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Enabling IT Professionals to Cope with Technological Change through Skill-based Coaching

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Enabling IT Professionals to Cope with Technological Change through Skill-based Coaching

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The constant advancement in technology poses unprecedented complexity and challenges to companies. Information technology (IT) is at the forefront of this trend. Skills to assess and embrace modern IT are becoming a major factor for innovation and success. IT professionals have to stay either up to date or fail. All professionals working in the IT field are affected by this trend, from the software engineer implementing a new solution to the head of the IT department (Chief Information Officer, CIO). The purpose of this article is to conceptualize skill-based coaching as a new approach for helping IT professionals cope with today's challenges. We conduct two in-depth case studies. In the first case, an agile software development project at a food industry company is investigated. In the second case, a structured teaching and coaching program offered by an university is analyzed. The coaching cube is used to compare both cases. Through measuring a significant increase in skills the suitability of the concept is shown. Based on the results of the case studies, skill-based coaching is conceptually described and explained. Results show that skill-based coaching is a feasible approach to empower IT professionals and enable them to work with modern and future technologies.

1 Introduction

In times of recession and economic instability, companies face unique challenges on a daily basis. For the year 2015 the alignment of a plethora of different devices, people, and tasks as well as the need for innovation will be among the most important and indisputable trends (Andriole 2012). Professionals have to keep track of technological developments and decide if and how to adopt them if they want to cope with these trends. The speed of progress in technology multiplies the complexity and increases the need for personnel with appropriate skills (Bullen et al. 2007). Additionally, professionals permanently have to advance their skill set and consequently develop IT leadership skills (Urff Kaufeld et al. 2009). There is a need to build suitable strategies and plans to meet the future demands that these changes will bring (Atos 2012, p. 11). However, companies are often not able to train their staff on their own; hence, new teaching and coaching approaches are necessary (Boehm et al. 2011b; Stolze et al. 2011).

A trend toward coaching can be observed. In the past five to 10 years more than 30% of all companies – from small micro-firms to global acting enterprises – used coaching consciously or unconsciously (Bax et al. 2011; Stephan et al. 2010). At the same time coaching is seen as a popular method among trainers in terms of single, group, or team

coaching (Joo et al. 2012). In the past, next to strategy or management consulting, coaching established itself as a person-oriented form of consulting service (Bax et al. 2011). Coaching should not only be seen as an advisory service in the context of company-wide change processes but also as the guidance of individual persons in their personal and job-related development (Schreyögg 2003). In contrast to psychotherapy, the target group of coaching is healthy individuals (Bax et al. 2011). There has been an attempt to clarify the roles of coaching, along with a description of coaching models, best practices, and related matters (Witherspoon and White 1996). Even today, coaching is still a field with research opportunity and need. No consensus about the core types of coaching approaches has been reached so far; while Hoerr et al. (2009) discuss three main types, Witherspoon and Randall (1996) suggest four types, for example. Up to now, most research considering coaching has been written from a human psychology perspective, particularly when incorporating psychotherapeutic approaches. Therefore, other disciplines' contributions (such as Information Systems) has been weak, although they would be necessary to derive and develop a more holistic understanding of coaching (Gray 2006, p. 475).

The required skills of IT professionals depend on their specific tasks and also vary over the time of their career (Luftman 2004). Software engineers are required to possess extensive programming experience. An employee working at the IT service desk or an (internal) IT consultant needs more communication skills. Moving up the career ladder, the Chief Information Officer (CIO), as head of the IT department, has to have more managerial competences. Using IT in learning often has been discussed in the literature and in practice (Alavi and Gallupe 2003), but learning the use and application of IT has not been discussed. In addition, technological advancements emerge today with such a high velocity that the individual employee cannot manage these developments on his or her own (Huber and Watson 2013). Accordingly, it has been recognized that:

> *"The IT profession is rather unique in that new developments occur unrelentingly, but older technologies never seem to go away! Even though legacy systems could easily be replaced by newer technologies, the business case for replacing them is difficult to make. As a result, organizations continue to operate systems and applications coded in older (sometimes ancient) languages while interfacing them with newer technology. As long as older technology survives, the need for expertise to manage these technologies remains. Frequently, the most critical skills within the IT professional ranks are those that relate to these older technologies."* (McKeen et al. 2009, Rn. 807)

In many cases IT professionals – especially those working in senior positions – do not have enough time for personal lifelong training, for example to attend a course at a university (Boehm et al. 2013a). Instead, new forms of coaching such as skill-based coaching are more and more applied (Segers et al. 2011). However, a clear understanding of what these approaches look like is missing (Hoerr et al. 2009). Although we conducted a comprehensive literature review, we could not identify any article dealing with the application of coaching within the IT environment. While there are actually career track options, such as, for example, those recommended in the IS 2010 model curriculum (Topi et al. 2010), one can criticize that they are implemented only by very few universities (Bell et al. 2013, Rn. 90). Therefore, new methods and approaches for the development of IT professionals are required (Boehm et al. 2011b).

Conceptualizing skill-based coaching in the IT environment is therefore the purpose of this article. Using the method of case study research (Yin 2009), two cases have been deeply investigated. The results will help other researchers as well as practitioners to bet-

ter understand and apply the concept of skill-based coaching. Our research has been guided by the following questions:

(RQ1) How can IT professionals be empowered to cope with technological change by skill-based coaching?

(RQ2) How can skill-based coaching as a practical phenomenon be scientifically explained?

To answer the research questions, our article is structured as follows. After providing the theoretical background of skills of IT professionals and IT leadership development as well as coaching approaches, we describe our research method, including the research framework, data sources, data collection, and data analysis. In section IV, the two cases are presented by discussing the respective context, processes, and results. A summary is also given for each case. Next, the two cases are critically discussed and compared. In section VI, the results are discussed and our research questions are answered. Finally, a conclusion and outlook are given.

2 Background

2.1 Skills of IT Professionals

Skills are broadly defined as learning basic concepts, strategies, methods, behaviors, attitudes, and perspectives for business success (Gray 2006, p. 478). The term "skill" is often used interchangeably with "competence" (Peppard 2010, p. 98). The difference is that while skills are defined as the ability to apply knowledge and use know-how to complete tasks and solve problems, competencies are the proven ability to use knowledge, skills, and personal, social, and/or methodological abilities, in work or study situations and in professional and personal development (European Parliament and European Council 2011). In short, competence can be conceptualized as the duality of skills (knowledge) and experience (Bassellier et al. 2003).

Skills can be divided into technical (hard) skills and personal (soft) skills. When new IT personnel are hired, soft skills such as leadership skills are becoming more and more important in comparison to hard skills such as programming (Joseph et al. 2010; Groysberg et al. 2011). However, the difficult question to answer is what the appropriate skills are; universities "should impart to enable […] undergraduate students to develop the behaviors and practices they need to succeed, both short term and long term" (Huber and Watson 2013). Model curricula, as for example the ACM/AIS IS 2010 Curriculum (Topi et al. 2010), try to give a (high-level) recommendations in this case. However, teaching soft skills is especially difficult and often neglected. In order to overcome this problem, Huber and Watson (2013) suggest using methods of mentoring, networking, and long-term career development for building soft skills.

A variety of different professionals are usually working within the IT environment. They have different personal backgrounds, education paths, and expectations. McKeen et al. (2009) explored the number and types of IT skills that are important currently and in the future. According to their study, the following roles/titles have been derived:

- "Roles/titles that emphasize business and managerial skills include account/relationship manager, business analyst, business technology specialist, project

manager, senior platform manager, development manager, strategy consultant/manager, and various administrative roles within IT.
- Roles/titles that emphasize technical skills include technical specialist, systems programmer, programmer analyst, network/communication analyst, storage analyst, security analyst, enterprise architect, data architect, developer, quality assurance, database development manager, application maintenance, production support, data mining/analytics, and internet maintenance and development." (McKeen et al. 2009)

It is obvious that there is a great variety of different roles/titles for IT professionals. The list presented above may not even be conclusive. In the last decades, literature often focused on one role: the chief information officer (CIO). She/he is the corporate executive who is particularly responsible and accountable for their firm's IT management practices (Smaltz et al. 2006, p. 207). A lot of research has been conducted, for example, on the role of the CIO in organizations (see for example (Broadbent and Kitzis 2005; Joia 2010; Smaltz et al. 2006; Carter et al. 2011; Grover et al. 1993; Chen et al. 2010)). Researchers also investigate leadership quality and how it affects firm performance (Armstrong and Sambamurthy 1999; Chen et al. 2010; Preston and Karahanna 2009) or career orientations and career paths (Austin et al. 2009; Broadbent and Kitzis 2005; Dawson and Kauffman 2011), for example. However, Smaltz et al. (2006) said that there has been limited empirical research on the CIO role. Therefore, Boehm et al. (2013b) conducted an empirical analysis on skills of CIOs and how they are interrelated. In a first workshop skill lists found in the literature were worked on with eight experts from practice. Twenty-two CIOs from different that industries assessed their skills in the items of the compiled list. Boehm et al. (2013b) found that CIOs have the highest skills in virtualization and management in the information age as well as the highest skills in interpersonal skills, leadership management, and project management. A backlog demand was identified in the fields of coaching, IT training, managing security, compliance and risk, and IT governance. In other studies, client-facing capabilities, such as business domain capabilities (Bullen et al. 2007) or communication skills (Enns and McDonagh 2012) have been identified as important skills for IT professionals.

For structuring the variety of different skills of CIOs, Boehm et al. (2011b; 2013b) developed a framework based on a comprehensive literature review as well as empirical analysis of continuing education offerings and workshops with professionals. The authors constitute that skills are in general highly interrelated. Figure 1 shows the network of different skills by depicting the calculated correlation values between skills. Only the significant links are shown. Three groups of skills have been identified: methodology courses (orange), personal skills modules (green), and up-to-date skills (blue). Management in the Information Age integrates aspects such as Internet economics and management basics as well as consulting methods and approaches. In the field of IS Fundamentals, the basics of IS/IT, enterprise software, business intelligence, and operations research are covered. Enterprise Architecture Management discusses all aspects of Business IT alignment and IT service management. Process-oriented approaches and methods belong to the field of Business Process Management. The IT Consulting skills focus on knowledge and methods related to business and IT advice. Within the field of Managing Security, Compliance and Risk subjects such as IT security, legislation, contracts, and risk management are discussed. Sustainability and Ethics deal with green IT, management ethics, and social aspects of information management as well as intercultural studies. The personal skills cover aspects on interpersonal skills, leadership, and conflict management as well as project management. IT governance, cloud computing, outsourcing, virtualization, (process) modeling,

customer and employee satisfaction, coaching, Enterprise Resource Planning, and IT training are elements of the up-to-date skill set. These skills are also seen as highly relevant for IT professionals in the literature (cf. for example (Chan 2011; Corbett 1994; Ekimci and Ozkan 2009; Groysberg et al. 2011; Urff Kaufeld et al. 2009; Werr 2005)).

