CORPORATE EDUCATION ENGINEERING

Entwicklung und Anwendung eines Service-Systems zur berufsbegleitenden Weiterbildung im IT-Management und -Consulting

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1 Ausgangssituation

„Weisheit ist nicht das Ergebnis der Schulbildung,
sondern des lebenslangen Versuchs, sie zu erwerben.“
ALBERT EINSTEIN (1954)

Das heutige Geschäftsumfeld ist gekennzeichnet von Innovationen und sich dynamisch entwickelnden neuen Konzepten (Osorio und Bulchand 2011; Atos 2012). Informationstechnologie (IT) hat in den letzten Jahrzehnten stetig an Bedeutung gewonnen (Moch 2011, S. 1). Besonders für Unternehmen gilt die Nutzung von IT inzwischen als wesentlicher Erfolgsfaktor für die effektive und effiziente Herstellung von Waren und Dienstleistungen (Soto-Acosta et al. 2010, S. 274). Diese Tatsache hat große Auswirkungen auf Fach- und Führungskräfte. Die immer rasanter verlaufenden Entwicklungszyklen innovativer Technologien führen zu gestiegenen Anforderungen und stetigem Qualifikationsbedarf an die Mitarbeiter (Jung 2011). So wurde beispielsweise festgestellt, dass – insbesondere in kleinen und mittleren Unternehmen (KMU) – großer Bildungsbedarf bezüglich IT-Risikomanagement besteht (Teuteberg 2010, S. 87). Permanentes und lebenslanges Training von Fähigkeiten und Wissen ist daher notwendig, um auch in Zukunft erfolgreich zu sein (LaFrance 2010). Hier ist eine Kombination verschiedener interdisziplinärer Qualifikationen entscheidend. Nicht nur „harte“ Fähigkeiten, wie z. B. Programmiererfahrung, zählen bei der Einstellung neuer IT-Fach- und -Führungskräfte, sondern auch „weiche“ Faktoren, wie z. B. interpersonelle Fähigkeiten, sind von großer Bedeutung (Joseph et al. 2010; Valacich et al. 2012; Luftman 2004). Hinzu kommt ein stetig steigender Fachkräftemangel (Litecky et al. 2008, S. 109), dem nur mit verbesserter Aus- und Weiterbildung begegnet werden kann (Hentschel 2012, S. 8). Da im IT-Bereich fachliches Wissen nur eine geringe Beständigkeit besitzt, ist zusätzliche berufsgleitende Weiterbildung zwingend notwendig (Rohs 2004, S. 188; Brink et al. 2010, S. 65).

Der Weiterbildungsmarkt ist durch eine Vielzahl von Angeboten und Formaten gekennzeichnet (Borch und Weißmann 2002, S. 8; Schmidt 2010; Gries et al. 2005). Nach einer Studie des Branchenverbandes BITKOM werden jährlich ca. 1.500 € pro IT-Beschäftigtem für dessen Weiterbildung ausgegeben (BITKOM 2011, S. 5). Häufig findet diese Weiterbildung nur in einfachen Schulungen in Hotelsälen statt, ohne dabei auf den tatsächlichen Nutzen für die Teilnehmer selbst oder das Unternehmen zu achten (Sander und Schwarz 2011, S. 3). Generell gilt, dass Weiterbildung als die Wiederaufnahme organi-

sierten Lernens nach Abschluss der ersten Bildungsphase und darauf folgender Erwerbs- bzw. Familientätigkeit definiert werden kann (Kultusministerkonferenz 2001, S. 4). Nachhaltige und damit erfolgreiche Weiterbildung zeichnet sich dadurch aus, dass das neue Wissen und die neuen Fähigkeiten im Beruf angewendet werden – sich somit das Verhalten ändert (Fitzgerald 1992, S. 81).

