Curricular Framework of SAP ERP Management Education: Design and Evaluation of a German University

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ABSTRACT

Information and Communication Technologies (ICT) play an essential role in all areas of today’s economy and have thus increasingly being focused on in higher education in recent years. Despite these welcome efforts undertaken, shortcomings in this area still exist. In consequence, there is great need for an ICT-based higher education curriculum redesign. This requires not only the development of innovative course designs using ICT but above all a modernization of traditional higher education teaching patterns to improve the fundamental understanding of ICT. Due to its close relationship to ICT, this is of particular importance for managerial accounting education. This paper displays a detailed example of a curriculum designed to impart skills in using SAP ERP software which is an important key competence of future managerial accountants by using an innovative action-oriented teaching approach.

Keywords: Curriculum Design; Curriculum Evaluation; Higher Education; SAP ERP

RELEVANCE OF SAP ERP FOR A PRACTICE-ORIENTED MANAGERIAL ACCOUNTING EDUCATION

While academic teaching traditionally focuses on the transmission of expertise (Brown, 1994), employers increasingly expect their employees to fulfill a constantly growing amount of tasks that need both expertise as well as vocational, personal and social competences (Nyhan, 2002) including competent handling of latest Information and Communication Technologies (ICT). In consequence, higher education graduates often fail to fulfill employers’ expectations in multiple respects. To address such problems associated with labor market relevance, a fundamental revision of higher education curricula is required urgently. When considering curriculum redesign, the most important prerequisite is a discipline specific identification of labor market-related competences.

According to IFAC (2009) knowledge in and handling of ERP software is essential for accounting related professions. A review of current job advertisements clearly shows that this qualification applies equally to the field of managerial accounting. A high demand for competence in using SAP software, the market leader in the field of ERP software (Hewitt Associates, 2008), can also be concluded from this review. This fact is also confirmed by the continuously increasing use of SAP ERP software in academic teaching (Bedell et al., 2007).

STEP BY STEP DEVELOPMENT OF A PRACTICE-ORIENTED MANAGERIAL ACCOUNTING CURRICULUM

Identifying over-all key qualifications of managerial accountants

To achieve the intended aim of equipping managerial accounting students with practice-relevant competences and a profound range of methods, identifying the set of competences needed in the corresponding occupational field, in our case managerial accounting, is the first step towards a practice-oriented curriculum. The understanding of managerial accounting presented below follows a coordination-based approach. Figure 1 gives an overview of managerial accounting key competences.

Figure 1. Managerial Accounting Key Competence Model

- Expertise
  - Comprehensive Coordination Instruments
    - Centralised Management Systems
    - Budgeting Systems
    - Ratio and Target Systems
    - Transfer Pricing
  - Isolated Coordination Instruments
    - Incentive Systems
    - Target Setting
    - Analysis of Variance
    - Cost and Profit Accounting
    - Reporting System
    - Investment Planning and Control
  - Computer Competences
    - Spreadsheet
    - ERP
    - Data Warehousing

- Methodological Competences
  - Knowledge of Possible Solution Techniques
  - Ability of Case-Individual Application

- Action-Oriented Competences in Managerial Accounting

- Social Competences
  - Communication Competence
  - Team Spirit
  - Conflict Resolution Competence
  - Mediation Competence
Following this line of argument, the main objective of managerial accounting is seen in a ‘secondary coordination’, which is to ensure coordination between individual operative management functions and their orientation to the attainment of corporate objectives (Kaplan and Atkinson, 1998; McWatters et al., 2008). Based on managerial accounting key functions, a conclusion of key competences necessary can be drawn.

First of all, successful managerial accounting is based on expertise in tasks specific to managerial accounting. As an analysis of current job advertisements shows, computer skills are of particular importance to employers (Stoner, 2009). In addition to competences in spreadsheet and other decision support and reporting tools, competences in handling of enterprise resource planning systems, data warehousing and OLAP database are especially high in demand. Even more challenging is the required methodological competence, which comprises both extensive knowledge of possible solution techniques and the ability of case-individual application. The latter is of immense importance, since coordination-oriented managerial accounting is particularly characterized by a steady adaptation to new application contexts.

The mere possession of sound managerial accounting skills is not sufficient for professional success. Soft skills mainly in the fields of communication, leadership and team orientation are key success factors (Goltz et al., 2008). First of all, managerial accountants’ social and interpersonal competences have to meet highest requirements. Aiming at raising problem awareness and communicating complex solutions in easily understood language to colleagues at different organizational levels, whose main tasks often may not include managerial accounting, well developed verbal and presentation competences combined with team spirit are central tools. After having identified and clearly defined the set of action-oriented competences, it is the next step to find innovative teaching concepts to turn their application into practice.