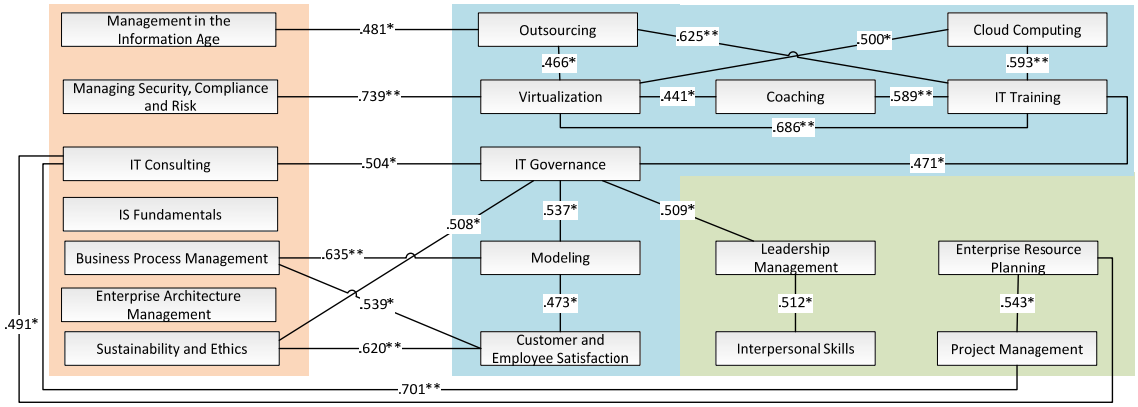

Figure 1. Skill Correlation Network for CIOs (Boehm et al. 2013b)

Boehm et al. (2013b) identified interrelations and found gaps that have not yet been identified (cf. Figure 1). For instance, the relationship between cloud computing and outsourcing is often not seen, and therefore it could be concluded that training is necessary. This gap should be overcome in the future by establishing a better knowledge transfer between research and practice. From these studies one can conclude that there is a demand for new coaching approaches to overcome these gaps and enable IT professionals to cope with their future tasks. One has to note that the study by Boehm et al. (2013b) focused solely on CIOs. However, researchers have not yet analyzed other professionals' roles/titles.

In order to be able to understand the skills that are relevant for IT professionals, it is important to understand the environmental and situational surroundings an IT professional is confronted with every day. IT personnel research views the IT professionals' context as layers (cf. Figure 2) (Ang and Slaughter 2000). Each layer represents a higher level of analysis.

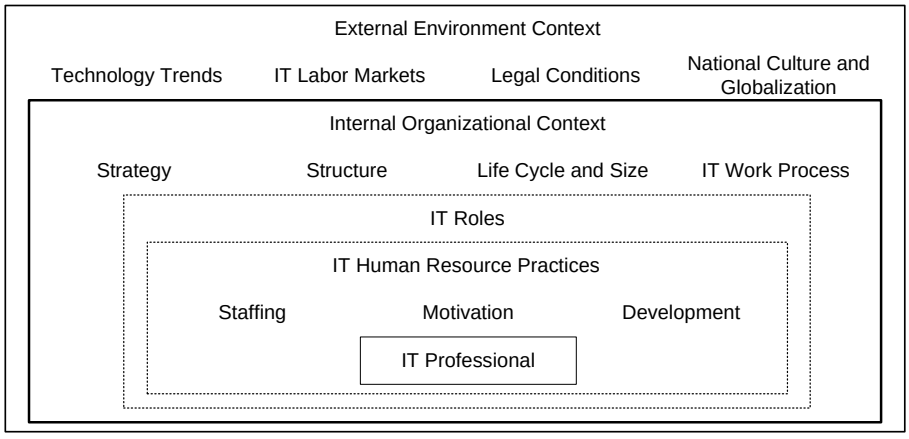

Figure 2. Contextual Perspective of IT Professionals (Ang and Slaughter 2000)

The external context for IT professionals (cf. Figure 2) consists of technological trends, IT labor market conditions, laws and regulations, and national culture and globalization (Ang and Slaughter 2000). Technological trends are, as mentioned above, the most critical aspect for IT professionals because of the fast evolution of IT. Consequently, the relevant skill set for IT professionals also constantly changes. The conditions of the IT labor market affect IT professionals in a way that, due to the proliferation of IT, the demand for highly skilled personnel is high. In the past years, a so-called "war for talent" (Beulen 2008) has been described, meaning that the labor market can be characterized by a surplus of companies offering jobs, and IT professionals can pick a job out of several offerings. However, this situation is not comfortable for both sides because especially highly skilled professionals are rare (Keim and Weitzel 2006). The legal environment also influences the skill set of IT professionals. As technology becomes more and more essential for survival of an organization, questions of liability and governance also become more important. Additionally, the number of disputes relating to contractual issues (for example around outsourcing relationships) as well as the number of governmental regulations has increased [Little et al. Little et al. 1999]. National culture and globalization also affect IT professionals. Today global teams work together on the same IT project across national borders and continents. This is fuelled by the entry of those newly industrialized and developing nations (e.g., BRICS states: Brazil, Russia, India, China, and South Africa) into the global IT market (Ang et al. 2011; Beulen 2008). Global and virtual teams require again another set of skills – predominately communication and leadership skills (Kayworth and Leidner 2002).

Important elements of the internal context of an IT professional (cf. Figure 2) are organizational strategy, structure, life cycle and size, and the IT work process (Ang and Slaughter 2000). Organizations where IT is seen as an utility service run at the lowest cost, and the IT strategy will result in limited opportunities for promotion and career development (Ang and Slaughter 2000). The impact of the organizational structure is similar. Depending on the location of the IT function within the organization, professionals need either broader or narrower skills (Ang et al. 2011). Furthermore, it is obvious that, depending on the stage of the organizational life cycle (start-up, growth, maturity, or decline (Baird and Meshoulam 1988)) and organizational size, the required skill set of IT professionals differs. Finally, the quality of the process of transforming user (customer) specifications into information technologies and systems requires specific skills (Beulen 2008). There is a need for routinized and predictable process as well as a better foundation for the development of client-facing capabilities, such as project management and business domain capabilities (e.g., communication) (Bullen et al. 2007).

In conclusion, the IT professional in the center (cf. Figure 2) does not only have to cope with direct influences such as staffing, motivation, and personal development, but also with external and internal context beyond her/his influence. Additionally, an individual IT professional cannot unite all theoretically existing different skills at a high level in one person. Organizations have to plan their IT staffing on the basis of an analysis of skills that are currently and in future important (McKeen et al. 2009). One possibility would be to map important skills to different time frames while considering specific organizational strategies, the role of IT within the organization, and the technological environment of the organization (Ang and Slaughter 2000).

2.2 IT Leadership Development

The question is how the IT leadership development of professionals who are incorporated into daily operational tasks of ensuring ongoing business processes (Luftman 2004) can be enabled. In general, different strategies for career development are discussed and the selection of the appropriate offering is rather difficult (McKeen et al. 2009; Boehm et al. 2013a). This is true particularly for young qualified professionals in the IT field.

The growing impact of IT decisions on organizations and the complexity of the work to be done imply that all IT professionals should today be expected to act as leaders independently of their official role/title (Smith and McKeen 2005; Silver et al. 1995). The trend discussed as intrapreneuring – meaning personnel behaving like an entrepreneur while working within an organization (Pinchot 1985) – also can be seen as an evidence for this. Empowerment of IT professionals so that they can manage IT-related problems by themselves is also crucial for the success of the company (Shrednick et al. 1992). An effective leadership team is crucial for any IT department to deliver any significant benefits to the organization (McKeen and Smith 2003, p. 295).

IT leadership development is a complex process and does not solely cover the attendance of seminars (Smith and McKeen 2005). IT leaders need a balanced mix of different skills comprising business skills, technology skills, leadership and management skills, organizational and cultural skills, and fiscal management skills (Lutchen 2004). Developing technology skills, for example, requires permanently monitoring new trends and technologies. This is quite challenging because several institutions identify diverse trends that are to be covered in research and practice (Gartner Inc. 2011; Hopkins 2011; Luftman and Derksen 2012). According to Gartner Inc., media tablets in combination with bring your own device (BYOD) strategies, next-generation analytics, and big data in terms of business intelligence as well as cloud computing are among the top 10 strategic technologies (Gartner Inc. 2011). Forrester Research investigated this field by asking 208 IT executives which technologies are most important for their business. According to that study, business intelligence, mobile apps, and business process management are seen as the most valuable technologies (Hopkins 2011). A survey by Luftman and Derksen (2012) of 195 U.S.-based organizations revealed the top 10 IT management issues in 2012. These are, among others, cost reduction, IT and business alignment, business agility, and speed to market. By comparing these three studies one recognizes that, depending on the perspective and applied method, even in this small sample different trends are identified. Only for a small number of trends is there a match between the studies. This makes it even more difficult for IT professionals to get an overview of relevant trends and choose goal-oriented continuing education offerings. In a study, Bassellier et al. (2003) empirically evaluated the connection between skills and experience (summarized as competence) with IT leadership. According to their data, IT competence can be accounted for one-third of the variance in IT professionals' leadership intentions. Urff Kaufeld et al. (2009) investigated the effectiveness of IT leadership. In their study, they found that:

> *"A key attribute of an effective leader was found to be the awareness of and sensitivity to the dynamics of the business environment, the people, tasks and organisational structure, which enables a leader to use particular competencies to invoke the appropriate behaviour or trait. It should be noted that in most cases it is simply a lack of any of these characteristics that make the leader ineffective."* (Urff Kaufeld et al. 2009)

Formal training is seen as the least effective and most expensive way to build better IT leaders [Kesner, 2003]. Enhancing traditional IS curriculum guidelines through active en-

gagement with an industry advisory board is one proposed solution that, however, only makes an impact in the long run (Huber and Watson 2013). Smith and McKeen (2005) suggest a comprehensive leadership development program consisting of (formal) training, processes practice integration, and a supportive environment. Establishing an environment is, according to the authors, the most important aspect but also the most difficult aspect. Well-articulated and instantiated values, a climate of trust, empowerment, clear and frequent communication, and accountability are central constituents of this type of culture. After realizing this environment, the leadership development program has to be integrated into the daily work. Based on these layers of IT leadership development, training can be conducted. More and more, traditional formal training approaches are replaced by new teaching and coaching approaches (McKeen et al. 2009).