IT-Management und -Consulting (ITMC) sind zwei zentrale Bereiche der Wirtschaftsinformatik. Beide sind äußerst personalintensiv (Barber und Strack 2005; Laudon und Laudon 2014). IT-Management umfasst Aspekte wie das Management von IT-Ressourcen (und -Personal), die Entwicklung und der Betrieb von Informationssystemen oder Fragen der IT-Governance (Luftman 2004; Laudon und Laudon 2014; Teuteberg et al. 2011, S. 12). In diesem Feld arbeiten eine Vielzahl von IT-Fach- und -Führungskräften, wie z. B. Programmierer, Analysten und Manager, mit vielfältigen Aufgaben. Mitarbeiterwerbung, -bindung, -motivation und -training zählen zu den zentralen Tätigkeiten des IT-Managers (Chief Information Officer, CIO) (Luftman 2004, S. 3). Weiterbildung ist auch für den CIO besonders wichtig, um zukünftige Trends und Anforderungen umsetzen zu können (Chun und Mooney 2006, S. 3098). IT-Beratung (oft auch als IT-Consulting bezeichnet) beschäftigt sich mit der Entwicklung, dem Management und dem Betrieb von Informationssystemen (Valacich et al. 2012). IT-Berater arbeiten als Intermediäre an der Schnittstelle zwischen der IT und den einzelnen Unternehmensbereichen (Bloomfield und Danieli 1995). Somit benötigen IT-Berater ein hohes Maß an unterschiedlichen Fähigkeiten: Sowohl ein tiefgehendes Verständnis von technischen Fragestellungen wird verlangt (Lautenbach 2010, S. 82), aber auch „weiche“ Kompetenzen wie ausgeprägte Kommunikationsfähigkeiten sind notwendig (Djavanshir und Agresti 2007). Aus diesem Grund ist berufsbegleitende Weiterbildung obligatorisch für jeden IT-Berater (Kaiser 2006, S. 49). Auch für IT-Beratungsunternehmen sind die Akquise qualifizierter Mitarbeiter (Recruiting), die Aktualisierung und der Ausbau zentraler Kompetenzen (Wissensmanagement) oder die Gewährleistung eines gleichbleibend hohen Professionalitätsgrades konstante Herausforderungen (Scheer et al. 2001, S. 4).

2 Motivation und Zielsetzung

"Particularly in the information technology industry, knowledge comes and goes so quickly that what IT professionals learned three years ago is already outdated. It is estimated that what students learn in their fresh-man year of college may be irrelevant by the time they graduate as seniors."

GISELLE LAFRANCE (2010), S. 25

Innerhalb der Wirtschaftsinformatik als Wissenschaftsdisziplin spielen die Themen Aus- und Weiterbildung sowie e-Learning und organisationales Lernen eine bedeutende Rolle und werden immer wieder in der Literatur aufgegriffen (Steininger et al. 2009). Dennoch wird oft zu wenig über Lehre in der Wirtschaftsinformatik nachgedacht (Davidson 2011). GILL UND BHATTACHERJEE haben drei zentrale Herausforderungen für die Wirtschaftsinformatik-Disziplin herausgearbeitet (Gill und Bhattacherjee 2009, S. 217):