Identifying key requirements for practice-oriented teaching approaches in managerial accounting

Traditionally, academic teaching is characterized by predominant use of face-to-face teaching techniques which often make it difficult for students to maintain interest and attention (Entwistle, 2009). Due to their mainly passive character, such ‘spoon-feeding education’ (Raelin, 2009:402) approaches fail to satisfy the requirements regarding the development of managerial accounting students’ communication, interpersonal and problem-solving competences (Adler and Milne, 1997). Subsequently, calls for a comprehensive modernization of higher education didactics increased.

In order to prepare students for future working life, innovative teaching concepts fostering competency acquisition and supporting steps from methodical knowledge to knowledge application are urgently needed. In consequence, recent didactic approaches particularly emphasize a shift in attitude from teacher-focused to more student-focused teaching or rather learning methods (Alexander, 2006; Entwistle, 2009). Generally, learner-centered teaching approaches are considered more suitable for obtaining high level student motivation and achievement (McCombs and Miller, 2007).

Action-oriented teaching approaches, which consider direct and active student participation as the keys to successful knowledge transfer, are conceptually closely linked to the concept discussed above. Through immediate application, acquired knowledge and methods will not only be consolidated but competences and abilities will be developed (Auster et al., 2005). In this context, corresponding literature emphasizes the great significance of creating open or rather complex learning environments (Woolfolk, 2010). Powerful complex learning environments are context bound, offer opportunities to embed world-of-work context in training situations, and motivate students to learn and work (Mulder and Sloane, 2004).

In practice, a joint use of both learner-centered and action-oriented teaching is favored to create highly effective teaching-learning arrangements. They are mainly characterized by being situated and authentic, critical thinking supporting as well as problem-, case- and team-based (Nyhan and Kelleher, 2002). Most importantly, situated and authentic learning environments are considered to be a prerequisite for learning success (Land and Hannafin, 2000).

Unfortunately, academic learning settings still often fail to prepare students for real life learning environments, which have apprenticeship character under expert guidance (Woolfolk, 2010). Problem-based learning fosters the acquisition of flexible knowledge that can be used in a way specific to the situation and that will be applied accordingly. In contrast, traditional academic teaching provides rather inert knowledge leading to information memorization, rather than to application (Woolfolk, 2010). Even though critical thinking is highly valued in educational research aspects concerning the development of critical thinking competence are often being neglected in academic curricula (Stanovich and Stanovich, 2010). The use of case studies in academic teaching is highly recommended because of their capability to cover the factors presented above simultaneously. A case study ‘is a description of a realistic problem scenario that is relevant to a particular profession or field of study’ (Mayer, 2003:319) and offers the opportunity to provide work and practice orientation in complex and realistic settings while still being illustrative and manageable for students. Further, the implementation of team-based assignments into academic courses is very important to prepare students for the challenges of future teamwork (Nyhan and Kelleher, 2002). Due to increasing complexity of work procedures and the resulting positive outcomes of effective teamwork, the use of teams has increased significantly over the past decades (Salmon et al., 2009). Learning how to cooperate effectively within a group is therefore an important element for future business success (Thornton, 2010).

Basic elements of an action-oriented teaching approach in managerial accounting

In spite of increasing calls for a modernization of academic teaching across all fields of study and the proven suitability of powerful learning environments in the domain of Business Economics (De Corte, 2003), relatively few accounting educators use active learning methods (Kern, 2002). In the following, we provide a general overview of our managerial accounting teaching concept based on the presented design requirements for complex teaching-learning environments recommended by the latest academic didactic approaches. In practice, the use of integrated teaching principles is subject to primarily capacity-
related restrictions. Due to a continuously increasing demand of university education, courses with a large number of participants, especially in bachelors’ degree programs are commonplace in German universities (e.g. up to five hundred students per lesson at Saarland University). This aggravates an implementation of learner-centered techniques.

A constitutive element of the underlying teaching concept is the use of case studies throughout all managerial accounting courses offered. First, during phases of inevitable face-to-face instruction, the lecturer falls back upon case study scenarios when explaining theoretical background and giving examples. Second, bonus points for the written exam at the end of the semester can be obtained by optionally working on exercise case studies and presenting the solutions in specifically scheduled exercise sessions. Third, the exam itself is based on a case study scenario consisting of different tasks all connected in terms of content. Additionally, elements of team learning are to be found in all offered courses. According to the specific course type, teamwork is compulsory or optional.