2.3 Teaching and Coaching Approaches

Today's coaching is rooted in business life and is most often used there – in contrast to approaches such as supervision (Joo et al. 2012). However, the word "coach" is much older. It was first used in the 16th century to describe a particular kind of carriage that conveyed people to where they wanted to be (Gray 2006, p. 476). From there the understanding of the term evolved toward the personal development sphere. In the 1970s and 1980s coaching conquered the U.S. management spheres as purposeful and development-oriented personnel management. Since the mid-1980s coaching was more and more understood as the guidance of managers through external consultants. In the 1990s the coaching concept gained traction outside the U.S. – for example, in Europe. Differentiation and wide acceptance of different approaches created a booming market. At the same time coaching incrementally developed into a blurred generic term for a multitude of different forms of guidance and training (Böning and Fritschle 2005; Steininger et al. 2009). The typical target of coaching is enabling people to help themselves (Joo et al. 2012). It is not a single event but a continuous process (Witherspoon and White 1996, p. 125). Coaching is applied in miscellaneous situations and settings, such as the delegation of tasks by a manager (Dean and Webb 2011), the implementation of sustainable IT infrastructures (Boehm et al. 2011a), or the restructuring in global companies toward centralized shared services (Westerman et al. 2011).

Often, coaching is discussed as a concept related to mentoring. In the literature, different understandings about this relationship can be found. Kram (1983) defines mentoring as a superordinate concept. She explains that coaching is a part of the career function filled by mentors. Swap et al. (2001) developed a similar understanding based on management and cognitive psychology literature. According to them, mentoring focuses on the transfer of the tacit dimensions of knowledge. Coaching is seen as an extension of mentoring. McKeen et al. (2009) argue that coaching focuses on the improvement of the individual job performance; mentoring covers everything else. They suggest hiring external coaches and performing mentoring internally. In the following, we will use the concept of McKeen et al. (2009) to discuss the concept of coaching.

Teaching and coaching are also closely related. Both target empowering individuals to complete presented tasks with knowledge and skills (Fitzgerald 1992). Often the terms are used interchangeably. However, the basic difference is about the communication patterns: teaching focuses on the presenter, a single person, or group speaking in one way. In contrast, coaching is a two-way communication process between coach and client (Hunter 2006). In any case, teaching and coaching should result in the actual application of the acquired knowledge or skills and thereby changed behavior (Fitzgerald 1992). There is an-

other difference between coaching and teaching. Within coaching there is often less focus on the acquisition of new knowledge and skills rather than in the enhancement of prevailing skills (Hunter 2006). For the teacher, respectively for the coach, comprehensive skills and much practice are required in order to be able to understand the client and unleash his/her potential (Witherspoon and White 1996, p. 125).

In order to structure and to better understand the coaching industry, Segers et al. (2011) developed a framework (the so-called "coaching cube") based on an extensive literature review (cf. Figure 3). The framework offers the three dimensions agenda (what), coach (who), and approaches (how) to characterize a coaching endeavor. While the left cube in Figure 3 shows the complete coaching cube, the right part shows the empirically most likely combinations. The authors identified in an empirical study the 15 most likely to be observed combinations in reality out of the potential 60.

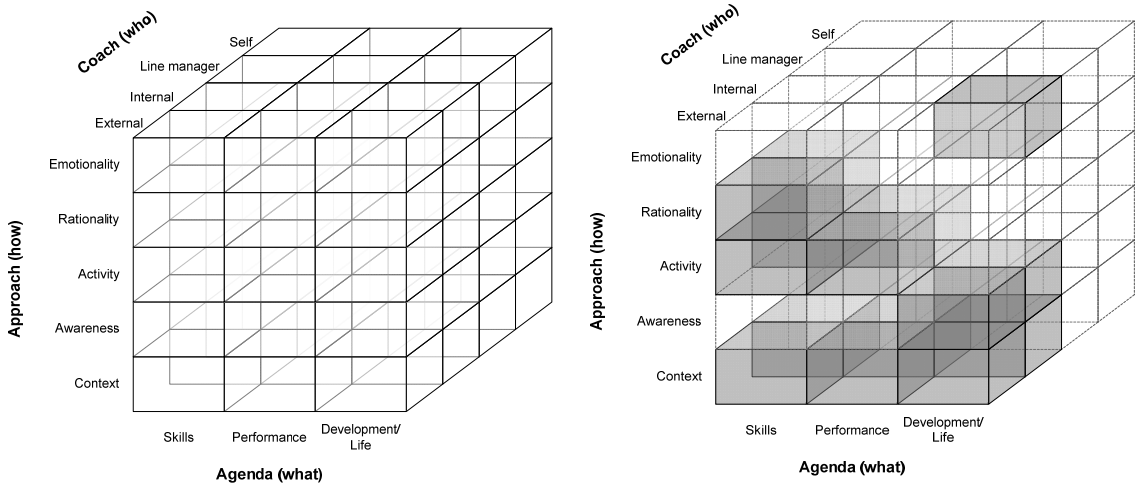

Figure 3. Coaching Cube (left: complete; right: most likely combinations) (Segers et al. 2011)

The coaching agenda (cf. Figure 3) distinguishes a focus on specific behaviors (skills coaching), a focus on an employee's specific performance potential, job requirements, etc. (performance coaching), or a more holistic view with a focus on intimate, personal questions (development or life coaching). The person who provides answers to the questions – namely the coach – can be either an external coach, an internal coach (who is outside line management), or a line manager. Additionally, self-coaching is included as a possibility. The approaches to coaching have been categorized based on the Emotionality-Rationality-Activity-Awareness-Context (ERAAwC) model from L'Abate (1981):

- Emotionality: Focus on the importance of experience and personal feelings.
- Rationality: Focus on rational-emotive and reality-oriented approaches stressing the importance of logical processes.
- Activity: Focus on activity, observation, modeling, and rewards.
- Awareness: Focus on emphasizing mediation, drawing, guided imagination, role plays etc.
- Context: Focus on paradoxical assignments, organization setups, or process observation.

As described above, Segers et al. (2011) distinguish between skill, performance, and development/life coaching as approaches. In the literature, other categorizations have also been described. Hoerr et al. (2009) present three main types of coaching:

- *Intervention coaching* occurs when the individual is thought by others to be in need of improvement and development by means of an intervention.
- *Development coaching* is when an individual really seeks to develop and grow himself or herself in a certain area or in multiple areas or in new roles.
- *Skill-based coaching* occurs when an individual actively pursues a coach in order to learn new skills.

Witherspoon and White (1996) suggest four types:

- *Coaching for skills*, with a focus on specific skills required for a current job;
- *Coaching for performance*, with a broader focus on a present job;
- *Coaching for development*, focused on learning for a future job;
- *Coaching for the executive's agenda*, directed on learning broadly related to the executive's own interests.

The main difference between skill-based and other coaching approaches is what should be changed (Witherspoon and White 1996). Many forms of coaching aim at the development of new behavioral patterns of the coached person. Examples for this are overcoming performance issues, the pursuit of a person's own agenda, or personal development. Skill-based coaching approaches focus more strictly on the development of certain, defined skills. Although critics sometimes argue that skill-based coaching does not have the same long-term effect as other forms of coaching (Gray 2006), the skill gained can make a crucial difference for the client. Additionally, skill-based coaching can be often found in practice but has not been investigated in depth so far (Segers et al. 2011).

3 Research Method

3.1 Research and Methodological Framework

Research in information systems can be characterized as pluralistic in terms of models and methods used for research (Banville and Landry 1989, p. 58). There is a rich tradition in the IS discipline especially concerning qualitative research (for example (Kern and Willcocks 2002; Mingers 2003; Remenyi and Williams 1996; Silverman 1998; Lee 1989)). Among methods of qualitative research, case study research is most widely used because of its suitability to understand the relationship between technology, innovation, people, and organizations (Darke et al. 1998). However, applying this method in the field often shows practical difficulties. Often case studies lack rigorousness (Dubé and Paré 2003). In their comparative analysis of 85 case studies, Sarker et al. (2012) found out that in one-third of the cases only a very generic justification for selecting case study research is given. Furthermore, more than half of the articles utilize only one case unit.

In other disciplines such as, for example, engineering and design, which are closely related to IS, case study research is especially employed to investigate practical phenomena to derive theoretical constructs (Boehm and Thomas 2013; Sarker et al. 2012). For the same reason, we chose to employ a qualitative methodological approach based on two case studies. Unlike a hypotheses-testing deductive approach this inductive procedure will help

us to investigate the field in depth and generate theories for later testing (Eisenhardt 1989). In the exploratory context of our research, we regard case studies as the best-fitting method to explore the topic at hand.

The empirical inquiry within case study research examines a present phenomenon in depth and within its real-life setting (Yin 2009). Several researchers advocate this methodology for investigating actual events, including organizational and managerial processes, because it allows the researcher to retain the meaningful and holistic characteristics of real-life events (Darke et al. 1998; Yin 2009). Although there may be a lack of generalization by using this methodology, it is a relevant tool for the identification of heuristics, emergence trends, or weak signals, which a more quantitative approach could not disclose (Jick 1979).

For analyzing teaching and coaching approaches, a comprehensive review model is necessary (Alavi and Gallupe 2003). A conceptual framework is the starting point for case study research (Yin 2009). Therefore, we elaborated a research framework (cf. Figure 4). We adopted the model of Alavi and Gallupe (2003), which is originally based on the Virtual Learning Environment model by Piccoli et al. (2001). Accordingly, the human dimension (administrators, participants, and instructors) and the design dimension (content, technology, interaction, etc.) are the major dimensions for assessing the educational success.

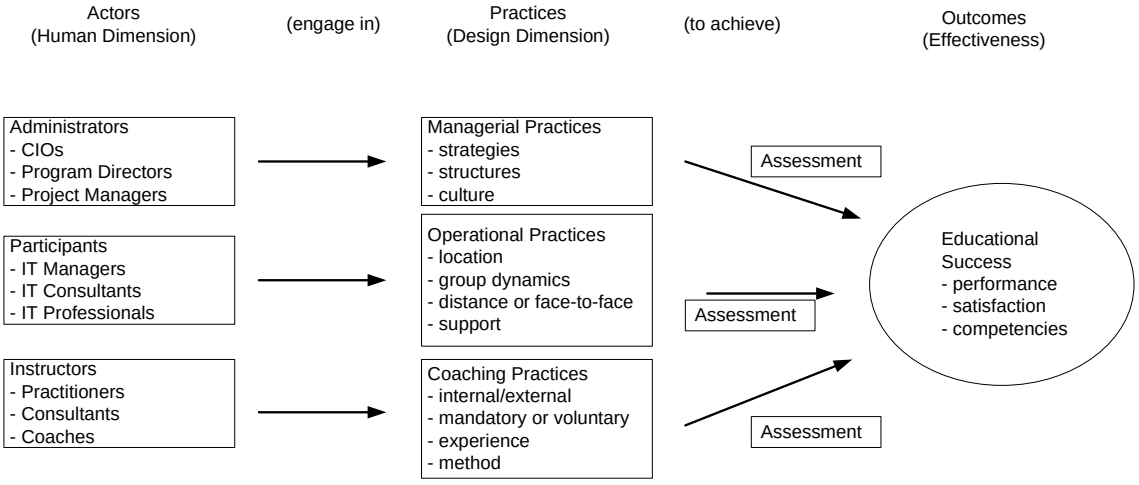

Figure 4. Research Model

The first set of participants consists of administrators who are involved in managerial practices. They are confronted with the need to develop strategies, create support structures, and adjust organizational cultures that enable a teaching and coaching initiative to be successful.