1. Forschung: *Was sollte erforscht werden und wie sollte Forschung stattfinden?*

2. Information: *Wie wird sichergestellt, dass Forschungsergebnisse ihre potenziellen Empfänger erreichen?*

3. Ressourcen: *Wie kann die Finanzierung zur Durchführung der Forschungsaktivitäten sichergestellt werden?*

Während die Herausforderungen bezüglich Forschung und Ressourcen weitestgehend bekannt und diskutiert sind, besteht bezüglich der Frage nach bestmöglicher Dissemination der Informationen Forschungsbedarf. Es stellt sich die Frage, wie Forscher und Praktiker besser zusammenarbeiten können, um den gegenseitigen Informationsaustausch sicherzustellen (Susman et al. 1989, S. 257; Benbasat und Zmud 1999, S. 8). In diesem Zusammenhang spielen auch die Balance zwischen wissenschaftlicher Rigorosität und praktischer Relevanz eine große Rolle (Kieser und Leiner 2009). Oft wird behauptet, Forschung im Bereich Wirtschaftsinformatik fehle es an Relevanz, da häufig Rigorosität überbetont werde (Winter et al. 2007, S. 404). Um diesem Problem entgegenzuwirken, schlagen Benbasat und Zmud (1999) vor, dass Forscher Themen aus der Praxis aufgreifen sollen, um diese mit Hilfe der Wirtschaftsinformatikliteratur zu bearbeiten. Gerade das Thema berufsbegleitende Weiterbildung bietet sich hier an, da Universitäten eine besondere Stellung einnehmen, indem sie selbst Teil des Untersuchungsgegenstandes sind (Balkin

und Mello 2012, S. 471). Dem Ansatz von Benbasat und Zmud (1999) soll daher gefolgt werden. Darüber hinaus lassen sich in der Literatur Richtlinien zum sog. Collaborative Practice Research (Mathiassen 2002) bzw. Research Collaborations and Consulting Relationships (Gill und Bhattacherjee 2009, S. 230) finden, die ebenfalls als Grundlage für die Forschung dienen sollen.

Weiterbildung ist in vielen Fällen eigene Verantwortung der Mitarbeiter und muss selbstständig organisiert werden (Kaiser 2006, S. 49). Zu Weiterbildungszwecken müssen Mitarbeiter und Unternehmen auf externe Partner zurückgreifen, die erwiesenermaßen Experten auf ihrem Gebiet sind (Adams und Zanzi 2004; Kaiser 2006, S. 49). Neben verschiedenen Anbietern können insbesondere auch Universitäten diese Aufgabe übernehmen (Severing 2003). Neben der Erschaffung von Wissen (Forschung) ist es Aufgabe von Universitäten, Wissen zu verteilen (Lehre) (Gill und Bhattacherjee 2009; Thomas 2006). Oft wird beschrieben, dass diese die zukünftigen Arbeitskräfte ausbilden sollen (Elliot 2011). Allerdings scheinen Universitäten selbst nicht dafür vorbereitet zu sein, denn Methoden und Ansätze zur besseren Wissensvermittlung zwischen Theorie und Praxis werden dringend benötigt (Wilson und Guzdial 2010). In der Literatur werden eine Vielzahl von Curricula zur universitären Ausbildung von Wirtschaftsinformatikern beschrieben (Downey et al. 2008; Plice und Reinig 2009; Topi et al. 2010); umfassende Dokumentationen von akademischen Programmen zur berufsbegleitenden Weiterbildung von IT-Fach- und -Führungskräften fehlen jedoch (Boehm et al. 2011a).

Weiterbildung im IT-Management und -Consulting ist für Unternehmen und ihre Mitarbeiter wichtig, um auch in Zukunft mit den Entwicklungen Schritt halten zu können und den aufstrebenden Märkten, beispielsweise aus China, etwas entgegensetzen zu können. Dies ist für Mitarbeiter aller Unternehmensbereiche und -größe – insbesondere aber für KMU – von zentraler Bedeutung (Simon 2012). Aktuell sind bei einem Umsatz von 22,3 Mrd. € (+8% im Vergleich zu 2012) 95.150 Berater in der Consultingbranche aktiv (+4,3% im Vergleich zum Vorjahr) (Bund Deutscher Unternehmensberater BDU e.V. 2013, S. 5). Der zukünftig steigende Bedarf erschwert die Notwendigkeit der Gewinnung qualifizierter Nachwuchskräfte (Bund Deutscher Unternehmensberater BDU e.V. 2013, S. 14). Im Jahr 2012 haben in Deutschland mit fast 50% der Bevölkerung im erwerbstätigen Alter, so viele Menschen wie niemals zuvor, eine Weiterbildung besucht (Bilger et al. 2013, S. 2). Den größten Anteil dabei nimmt die betriebliche Weiterbildung ein, die mit einem Faktor von 1,3 angestiegen ist. Allerdings hat dabei nur jedes fünfte mittelständische

