in the field of ITMC.

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