Participants are all kinds of IT managers, consultants, and other professionals who work in the respective context. They have various learning styles and demographic backgrounds. Participants have different expectations concerning their learning experience. Because of the heterogeneity in this group it is difficult to understand their requirements concerning skill-based coaching. Operational practices such as the question of the right location, group dynamics, distance or face-to-face meetings, and support issues are a concern for participants.

Instructors design and deliver skill-based coaching approaches to participants. Developing new coaching material, implementing assessment techniques, and delivering new approaches are the main tasks of these instructors. They cover coaching practices such as,

for example, the question of internal/external coaching, mandatory or voluntary courses, and the experience of participants as well as the selection of the right method.

Based on our research model (cf. Figure 4) we decided to analyze skill-based coaching from three perspectives: management, operations, and coaching. Additionally, we highlight the importance of the assessment perspective in order to ensure educational success in terms of performance, satisfaction, and competencies. To be able to derive significant information, we decided to conduct long-term analysis, meaning that in each case at least one year of investigation was planned.

3.2 Data Sources and Case Selection

Deriving a clear sampling logic for case selection is essential for ensuring theoretical relevance and substantive significance of the research (Dubé and Paré 2003). The selection process should not rest entirely on convenience or ease of accessibility (Yin 2009). Based on these recommendations, we developed the following rationales for our research process:

- Ability to answer research questions: The case study sites have to be able to deliver valuable data for answering our research questions. Therefore, it is necessary that skill-based coaching is actually applied in the specific setting for a sufficient period.
- Appropriate basic conditions: The circumstances in which the cases take place have to be appropriate for delivering usable data. Organizations should have a sufficient firm size and number of employees.
- High variety of sites: For ensuring a higher generalizability of the results, case sites should be different. This also helps to show the broad possible areas of application of skill-based coaching.
- Facilitating of cross-case analysis: Case sites have to be comparable in terms of research period, available resources, level of analysis, and personal contact. A meaningful cross-case analysis (Yin 2009) should be possible based on the available data.
- Relevant topic: Cases have to cover highly relevant and up-to-date topics of the IS discipline. This rationale aims to ensure the relevance of the derived research results.
- Privileged and long-term contact: In order to deeply analyze skill-based coaching, a privileged contact to all stakeholders and subjects of investigation is required. Access restrictions have to be minimized. Additionally, a personal and long-term partnership with the respective institutions is helpful.

After setting up the rationales, possible case sites were searched for and discussed among the researchers. Finally, we decided to use two cases that all fulfill our requirements. Table 1 gives an overview of the two cases and explains why they have been chosen. Within the first case, we intensively investigated a software development project at an industry-leading German food retail company. For more than one year, we were actively involved in the project and therefore got a deep look into all developments. This case represents a classical field for IS research in which a strong need for better processes because of problems with classical methods such as the waterfall model have been observed (Kitchenham et al. 2009). In order to show the broad applicability and variety of settings of skill-based coaching, we searched for a second case. In the case we have chosen, a structured teaching and coaching approach is conceptualized and implemented by a university. We worked together with the responsible people and accompanied the project for nearly two years. Although this case covers a combined teaching and coaching approach, the core idea of it is

based on the principles of skill-based coaching. Therefore, the case has been included in this study. The combination of teaching and coaching in the second case is therefore very suitable to show the broad range of applicability of skill-based coaching.

Table 1. Rationales for Case Selection

	Case SISDEV: Agile Development with Cutting-edge Technologies	*Case IC: Structured Teaching and Coaching Program*
Ability to answer research questions	Skill-based coaching is applied in a software engineering project.	Skill-based coaching is utilized in conjunction with a structured teaching approach.
Appropriate basic conditions	Project takes place in international leader in food retail. The organization has 3,500 employees.	IT professionals who participate in the program come from a variety of different organizations from various industries. The program vendor is a major German university.
High variety of sites	Focus on a classical software engineering project.	Focus on a new teaching and coaching approach.
Facilitating of cross-case analysis	Research period (1-2 years), available resources (interviews and documents), level of analysis (in-depth investigation), and personal contact are comparable.	
Relevant topic	Software engineering as a classical field within the IS discipline (Kitchenham et al. 2009).	Continuing education as a field of IS research that has gained more and more importance over the time (Steininger et al. 2009).
Privileged and long-term contact	The authors had direct personal contact to the internal CIO and the project team as well as the external coach.	Program took place in close proximity to the authors. Direct connection was established to the program vendor.

3.3 Data Collection

The period of intensive data collection lasted from December 2010 to December 2011 for Case SISDEV and from January 2011 to January 2013 for Case IC. Multiple data collection methods have been utilized during those time periods aiming at exploiting the synergetic effects of combining them and investigating a specific concept from different perspectives (Yin 2009; Capaldo 2007). This procedure is also called triangulation (Webb et al. 1966; Jick 1979). Three main sources of evidence were utilized:

- Focused Individual Interviews: We interviewed all involved stakeholders including project managers, team members, software developers, consultants, and coaches. Hence, all levels of hierarchy within the area are represented. The interviews with key stakeholders lasted between 60 and 90 minutes and were based on an interview guide, which consists of structured and unstructured questions. Conversations have not been recorded in order to ensure a natural manner. Researchers took notes during each interview and typed the transcripts immediately after each interview. Although we acknowledge that recording and transcribing increases the credibility and auditability of a study (Sarker et al. 2012), we have – similar to Silva and Backhouse (2003) – a clear reason: Interviewees might not feel comfortable talking about their personal skills and related issues in the organization knowing that they would be

taped. Follow-up questions were explored through a combination of face-to-face interviews and telephone conversations. In total, 10 individuals were interviewed in Case SISDEV and 43 interviews in case IC.

- Observation: We were able to directly observe actions of all stakeholders throughout numerous field visits. This included, for instance, observing the working procedures. Each visit lasted for at least three days and included at least two researchers. With this, in-depth observations could be made, which were used to gain an appreciation of how skill-based coaching works in practice. At both sites we attended periodic meetings, programming sessions, and – in case IC – also the actual events. Extensive field notes were taken by each researcher.
- Documents: We gathered several materials incorporated as supplementary sources of evidence produced by and about the case companies, including digital publications, CD-ROMs, catalogs, and minutes of meetings. Further information was gathered from the Internet, business press articles, and industrial journals. This documentary information helped us to reconstruct each case study setting in great detail.

Throughout the data collection process, all records have been maintained in a structured database. Notes from the interviews, field observations, and document studies have been taken independently by each attending researcher. Furthermore, it is important to note that all involved partners from both case sites developed a close relationship to the researchers and consequently even senior management, including the director, were favorably disposed toward collaborating with the team.

3.4 Data Analysis

The task within data analysis is to process the collected empirical material (Sarker et al. 2012, Rn. 8). As is typical in inductive research (Eisenhardt 1989), we adopted an interpretive approach for the analysis of the data (Klein and Myers 1999; Walsham 1993). All transcripts, documents, and field notes have been read in order to derive issues and themes related to skill-based coaching. Hereby, the researchers proceeded to the first step independently of each other. Next, all authors conjointly developed a draft report of the findings. This preliminary version of the case studies was shared with key stakeholders of the respective cases. The feedback we received from discussing the draft reports with them was incorporated into the final case study. By doing so, we completed the hermeneutic circle (Klein and Myers 1999). Informants of the case sites approved each case report for the second and last time.

Next to the case studies, the researchers also maintained individual summaries of each case including a synthesis of the skill-based coaching concept. In the next phase, authors developed individual preliminary propositions concerning the conceptualization. Then results were combined and used to compare them with existing literature to sharpen the insight. In case of conflict, an unbiased third academic researcher settled the dispute.

3.4.1 Research Reliability and Validity

As with any qualitative research, case study research should provide readers with some assurance regarding the reliability and validity of their analysis (Sarker et al. 2012). In order to enhance the rigor and validity of the study, we followed the principles of case study research. The literature described several useful guidelines (Creswell and Miller 2000; Gibbert et al. 2008; Yin 2009): triangulation (using multiple methods), maintenance of a clear chain of evidence (maintaining a database with traceable information), use of multi-

ple sources (research-based on more than just one kind of source), or relevance of the research (focusing on important topics). These guidelines have been implemented using our rationales for selecting cases and our utilized main sources of evidence (cf. the respective sub-sections of this section). Nevertheless, as Lee (1989) already emphasized, case studies in IS research have four basic problems:

1. How to make controlled observations
2. How to make controlled deductions
3. How to allow for replicability, and
4. How to allow for generalizability.

Concerning the first problem, Lee (1989) argues that case research often does not ensure controlled observations using, for example, laboratory or statistical controls. We tried to solve this issue by using natural controls. We interviewed the same people in their different roles. By doing so, we could hold one factor (people) constant and vary the situation. With respect to problem two, we derived controlled deductions, for example, involving verbal propositions. Based on this, we can describe logical deductions. Problem three presents an obvious difficulty, because any observed situation in the real-world setting is highly unlikely to recur. Therefore, other researchers might not verify the findings of our concrete cases. The solution for this problem is – according to Lee (1989) – that the other researcher could apply the same methodology and theories in a different case site. Hence, although the case study itself is not replicable, the case study's findings are. Finally, generalizability is the fourth problem. Sarker et al. (2012) argue that findings are not generalizable, but the theory or the concepts can be applied to other settings. Therefore, we tried to acknowledge the limited generalizability but tried to balance this disadvantage with the other advantages of qualitative studies.

Gibbert et al. (2008) emphasized that case studies need to reveal internal validity, external validity, construct validity, and reliability. In Figure 5 the applied principles in conducting our case study research are summarized.

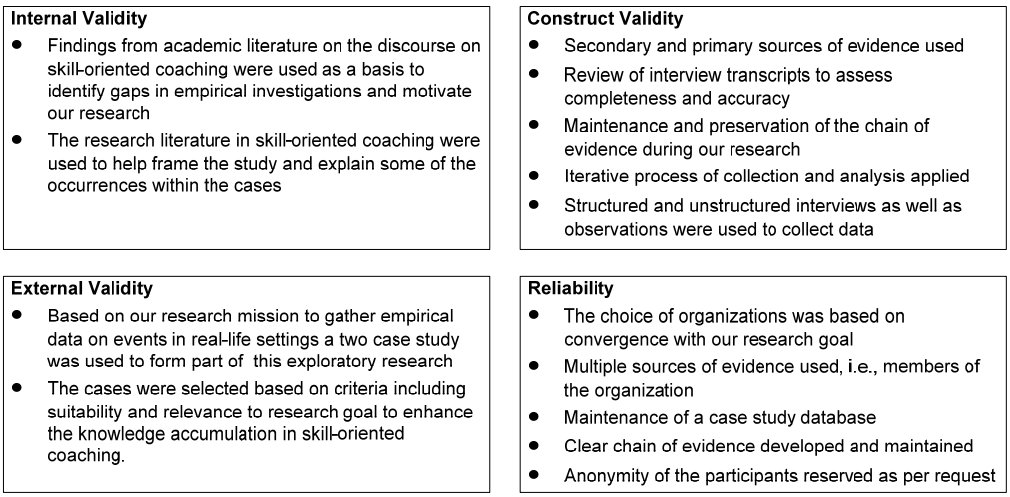

Figure 5. Applied Case Study Principles

Especially the validity of case research has to be ensured. Therefore, we utilized the six principles proposed by Klein and Myers (1999) to validate our research. Table 2 shows how our research stands against these criteria.