Unternehmen (22%) in Deutschland IT-Fortbildungen für seine eigenen Mitarbeiter durchgeführt (BITKOM 2013). Dies bedeutet Platz 13 im europäischen Vergleich. Spitzenreiter ist hier Norwegen mit 41%. Bei größeren Unternehmen bieten immerhin 79% der Unternehmen IT-Weiterbildung an. Dies entspricht Platz 6, wobei Finnland hier mit 88% führend ist (BITKOM 2013). In Deutschland steckt Weiterbildung dennoch in der Krise, wie das Institut der deutschen Wirtschaft Köln mitteilt (Seyda und Werner 2012, S. 2). Demnach hat Weiterbildung zwar in Zeiten vom Fachkräftemangel eine hohe Bedeutung, jedoch wird dies von vielen Betroffenen aber auch von ihren Unternehmen nicht richtig erkannt. Es lässt sich daher die folgende forschungsleitende Frage aufstellen: *Wie gehen wir mit unserem Wissen um?*

Die Zielsetzung dieser Arbeit liegt in einer systematischen Analyse von Weiterbildung im ITMC und damit verbunden Design und Implementierung (Entwicklung) und Evaluation (Anwendung) eines Service-Systems für diese Weiterbildung. Das zu entwickelnde und anzuwendende Service-System als Artefakt (March und Smith 1995) soll dabei aus Vorgehens- und Prozessmodellen, einem Ordnungsrahmen sowie einer prototypisch implementierten Plattform bestehen. Primärziel der Forschungsarbeit ist es, den Untersuchungsgegenstand zu erfassen, zu erklären und weiterzuentwickeln. Damit soll die Wissensbasis des interdisziplinären Forschungsbereichs aus theoretischer und praktischer Sicht erweitert werden. Aufgrund der anwendungsorientierten Ausrichtung der Wirtschaftsinformatikdisziplin (Scheer 2009) wird dabei eine Ausgewogenheit zwischen Rigorosität und Relevanz angestrebt. Mit dieser Arbeit werden sowohl Erkenntnis- als auch Gestaltungsziele verfolgt (Becker et al. 2003, S. 11).