All case studies used contain transfer task parts without clearly structured solution patterns. In this way, methodical competences will be trained by application of acquired knowledge to unknown operational situations. Furthermore, a comprehensive, course specific mentoring approach has been established. For example, student office hours have been installed during which advanced students serve as contact partners for fellow students’ questions and problems in rather quantitative-oriented subjects. By reducing students’ hesitation to ask the professor or staff members, students have been successfully encouraged to choose rather mathematical courses.

ADOPTING THE ACTION-ORIENTED APPROACH TO MANAGERIAL ACCOUNTING SAP ERP EDUCATION

Overview of the House of SAP ERP teaching at Saarland University

Figure 2 gives an overview of the SAP ERP education taught at Saarland University.

Figure 2. House of SAP ERP Education at Saarland University

As already indicated in the introduction, due to its enormous relevance in the occupational profile of managerial accountants, the curriculum part concerning the development of SAP ERP competence is presented in detail. All SAP ERP courses are structured in a modular way following the same general curricular design principles.

In addition to the design principles discussed in the section above, the cluster of SAP ERP courses is subject to some additional over-all requirements. All three ERP courses aim at providing application competence in SAP ERP while deepening and broadening managerial accounting expertise at the same time. Critical thinking shall be promoted by analyzing and questioning ways and results of system implementation. For a sustainable improvement of professional qualifications, mere application knowledge is not sufficient. Furthermore, an independent examination of the ERP system is needed. All courses take place in a PC training setting which is being attributed to achieve higher degrees in action-orientation than traditional forms of academic teaching such as lectures and tutorials do. Due to different focuses in terms of content, the specific competences provided by the particular courses will be explained separately.

Managerial Accounting using SAP ERP

Managerial Accounting using SAP ERP is the basic SAP ERP course in managerial accounting on masters’ degree level predominantly focusing on SAP ERPs Controlling Module’s key functions and its related business processes and modules. Accordingly, the main goal of the teaching concept is to provide basic knowledge in dealing with SAP software in general and with the Controlling Module in particular. Mostly untrained, inexperienced users are the course’s main target group. For this purpose, typical managerial accounting tasks, e.g. cost center accounting as well as cost object accounting are solved by using SAP ERP. The most challenging aspect of teaching heterogeneous classes with different standards of knowledge is to find a good balance between beginning and slightly advanced learners (Entwistle, 2009). Experience has shown that the vast student majority has no or limited previous SAP ERP knowledge which is the reason why traditional lecture-based approaches are still suited to communicate extensive amounts of content (Haskell, 2001). In consequence, modern academic teaching has to combine traditional, teacher-directed with innovative, student-directed types of teaching in an appropriate way (Haskell, 2001). Therefore, SAP teaching refers to an integrated lecture-based approach. During integrated lecture-based teaching, phases of guided learning alternate with phases of individual student learning. In Managerial Accounting using SAP ERP the latter consists in an independent repetition and reinforcement of the tasks previously carried out under teacher instruction. Compared to traditional, strictly teacher-centered lecturing, the use of the method proposed is characterized by intensified personal interaction between teacher and student which fosters application transfer (Haskell, 2001). Despite all advantages when using teacher-centered approaches, the students’ role inevitably tends to remain rather passive-receptive. In consequence, no optimum learning success will be achieved.

Active and creative student participation in learning processes is an essential prerequisite for the development of expert knowledge and methodical competence (Postholm, 2007). Selected and logically prepared knowledge in a teaching situation does
reflect complex, less structured requirements of everyday working life only to a very limited extent (Nyhan, 2002). In contrast, SAP business practice is characterized by confrontations with unknown facts and their system implementation. Transfer tasks without provision of exactly fitting solution patterns are particularly suitable for the simulation of vocational application scenarios (Haskell, 2001). Accordingly, in addition to the lecture-based part, our teaching concept includes a second basic module in form of a written semester paper which serves as the basis of student assessment and grading. In small groups, students work on assignments that comprise subject matters presented during teaching sessions as well as new problems to be solved independently. While a reinforcement of familiar exercises is used to deepen memorization (Willis, 2006), the use of challenging unstructured assignments is widely recognized as an effective means of stimulating and enhancing students’ self-responsibility and context transfer competences (Haskell, 2001).