Table 2. Validation Criteria

Criteria by Klein and Myers (1999, p. 72)	*Our Research*
1. Hermeneutic Circle All human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form.	By using an iterative process of draft preparation and approval through key stakeholders, the hermeneutic circle can be seen as completed.
2. Contextualization To make sense, the interpretations require the historical and social context.	Before visiting case sites, the respective contexts have been studied and analyzed using various documents. The context of each case is presented in the results section.
3. Interaction between the researchers and the subjects The subjects of the interviews are offering their interpretations of the phenomenon under study. The social interaction between researcher and interviewees influence the study.	Close personal contact with the stakeholder was established during the field studies. Interview partners have been carefully selected based upon our knowledge of the historical and social context. To complement interview transcripts, we used field notes from observations and other documentary sources.
4. Abstraction and generalization The generalization of particulars to abstract categories; generalization to social theories.	Interview guidelines and other mechanisms ensured comparability and generalizability of the field work. Applying our research framework to the case studies facilitated the general conceptualization of skill-based coaching.
5. Dialogical reasoning The confrontation of the original assumptions and preconceptions.	Drafts of the case studies were shared and discussed with informants. The authors incorporated these comments into the preliminary versions of the cases. The final descriptions have been approved by key stakeholders.
6. Multiple interpretations The relationship among context, power, social actions, and intentions.	Statements of different people working in different roles were complemented with our data field notes and other documents. This ensures the coverage of multiple interpretations.
7. Suspicion The unraveling of distortions created by the political, social, and historical contexts of the subjects.	Discussions with different types of people help in getting a comprehensive picture. During interviews we investigated different interpretations.

4 Research Findings

We conducted qualitative case studies to explore the context of skill-based coaching and its outcomes. In the following we present the two selected cases, SISDEV and IC. Following a brief description of the cases, we explore the facets of skill-based coaching by presenting the process. Results are also depicted for each case site.

4.1 Case SISDEV: Agile Development with Cutting-edge Technologies

4.1.1 Context

The first case, SISDEV, is about the development of a Sales Information System (SIS) within a 3,500-person-strong food retail company. The development goal was to enable the company's sales force to retrieve, edit, and create all relevant information about sales conditions within the highly complex and dynamic structure of the German food retail industry. These conditions are – for most customers – mutually nested discounts and abatements. Therefore, the system's specifications were not obvious from the start, but rather had to be discovered through a comprehensive functional and technical analysis. From a technical perspective, the system had to be integrated into the existing and future Enterprise Resource Planning (ERP) environment for invoicing and accounting.

Several different IT professionals were more or less explicitly involved in the project. The CIO of the company was mostly concerned about introducing a new company-wide ERP system. The lead of the SISDEV project was handed over to its deputy, who also ran the IT department's newly established project office. The CIO therefore did not have any formal role within the SISDEV project. Although this structure looked straightforward, it was never exactly defined where the borders between the project office and the main IT department were. Also, the skill sets of those involved were not clear at the beginning. Therefore, before conducting the actual coaching, we determined the actual skill level of those supposed to work on the SISDEV project through observation.

What was most problematic was the lack of flexible and agile procedures and knowledge of modern cutting-edge programming approaches within the IT department. Over many years its employees had gotten used to their daily routine work without considering new procedures, software development approaches, or programming languages. Another contributing factor to the misery was the fact that external service providers and consultants succeeded in selling products or services to the company that did not perfectly fit the company's needs. A lack of ability to steer these providers was identified. The CIO, for example, started his career in another field and was therefore not a trained IT professional, while his deputy did not have any previous experience with a project of this scale. Besides, the IT department offered only limited customer orientation toward the other departments within the company. Thus, the historically grown legacy system landscape made it difficult to meet current requirements. Finally, the lack of long-term oriented IT decision making became obvious when no long-term impact monitoring could be found. In general, updated IT management skills were strongly required.

Throughout our observation we focused on 10 stakeholders in the project: Besides the CIO and the vice CIO, we interviewed and monitored the actions of two end users, two external coaches, and four software developers/members of the IT department (cf. Table 3).

Table 3. Overview on in-depth monitored/interviewed Project Stakeholders

No.	*Project Role*	*Position*
1	-	CIO
2	Project Manager	Vice CIO
3	End User 1	Sales Department
4	Coach 1	External Consultant
5	Developer 1	Software Developer / IT Department
6	Developer 2	Software Developer / IT Department
7	Developer 3	Software Developer / IT Department
8	Developer 4	Software Developer / IT Department
9	End User 2	Sales Department
10	Coach 2	Software Engineering Consultant

4.1.2 Process

At the start of the development endeavor a "classic" waterfall model was chosen: requirement analysis, design, implementation, verification, and maintenance follow a strict procedural fashion (Royce 1970). Due to uncertainties and changes in the requirements specification, it took nine months from the initial requirement analysis until a first running version of the software was deployed. Although the analysis was conducted in depth – at least half the time had been spend on it – the result was not satisfying at all: The implemented SIS had insufficient response times. End users described the usability as "laborious" and "not task-compliant." The IT department (especially Developers 1 and 3) evaluated the application as "hard to maintain" because of its complex use of hard-wired code fragments between different application layers in different programming languages.

Though SIS was deployed and used productively, there was still a need for a preferably quick but sustainable replacement – especially for the user-facing front end. When project results were evaluated, the insight that a classical, plan-driven approach is not appropriate for dealing with uncertain and changing requirements regarding functionality and usability became obvious. Thus, a different methodology was contemplated.

An external consultant was employed as a coach. A skill-based coaching for agile software development approaches was chosen in order to handle this specific situation. Agile software development relies on a different opinion on how software development should be realized. Instead of creating big, upfront requirement specifications, the process of software development and the software product itself is assumed to be unpredictable. In contrast to traditional, plan-driven approaches change is welcome and supposed to support the customer's competitive advantage. Extreme Programming, Scrum, Adaptive Software Development, and Feature Driven Development are common examples of methods following this new paradigm. They all embrace the principles laid down in the Agile Manifesto, which relativizes the established fundamentals of traditional approaches (Cunningham 2001):

- Individuals and interactions over processes and tools,
- Working software over comprehensive documentation,
- Customer collaboration over contract negotiation, and
- Responding to change over following a plan.

Within four weeks of coaching a small team of four developers achieved the re-implementation of a new SIS front end from scratch using agile methods. Delivering half-

baked but runnable and testable pieces of software at short time intervals (rapid prototyping) ensured early and continuous end-user feedback. This practice helped to meet their special requirements regarding response times and usability.

After this promising result on the end-user side, the project manager investigated how to improve the back end components as well. Eventually, instead of reusing the just re-implemented front end, a radical restart was chosen. An external software engineering consultancy provided a holistic skill-based coaching into the agile technology Ruby on Rails. Workshops were used to teach fundamental knowledge in system design and programming, using the latest technologies and tools to exemplify the educational content. Based on this, the coaches supported the participants in transferring the learned theoretical skills to a real situation that was given by the SIS project. While workshops were performed as typical lecture sessions, the practical coaching was done in one-on-one sessions using the technique of pair programming. Following this approach, the team implemented the software within six weeks. Thus, not only the acquisition of knowledge but also delivering a solution for a real problem in that particular company was achieved.

The integrated SIS solution is currently actively used in mission-critical areas. It proved to be sustainable in terms of changeability and enabled the skill transfer to all members of the software development team.

4.1.3 Results

The application was completely implemented and put into operation six weeks after the decision had been made to develop it from scratch.

> *"We first could not believe that it would be possible to rewrite a system as complex as SIS so quickly from scratch." -- A developer*

All requirements were satisfied thanks to continual and timely feedback. In addition the end users' satisfaction increased because of their involvement in the development process.

> *"What we all asked ourselves in the sales department was: Why did the IT department not go for this solution in the first place? Why did they not show us prototypes earlier? Then the disaster of the first attempt could have been avoided. We know our requirements are complex but we know if they are satisfied when we see an actual piece of software rather than some PowerPoint deck." -- An end user*

Finally, the system was handed over to the company's IT department, which is now able to maintain and expand the system effectively and efficiently, because the software development project also provided training for the business' own software developers. From an economic perspective the project reduced costs not only due to increased end user productivity, but also by getting rid of licensing fees. All used technologies are open source and subject to permissive licenses such as the MIT license. Thus, the typical lock-in-effects of proprietary software could be avoided.

> *"Honestly, I am still surprised about the successful and quick reimplementation without using big-name, big-cost tooling." -- The CIO*

From a skill perspective a change in skill levels could be observed. In order to quantify this, the involved stakeholders of the project have been asked to document their skills using a questionnaire. Based on a self-assessment method (Vygotsky 1962), skills before and

after the project have been recorded on a scale from -2 (deficient) to +2 (very good). Results are depicted in Figure 6. The most significant changes can be documented with respect to project management skills and, interestingly, in sustainability and ethics. The subsequent skill increase essentially comes from the larger feeling of ownership among the programmers as well as the users. Together they were not only working on some tool, but they were also working on "their" tool and wanted to make it as long-lasting and socially acceptable as possible.

> *"For me this is also a personal success story. I always believed that change must have been possible, but did not know how to achieve it. With the help of the coaches we could get there. I am also proud of my team and the whole IT department. It evolved in a great way, but we still have a long road ahead to become the 21st century workplace I imagine."* -- *The Vice CIO*

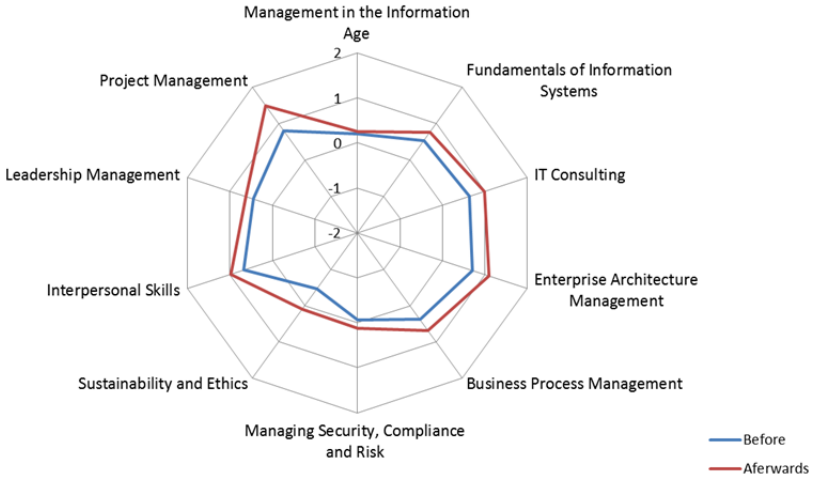

Figure 6. Observed Skill Levels Before and After Coaching

4.1.4 Summary

The skill-based coaching approach provoked a complete 180° turn of the SIS project. Instead of following traditional approaches, the involved people focused on their skills and then searched for an appropriate technology. Coaching by the involved consultancies enabled and empowered the company and its IT department. The previously identified deficits of skills have been clearly lowered although they have not been completely removed yet. In future, more coaching is necessary to do so.