Due to its motivation effects (Nijstad, 2009), team orientation is the second conceptual linchpin. Even during classroom lessons, students are explicitly encouraged to help each other in order to train communication and problem-solving skills. Doing so in an extraordinary way, participants earn bonus points for the final exam. To guarantee favorable conditions for teamwork, some basic regulatory framework issues regarding the composition of teams in terms of size, mix or interpersonal skills (Hackman, 2002) as well as fairness and marking aspects have to be addressed (Willcoxson, 2006). In order to simulate a project team environment close to real working life, professional team coordination mechanisms were copied (Rico et al., 2008). Grouping was carried out on the part of the chair to form heterogeneous teams and to ensure training of dealing and working with unfamiliar fellow students with possibly different cultural background and different learning styles (Banks, 2005). Another important teamwork component is the presentation of the jointly elaborated findings and results to all teams in a final session at the end of the semester.

Simulation Game ERPsim

In many respects, business games or business simulations go further than traditional academic teaching methods such as lectures, seminars or tutorials. Despite the proven educational value of ICT simulations (Lehtinen, 2003), they are still slightly underrepresented in current academic curricula (Romme, 2003). According to Davis et al., simulation involves ‘creating a computational representation of the underlying theoretical logic’ (2007: 481). Fortmüller sees the main advantage of using business games in teaching in ‘the dynamic design of the situations required and in the feedback based on the consequences of one’s own activities’ (2009: 69-70). In this way, the achievement of the following learning objectives pursued will be particularly effective: the ability to use already acquired knowledge in a specific problem situation, to combine separately acquired activities to a systematic sequence of action, to assess interactions and consequences of individual activities to the activities of others (Fortmüller, 2009).

The same applies to team orientation. One advantage of this completely team-focused setting is the increased promotion of problem-solving competences by providing higher levels of commitment compared to only partly team-oriented approaches (Alexander, 2006). Moreover, business games are particularly suited to develop students’ entrepreneurial competences while at university. So-called entrepreneurial learning is a specifically effective form of management learning. Entrepreneurs’ high action orientation and learning behavior based on experience and discovery, doing and reflection (Rae, 2000) is extremely desirable in higher education, too (Pittaway and Cope, 2007).

In the managerial accounting curriculum presented, the strategic planning simulation ERPsim is the next step towards the creation of entrepreneurial competences. It gives students the opportunity to gain hands-on experience in ERP and business management at the same time. Simulating all areas of strategic and operative management decision-making under real-world conditions, the teaching concept fosters students’ understanding of integrated business processes and links them to real world ERP system applications. In this simulation game, competing teams operate in a dynamic and changing environment while they have to cope quickly with selected tasks concerning standard business processes. Since decision-making under time pressure and immediate realization are future key success factors (Hodgkinson and Healy, 2008), the business game is even more suitable to simulate realistic future working conditions than other teaching approaches (Harper et al., 2000).

Compared to Managerial Accounting using SAP ERP which has a deeper theoretical base, the simulation game ERPsim is rather focused on real-world experience and training of application knowledge.

TERP10 Certification

As final course of the managerial accounting SAP ERP curriculum, selected graduates and highly talented undergraduate students are given the opportunity to attend the 10-day SAP certification course ‘TERP10’ for free which is offered in cooperation with SAP University Alliances. At the end of the training, students may achieve an externally recognized proof of their SAP ERP competence by taking an SAP global certification examination. Successful students will receive an official SAP certificate, which is fully recognized in industry worldwide. Specially-trained lecturers and professors will teach this universally-recognized professional SAP certification program to their students. The focus is on providing a complete overview of all SAP ERP modules with particular emphasis on underlying fundamental integrative business processes. Next to certificate acquisition, the advantages for managerial accounting students are in a further reinforcement of knowledge previously acquired in the field of SAP ERP. Additionally, managerial accountants particularly gain a benefit from the overview given of all SAP ERP modules because of their interface position between different operational management functions, as mentioned earlier.

Graduates of this program enjoy many benefits and opportunities of being an SAP certified expert with a highly-valued qualification, promoting their proficiency in understanding of SAP software solutions. This additionally offered certification course is – although no credit points are granted for passed exams – continuously high in demand.