4.2 Case IC: Structured Teaching and Coaching Program

4.2.1 Context

The permanent change in business and IT is a challenge for all companies. Small and mid-sized enterprises (SMEs) especially have to cope with this volatile environment because they do not have the resources to manage extensive training programs on their own. Instead they need to get ready-to-use knowledge in a way that does not distract employees from their job. At the same time universities should foster the exchange and invention of new ideas. The transfer of IT knowledge into SMEs has been politically advocated and has

especially led to the development of a structured teaching and coaching program in the IC case.

In principle, the program that was intensively investigated for this case worked as follows: A structured teaching concept was developed and offered in cooperation with members of a university and successful CIOs. IT professionals from different industries and personal backgrounds participated. After several presence meetings, phases of coaching were conducted in which personal development is emphasized. An online platform was developed that facilitated contact among participants and coaches (CIOs and university staff). Based on a comprehensive state-of-the-art analysis, the parties conjointly created a platform for skill-based coaching in which the taught skills are derived from experience. Coaching is an integral part of the concept because teaching lessons are only seen as a trigger for personal development.

We were able to observe the whole process of concept development and implementation. We interviewed coaches and participants over a two-year period (cf. Table 4). Field notes were taken during meetings. Usage of the online platform was also analyzed. Finally, documents that have been used for developing the program have been investigated. Over the two years, the program has been offered successfully twice.

Table 4. Overview on Experts

No.	*Role*	*Position*	*Size*	*Industry*
1	Participant (1st round)	IT consultant	4.950	Consulting
2	Participant (1st round)	CIO	200	Machinery and plant engineering
3	Participant (1st round)	Department head of Systems Engineering	70	IT services
4	Participant (1st round)	CIO	151	Timber processing industry
5	Participant (1st round)	IT consultant	1.500	IT services
6	Participant (1st round)	IT consultant	1	IT services
7	Participant (1st round)	CIO	30	Timber processing industry
8	Participant (1st round)	Developer	100	Food industry
9	Participant (1st round)	Project manager	200	Consulting
10	Participant (1st round)	Developer	121	Food industry
11	Participant (1st round)	IT consultant	2	Consulting
12	Participant (1st round)	Software support	19	IT services
13	Participant (1st round)	CIO	650	Machinery and plant engineering
13	Participant (2nd round)	CIO	2.100	Machinery and plant engineering
14	Participant (2nd round)	CIO	3.500	Food industry
15	Participant (2nd round)	Developer	19.000	Publishing industry
16	Participant (2nd round)	IT project manager	1.500	IT services
17	Participant (2nd round)	CIO	90	IT services
18	Participant (2nd round)	Vice CIO	3.500	Food industry
19	Participant (2nd round)	Business Development Manager	350	Automobile industry
20	Participant (2nd round)	Project manager	19.000	Publishing industry
21	Participant (2nd round)	CIO	230	Machinery and plant engineering
22	Participant (2nd round)	CIO	30	IT services
23	Participant (2nd round)	Solution Architect	10.000	Logistics

24	Participant (2nd round)	CIO	450	Automobile industry
25	Program provider	University staff	16	University
26	Program provider	University staff	16	University
27	Program provider	Project manager	16	University
28	Coach	Lawyer	34	Law
29	Coach	CIO	21.767	Automobile and defense industry
30	Coach	Personal coach	1	Consulting
31	Coach	IT project manager	14	IT services
32	Coach	IT administrator	200	E-commerce
33	Coach	CIO	840	Food industry
34	Coach	CIO	10.000	Logistics
35	Coach	CIO	3.210	Automobile industry
36	Coach	CIO	12.342	Machinery and plant engineering
37	Coach	CIO	350	Insurance
38	Coach	CIO	150	Financial services
39	Coach	Vice CIO	200	IT services
40	Coach	CIO	600	Research
41	Coach	CIO	1.200	Insurance
42	Coach	IT project manager	326.000	Machinery and plant engineering
43	Coach	IT project manager	76.400	IT services

4.2.2 Process

The observed process for concept development and implementation was defined by a procedure model. The project team had previously developed this model as a guiding plan for the project. The procedure model consists of supporting activities and core activities. Project management and quality management support the project and ensure overall success. The core activities while setting up an integrated course consist of three phases: initiation, formal teaching and coaching, and post-teaching. Within the initiation phase, an analysis of the state of the art takes place. The course is conceptualized and finally set up. This last activity is the bridge to the formal training and learning phase, which consists of the *4E-Circle of Teaching and Coaching*. Enrollment, execution, evaluation, and evolution are now run in cycles. Marketing activities, registration of participants, and other organizational activities have to be done within the enrollment. The execution contains the actions of teaching and coaching. Within a teaching phase, practical information is presented to participants and discussed. Through this, a self-coaching phase starts in which new input can be used in daily business. While evaluation captures all activities related to the assessment of the modules, the evolution activity ensures that all stakeholders improve the approach constantly. If the actual teaching phase is over, a lifelong self-coaching and the application of the taught skills has to be ensured within the post-teaching phase. Methods for doing so have to be discussed in the previous phase and are now applied. Parallel to the core activities, comprehensive documentation takes place. This is necessary, because other institutions and universities should also be able to implement the approach.

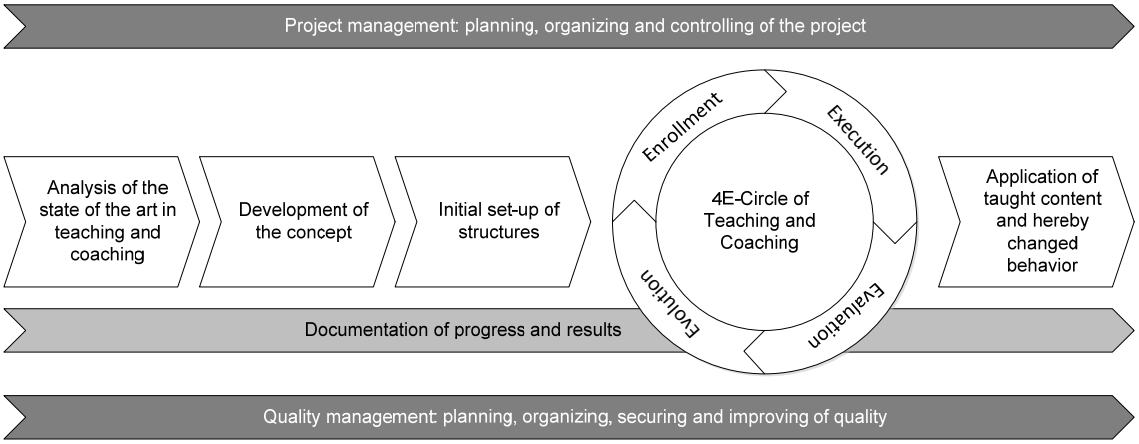

Figure 7. Procedure Model of the Teaching and Coaching Program

In general, universities offer many different courses to various students. These courses are mostly taught by professors or other faculty members. Next to "normal" graduate and undergraduate courses there are also courses targeted at IT professionals. What is problematic is that in many of these courses professors teach the same content they use for normal students. The unique characteristic of the new teaching and coaching program is that the lecturers are practitioners. However, the selection of these lecturers is very difficult. Only those practitioners should be chosen who have proven the success of their projects. Within the IC case, only those practitioners were selected who won industry prizes for their work. Using these people has two advantages: Firstly, they have demonstrably proven their success and, secondly, they are people who are able to present themselves and their work in a professional way.

The selected practitioners have worked together with faculty members to prepare their insights from practice for teaching other practitioners. The addressed skills in each module have been derived based on input from the practitioners as well as based on the literature. Figure 8 shows exemplary documents that were used in the development phase and that were also analyzed by the authors of this article. Module descriptions of continuing education offerings for IT professionals were utilized. In addition, a framework that was developed by the program directors provided more insight into the market. Based on these documents, the structured teaching and coaching approach was developed and implemented. The university team ensured the appropriateness of content and methods. By doing so, unique information and best practices could be shared. Even better, lecturers could also learn from the participants through intensive discussions. The following list shows some exemplary topics that were taught:

- Holistic approach of IT management,
- Cloud computing – legal aspects and company development,
- Implementation of process management in change projects,
- Social business strategies,
- ERP consolidation and harmonization, and
- Coaching methods for IT professionals.

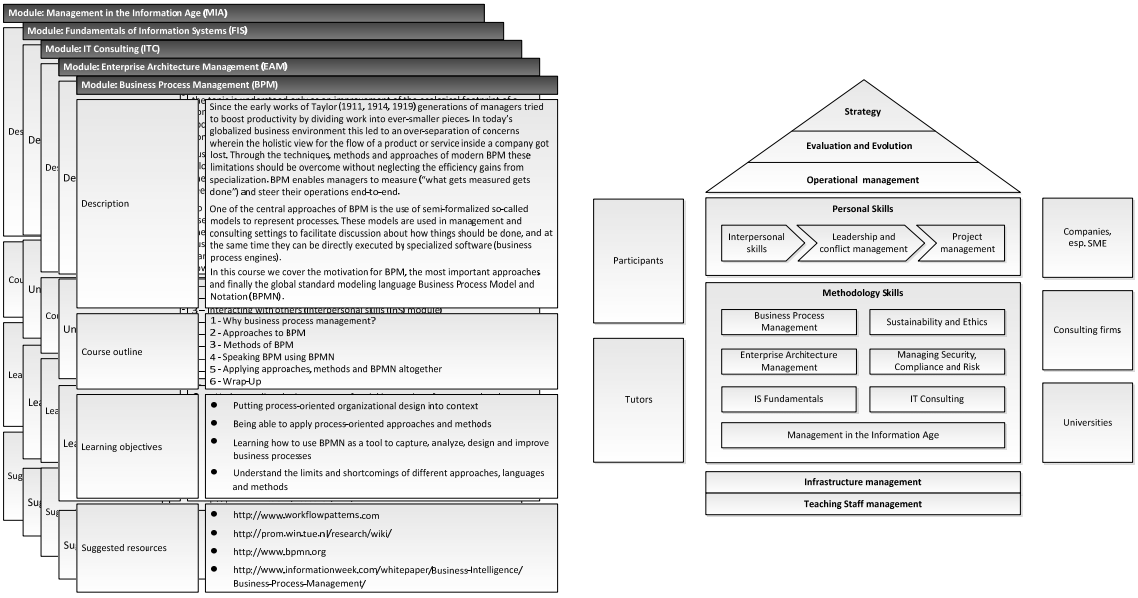

Figure 8. Exemplary Documents (left: module descriptions, right: framework)

The new teaching and coaching program was executed as follows: For eight consecutive weeks, the class met on an evening (usually from 5:30 pm to 9:00 pm) once a week. After the participants were welcomed, the main session started at 6:00 pm with a presentation by the lecturer. After the presentation the format shifted to an open discussion round. The whole session took in most cases two hours. Afterwards, all participants went to another room to get some distance from the learning environment. Hors d'oeuvres were served. Then a second, important phase of the evening started. Networking among participants, between participants and lecturers, and between faculty members and all other actors took place. Another important part of the program was the virtual learning environment. Here, all actors could discuss questions, download all relevant files, and get further information on the discussed topics.