SAP ERP MANAGERIAL ACCOUNTING CURRICULUM EVALUATION

In recent years, the importance of teaching and curriculum effectiveness has increased (Popham, 2008). Regularly, performance ratings are conceptualized as student evaluations of
teaching (McNatt, 2010). In order to verify the achievement of the intended aim of equipping managerial accounting students with action-oriented competences and thus enhancing their professional capabilities, an evaluation of the managerial accounting curriculum proposed is necessary. Even though meaningful results could only be received through evaluation carried out after several years of work experience, this form of survey had to be ruled out for several practical reasons. Except from procedural difficulties, the resulting time lag would have had negative impacts on the intended continuous curriculum improvement process. Therefore, a common evaluation method was used. ERP course participants were asked to answer a structured questionnaire anonymously. In addition to questions concerning course content and teacher performance, the questionnaire focused on the assessment of the underlying teaching concept and its practical relevance. In the following, questions concerning the latter will be discussed more detailed.

Altogether, feedback was very positive. All of the three ERP courses were classed as ‘very good’ or ‘good’ by a vast majority of the 160 participants surveyed. These positive results may most likely be attributed to the high level of student acceptance of ERP courses in general. 100 percent of ERPsim participants, 93 percent of TERP10 participants and 90 percent of Managerial Accounting using SAP ERP participants ‘totally agreed’ or ‘agreed’ with the statement ‘such courses should be offered more often’. A similar positive rating received the item ‘the course content will be useful for my future working life’ with a total agreement/agreement of 60 percent of ERPsim, approximately 74 percent of TERP10 and 88 percent of Managerial Accounting using SAP ERP participants. The highly favorable vote from participants in Managerial Accounting using SAP ERP may be due to the fact that the underlying teaching design of this course was free from external restrictions. Therefore, its evaluation results will be examined in detail (see Table 1).

Table 1: Evaluation of Managerial Accounting using SAP ERP

<table>
<thead>
<tr>
<th></th>
<th>totally agree</th>
<th>agree</th>
<th>neither agree nor disagree</th>
<th>disagree</th>
<th>no statement</th>
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<tbody>
<tr>
<td>Working in a team was a good training for my future working life.</td>
<td>48.33 %</td>
<td>31.67 %</td>
<td>11.67 %</td>
<td>5.00 %</td>
<td>3.33 %</td>
</tr>
<tr>
<td>The acquired knowledge is highly relevant for managerial accounting practice.</td>
<td>18.33 %</td>
<td>53.34 %</td>
<td>18.33 %</td>
<td>8.33 %</td>
<td>1.67 %</td>
</tr>
<tr>
<td>The final presentation was a good training for my future working life.</td>
<td>30.00 %</td>
<td>46.67 %</td>
<td>13.33 %</td>
<td>6.67 %</td>
<td>3.33 %</td>
</tr>
<tr>
<td>I learnt a lot by working independently in SAP ERP.</td>
<td>43.34 %</td>
<td>38.33 %</td>
<td>10.00 %</td>
<td>8.33 %</td>
<td>–</td>
</tr>
<tr>
<td>The course did simulate typical fields of application in managerial accounting successfully.</td>
<td>15.00 %</td>
<td>45.00 %</td>
<td>28.33 %</td>
<td>10.00 %</td>
<td>1.67 %</td>
</tr>
<tr>
<td>The course did contribute to improving my action-oriented competences.</td>
<td>13.34 %</td>
<td>48.33 %</td>
<td>23.33 %</td>
<td>11.67 %</td>
<td>3.33 %</td>
</tr>
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</table>

Taken as a whole, very positive student feedback confirmed the teaching approach pursued. The team work part and the final presentation were considered to be a good preparation for future working life. Independently working in SAP ERP met high student approval. Students had the clear impression to have learnt a lot. The slightly lower level of agreement concerning the course content’s relevance for the managerial accounting practice and the simulation of typical managerial accounting application fields might be explained by a relatively high share of students with rather little previous knowledge in managerial accounting due to their low number of semesters or focuses on studies different from business management. Last, it must be stated that approval to the final item of the questionnaire ‘the course did contribute to improving my action-oriented competences’ was well below the approval to all other items. This is a somewhat surprising effect since individual components of action-oriented competence were voted very positive. A possible explanation for this effect might be a lack of information on the action-oriented teaching approach. In consequence, insufficient knowledge of the key term resulted in increased disapproval.

**CONCLUSION**

The repeatedly positive student evaluation results encouraged the chair of managerial accounting in its efforts to install latest academic teaching techniques. Obviously, students do prefer action-oriented teaching approaches to traditional teacher-centered approaches, despite perceiving them as much more challenging in terms of individual involvement and workload. Moreover, over-all student perception of the concept being a good preparation for future managerial accounting workplace requirements verifies the achievement of the intended main objective.

**REFERENCES**