After the presence sessions, participants were asked to adopt the taught content in their daily business. The necessary advice on how to do so was part of one theoretical session. Additionally, an online community system supported participants in this phase as an enabling platform. The system was part of a larger social media platform. This solution gave the opportunity to easily offer a comprehensive discussion board and to provide all necessary documents in an effortless way.

In a follow-up to these self-coaching sessions, the participants were interviewed in order to gain insights into their changed behavior. Interviews took place either in person or via telephone. Of course, the activities on the community system have been documented carefully.

4.2.3 Results

The teaching and coaching program can be seen as a win-win situation for all involved stakeholders. Participants received unique information and get in contact with other colleagues. Lecturers also got new input for their work. New contacts to the practice were also extremely valuable for the university.

Field notes and interview transcripts can be seen as the most valuable documents for analysis. From various discussions, we know that covering current and future trends and

new technology is a key advantage of this kind of program. However, familiarizing oneself deeply with specific topics is crucial.

> *"I like to be surprised, simply because attending such a program broadens my horizon and sets up myself more broadly. And then I would not even say in advance, okay this is a topic that I would like to give special care, but I just want to get new inputs there, new and simple triggers." -- A participant*

It is crucial for IT professionals to get to know different perspectives and ways in order to acquire a broad knowledge and to work out relevant ideas for the own company. Developing a "critical self-image," seeing the "big picture," and "looking beyond the rim of one's tea cup" are catchphrases that were uttered by all involved stakeholders as evidence that it is important not to be left behind. Discussing problems related to IT and other organizational issues is also a major field for professionals.

> *"My IT always has a strong focus on business. It's part of the value chain, especially in our area, in the automotive industry. Here it is clear that the task of IT is to implement the business needs and to see where IT can support it. Where are possibly new requirements? Can I cover them? How can I cover them? What do I have to do in order to remain effective?" -- A participant*

During our research we got the impression that all stakeholders were willing to improve their own performance through better knowledge as well as through a communication and exchange among like-minded people. The reason for this is the fact that the scope of duties of each employee enlarges with the progression of time working in a company. Long-term planning of the fast-changing requirements in the IT sector does not make sense, according to a program director.

> *"Especially in the dynamic IT environment, good people are expensive and rare. They should not be bothered for hours with bureaucracy and all those things, which is perhaps theoretically useful but does not generate great utility in practical applicability." -- A program director*

Discussing trends is not the only advantage of programs such as the one we investigated. One of the interviewed organizers remarked that new technologies such as, for example, cloud computing are widely discussed in various forms of teaching and coaching programs. However, often no practical experience can be presented and only superficial information is given. Assessment of quality of such offerings is therefore very difficult. Medium-sized enterprises often wait too long before they spend time on attending continuing education offerings. Others permanently search for new opportunities.

> *"We go with many new things or simply say that this is not interesting for us. When it comes to training. Firstly, there are web portals on the Internet with comprehensive information. Secondly, there are external consultants who come into our organization. Furthermore, we attend seminars, workshops, webinars, and much more." -- A participant*

IT professionals in general do not have much time for training. Organizers have to keep this in mind when designing courses. The investigated skill-based coaching approaches fulfills this requirement very well because it combines evening sessions with flexible personal coaching phases.

Next to the time issue, also differences in the personal development of the participants were highlighted during our research. The problem is that there are a variety of different professions in the field and consequently various states of knowledge and experience. Additionally, younger participants often learn faster than older ones. Nevertheless, in this case, another advantage of the skill-based coaching approach becomes visible.

> *"Younger employees often are able to learn new things faster. This is a problem. Older employees usually have problems in understanding unknown circumstances or need more time for learning. Although this fact is well known, it is still a problem for us. Otherwise, those employees who work for the organization for a long time have special practical knowledge, for example, on processes. The exchange between both kinds of employees is a big advantage of the discussed coaching approach." -- A participant*

The heterogeneity within the group is therefore a stimulus for mutual stimulation of the participants. This is especially true when new trends are discussed and less true for special topics such as programming. A coach highlighted the networking opportunities as a further advantage of the skill-based coaching approach.

> *"The discussed teaching and coaching program is a very special form of continuing education. The linkage is indispensable because the lecturer of the presence meetings does not act like in a classical presentation. Therefore, I used to see it more as a concept of exchange between experienced colleagues and colleagues." -- A coach*

> *"The conversion in breaks and during the coaching phases were more important than the actual presence meetings. I got to know colleagues who have similar problems. The exchange of experiences helped me in my daily work. I never saw a program similar to this one." -- A participant*

Usage numbers of the community system show the high utilization of the provided features. To ensure the success of the program, the skills of the participants have been assessed using questionnaires (similar to the questionnaire used in the first case). Based on the self-assessment method (Vygotsky 1962), skills before and after participation have been recorded on a scale from -2 (deficient) to +2 (very good). The results from the first run in autumn 2011 with 21 participants are depicted in Figure 9. By analyzing them it becomes obvious that the assessment of technical hard skills could be raised considerably (0.35 points on average). The biggest difference can be recognized in the fields of managing security, compliance and risk, and business process management as well as sustainability and ethics. The soft skills have been constant. Only within project management was a slight gain recorded. Altogether, a significant improvement of skills using the teaching and coaching approach was reached.

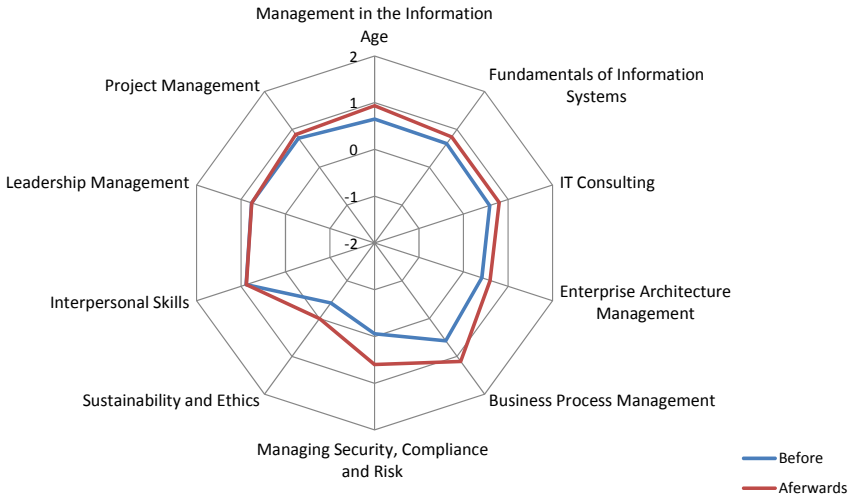

Figure 9. Skills of the Participants Before and After Participation

From our field notes we know that not all aspects were perfectly fulfilled. Some participants recommended discussing specific methods such as, for example, methods in project management; others wanted to focus more on smaller organizations instead of medium-sized enterprises, and others complained about foreign technical terms and Anglicisms. Nevertheless, most participants appreciated the program.

During the interviews, the project team got valuable information about the self-coaching phases. The structured teaching and coaching program was especially helpful to give participants the skills to select appropriate new technology. Because of the large amount of new trends in the IT business, this was very valuable for them. Furthermore, participants now are able to better reflect on their own work, have new ways of thinking, and can improve internal communication. However, participants argued that more focus has to be put on soft skills in the future.

> *"I think that we need to focus more on soft skills. More communication is necessary because this is often a problem when IT professionals who are technically well trained need to present something somewhere. Standing in front of others and communicating technical solutions is often very hard for them." -- A participant*

4.2.4 Summary

The structured teaching and coaching program is another form of skill-based coaching. The university acts as an academic facilitator and offers an enabling platform for companies. Participants are induced to work on new topics and develop new skills by themselves.

5 Comparison of Cases

Skill-based coaching could be observed in the two SISDEV and IC cases. Both have similarities and differences in multiple dimensions with regard to management, operations, coaching, and assessment. To gain insights into the topic and derive meaningful conclusions, we structured the characteristics of both cases in Table 5 following the dimensions of our conceptual research model (cf. Figure 5).

Table 5. Overview in Comparison

Dimension	*Characteristic*	*Case SISDEV*	*Case IC*
Management	Strategic goals	Integrated IT system and better skill set	Skill development
	Structure	On-demand meetings, dynamic process	Regular meetings, laid-out process
	Management culture	Hierarchical, top-down	Participative, bottom-up
Operations	Location	On-site meeting	Off-site meeting
	Group dynamics	High, very interactive meetings crossing the hierarchical culture	High, very interactive
	Group size	Up to 6	Up to 15
	Distance or face-to-face	Face-to-face	Face-to-face and distance
	Support	Ad hoc documentation, group lunch	Provision of presentations, E-learning environment with networking features
Coaching	Internal/External Coaches	External and internal	External
	Management is coached	Yes	No
	Mandatory or voluntary	Mandatory	Voluntary
	Experience of Coaches	Skill and coding focused experience	Project and skill-focused experience
	Method ("Type of coaching")	Group work, hands-on coding	Group work, best practice sharing
Assessment	Indicators	System uptime, cost, time savings	Generated revenue, self-assessed skill gain

First, we looked at the two cases from a managerial point of view. The overarching question is which strategic goal had been pursued. In the SISDEV case a running IT system was the goal, while in the IC case the skill development itself was set as the objective. The next characteristic is the structure: a dynamic process with on-demand meetings compared to a pre-structured series of meetings. Also the management culture between the cases is fundamentally different. One is hierarchical top-down, while the other is bottom-up participation-driven. With only the managerial dimensions being compared, the result is that both cases are to a certain extent fundamentally different.

This difference continues in the operations' type of location: in the SISDEV case on-site meetings, and in the IC case off-site sessions. However the group dynamics were high in both cases and very interactive. In the SISDEV case, the interaction patterns also overcame the prevailing hierarchical culture. The size of the coached groups is different again as well as the use of elements of distance learning. The latter one is only used in the case IC while in SISDEV only face-to-face meetings could be observed. This goes hand-in-hand with the use of supporting material and activities: while one case only had ad hoc documentation and group lunches, the other case revealed an e-learning environment with networking features and distribution of presentations. This might also be interlinked with different locations – on-site and off-site.

The coaching in both cases was performed by external coaches. In the SISDEV case also internal coaches could be observed in the project as knowledge and skills started to spread. The management of the case's endeavor itself was only coached in the SISDEV case while management remained outside of the coaching itself in the IC case. This is insofar consequent as in the IC case employees were mandatorily coached and only voluntarily coached in the IC case. The selection of coaches and their main method is also interrelated with these factors: coaches with experience in coding doing group work in hand-on coding sessions had been selected in the SISDEV case, while project experience and best-practice sharing in group work were the selection criteria in the IC case.

From an assessment perspective different indicators have been used. In the SISDEV case not the skill transfer itself but the achievements with these new skills have been measured. Technical indicators such as system uptime as well as cost and time savings were used. In the IC case self-assigned skill gain was the premier indicator while generated revenues only served as a proxy later.

In order to compare the two cases, we used the coaching cube by Segers et al. (2011) to characterize the two cases (cf. Figure 10). Case 1 (SISDEV) addresses the skills as well as the performance agenda. It uses an activity approach. All possible coaches can be found here. In contrast to this, in case 2 (IC) the coaching only addresses the skills agenda. Rationality and Context approaches are used. Here, only external coaches and self-coaching can be found. The classification of the two cases is basically in line with the highest probable combinations found by Segers et al. (2011) (cf. Figure 10). However, there is one distinctive difference: The described cases use a combination of different coaches and are not limited to external and internal coaches. The development/life agenda is not addressed by the two cases. Based upon these results, the two cases deliver important new insights on skill-based coaching approaches for IT industry professionals.

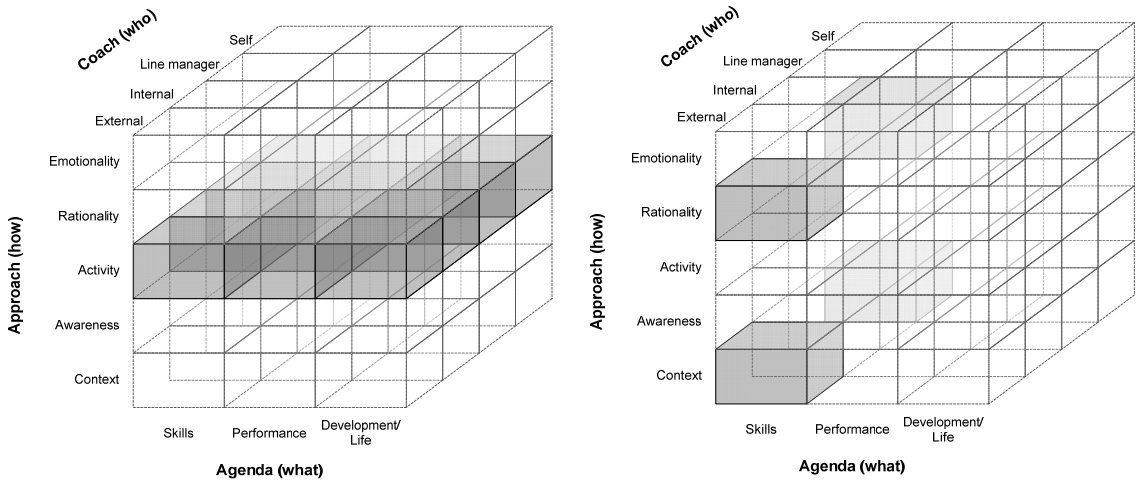

Figure 10. Applied Coaching Cube (case SISDEV left, case IC right)

6 Discussion

Our research has been guided by two questions that can now be answered. RQ1 is about the problem of how IT professionals can be empowered to cope with technological change through skill-based coaching. In order to answer this question we conducted two case studies. The results presented in sections IV and V can be seen as the answer to our first

research question. By describing and analyzing the two cases one gets a good impression of how this important empowerment can be achieved. Helping people to help themselves is the right way to do this. In our first case, coaching qualified the company and its IT department to successfully implement the SIS project. Without the application of this approach, the project would not be realizable on time, within budget, and in resource utilization. Another form of skill-based coaching was depicted in our second case. The structured teaching and coaching program represents an enabling platform for organizations to cope with new topics and the necessity to develop new skills. Therefore, the two very different cases show how skill-based coaching can empower IT professionals. Based on these results, we developed hypotheses that can be assessed quantitatively in future research:

H1: Current coaching approaches are insufficient for training IT professionals.

H2: Skill-based coaching is an appropriate instrument for IT professionals.

H3: Skill-based coaching can be used in different situations, settings, or goal sets within the IT sector.

H4: Skill-based coaching as a novel approach is suitable and delivers valuable results.

H5: Skill-based coaching ensures sustainable results.

Researchers can build on our results and investigate further possible case sites. Making practitioners aware of the capabilities of skill-based coaching is also one additional implication of our research. Furthermore, due to the detailed description of the two cases, they have two practical examples at hand that can be transformed to their actual fields of application.

Our second research question aimed at explaining skill-based coaching as a practical phenomenon. Based on our results and the comparison of the cases in the previous sections, we derived a conceptualization of skill-based coaching (cf. Figure 11). Central stakeholders are coach and coachees who work together in a discussion and feedback circle. Personal skills, present and new technologies, and method knowledge are input factors that directly affect the performance of the coach. After each coaching phase, the coachee has to apply the learned things. Networking among the coaches is also a central element of the approach. Our analyzed cases can be differentiated in a way that in the first case the initiative to start came from the coachees (pull) and in the second case it started on the coach side (push). In all situations, the internal organizational context as well as the external environment context influence the coaching process. Also, the usage of an enabling platform (for example, the software solution used in the second case) positively influence the process. The result of the approach is an increase in skill levels as well as successful changes.

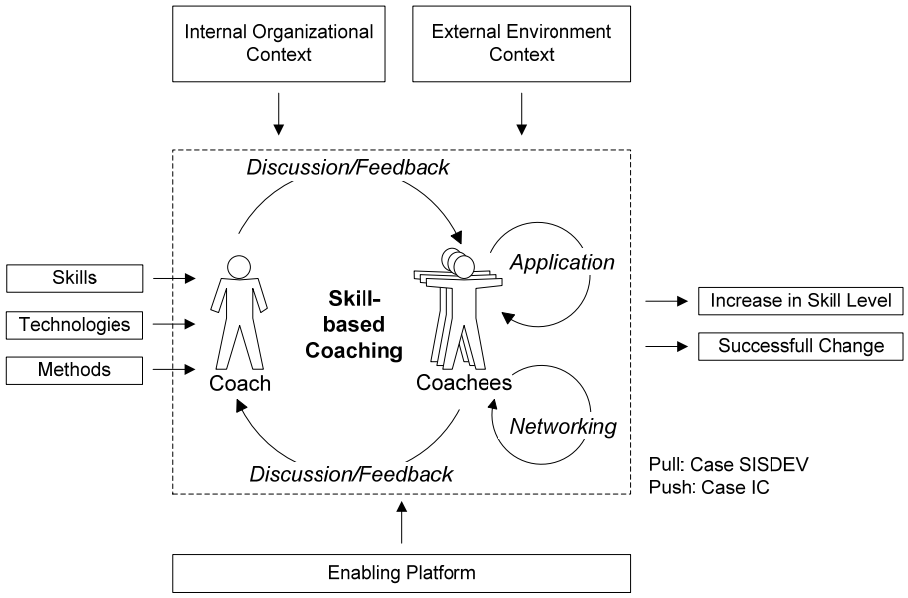

Figure 11. Skill-based Coaching

This conceptual model of skill-based coaching can be used by both researchers and practitioners. The model helps in developing a theoretical understanding of a practical phenomenon. This understanding can be utilized by scientists for other empirical research, for example. Further theory development is also imaginable. For practitioners, the model (cf. Figure 11) is an easy-to-understand illustration of a complex approach. This helps in obtaining a faster and better understanding. Through this, practitioners can be more easily made aware of new forms of coaching.

There are two important remarks to be made about our conceptualization. First, it is important to note that our model (cf. Figure 11) explains skill-based coaching in the IT sector. The basic principle of the approach may be more or less also applicable in other settings. Nevertheless, we focused on IT professionals in considering their specific contexts, skills, technologies, and methods. Therefore, an application only in this sector currently makes sense. Second, the concept of skill-based coaching can be applied to all IT professionals (CIOs, IT personnel, IT consultants, and others) at all career levels. Nevertheless, concrete skills and methods may vary between different types of professionals. Therefore, this needs to be considered in the respective contexts of application. However, as we know, for example, from the second case that half of the participants were CIOs (and other people working at an IT department) and the other half IT consultants. Both conjointly and successfully took part in the program.

Every (empirical and conceptual) research has its limitations. First, we investigated only two cases. Although the results are highly valuable, the analysis of further cases might be desirable. There even might be cases in which the utilization of the approach would not be successful. This also needs to be documented. Second, results of the case studies need to be compared with other groups who follow other (traditional) approaches. By contrasting both approaches, the advantages and disadvantages of skill-based coaching can be better worked out. A suggestion is to set up a laboratory situation as a comparison group. Third, longitudinal studies need to be conducted in order to show long-term effects of the coaching programs. Although we investigated skill-based coaching for 1-2 years, a longer time frame could yield more insights.

7 Conclusion and Future Research

In this article we examined how skill-based coaching can help IT professionals to cope with future challenges. After providing a theoretical background on skills, IT leadership development, and coaching approaches and describing our research method, we conducted two in-depth case studies on skill-based coaching. We showed that coaching is a feasible approach to empower IT professionals and enable them to work with modern and future technologies. We discussed and compared the two cases. In both cases, positive results were yielded. The measured indicators point to an increase in skill from the coached people. Thereby, skill-based coaching transferred skills into the organization where they become competencies after a while in use. Finally, we derived a conceptualization of skill-based coaching that can be used in theory and practice.

The literature can build on the derived results in order to develop comprehensive theories of skill-based coaching. The usage of the coaching cube gives a good classification of the cases that is particularly important for practitioners to know. The presentation of the two successful approaches can be seen as a foundation for research and practice to develop and derive more methods. The conceptualization of skill-based coaching as the main contribution of our research is a good foundation for future studies.

In future, more research on skill-based coaching is necessary in order to extend knowledge in this important field. Quantitative research using sophisticated statistical methods will support and measure our results. Future research is also necessary in order to analyze more cases and also get quantitative figures on the relationships between coaching and organizational success. However, we know from the interviews that looking beyond one's own cultural horizon does not only support participants directly but also affects the company indirectly by resulting in more skilled, satisfied people with higher competences and performance.

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