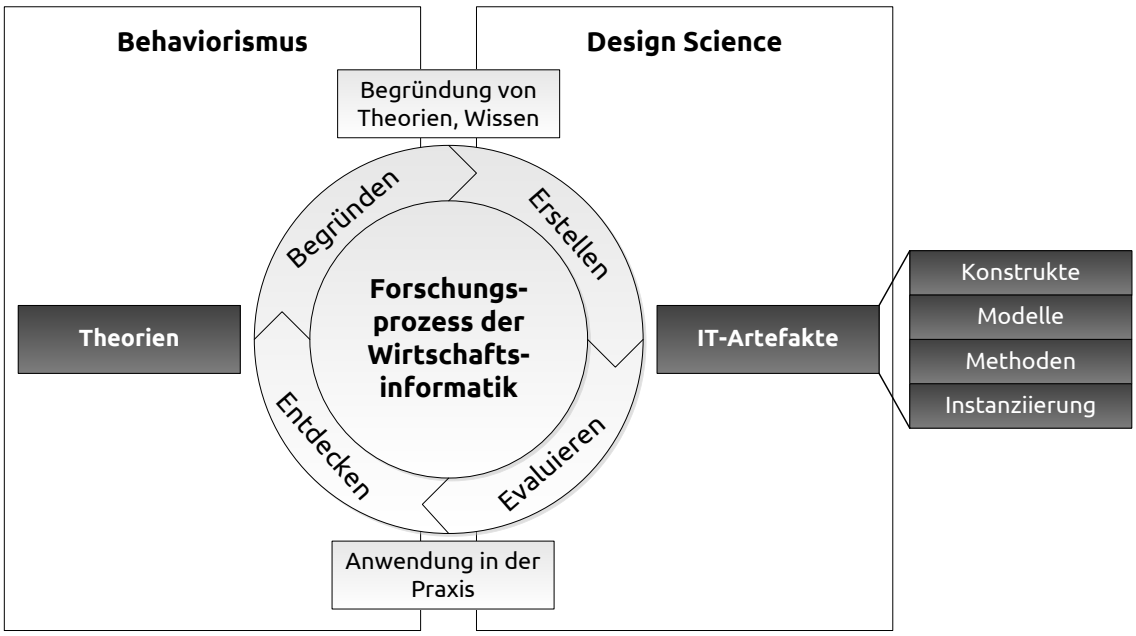
3 Einordnung

In ihrer idealistischen Definition kann die Universität als „Stätte der Bildung durch Wissenschaft“ (Mittelstraß 1982, S. 101) gesehen werden. Ziel wissenschaftlicher Aktivitäten ist die Produktion problemlösenden Wissens – beispielsweise in Form von neu aufgeworfenen Fragen, getesteten Methoden oder weiterer Anregungen für die Bildung von Theorien (Myers 2009; Heuermann und Herrmann 2003, S. 281). Dabei ist Wissenschaft nicht automatisch auch Wahrheit. Wissenschaft ermöglicht lediglich objektivere Kommunikation und damit effizienteres arbeitsteiliges Handeln (Eberhard 1999, S. 20). Charakteristisch für wissenschaftliche Aussagen ist somit nicht, dass sie wahr sind, sondern vielmehr, dass sie verständliche und wohldefinierte Begriffe verwenden und daher allgemeingültig sind (Eberhard 1999, S. 20). Gerade die Kommunikation zwischen Produzenten wissenschaftlichen Wissens und Nachfragern nach problemlösendem Wissen ist häufig komplex (Kieser 2002, S. 4). Hinzu kommt, dass häufig Wissenschaft mit Grundlagenwissenschaft gleichgesetzt wird und somit die Anwendung wissenschaftlicher Erkenntnis zur Erreichung menschlicher Ziele als Aufgabe der Praxis gesehen wird (Ulrich 1981, S. 3). Aus diesem Grund ist es ein Ziel dieser Arbeit, neben der Entwicklung und Anwendung von Methoden und Modellen, eine Plattform zur Durchführung von Weiterbildungsveranstaltungen prototypisch zu implementieren. Daraus lassen sich wertvolle Erkenntnisse zur Umsetzbarkeit und Anwendbarkeit wissenschaftlicher Artefakte als Basis für deren Anwendung in der betrieblichen Praxis oder zu einer Produktentwicklung gewinnen (Thomas 2006, S. 13).

Diese Arbeit kann, neben der allgemeinen Einordnung in die Wissenschaft, zur interdisziplinären Wissenschaftsdisziplin Wirtschaftsinformatik (WI) zugerechnet werden. Gegenstand dieser Disziplinen sind Informationssysteme (IS) in Wirtschaft, Verwaltung und privatem Bereich, wobei IS soziotechnische Systeme sind, die menschliche und maschinelle Komponenten (Teilsysteme) umfassen (WKWI und GI FB WI 2011). Die Bedeutung des Faktors Mensch wird bereits in dieser Definition deutlich. Die WI wird als anwendungsorientierte Disziplin verstanden, deren Aufgabe es ist, ihre Erkenntnisse an der Unternehmenspraxis kritisch zu reflektieren und sie in die Praxis zu transferieren (Scheer et al. 2005, S. 241–242; Scheer 1993, S. 65). Ein weiteres Charakteristikum ist die Interdisziplinarität. Die WI ist als Bindeglied zwischen den Fachgebieten Betriebswirtschaftslehre und Informatik verortet (Hansen und

Neumann 2009). Hinzu kommen Schnittstellen zu Informationswissenschaften und Ingenieurwissenschaften.

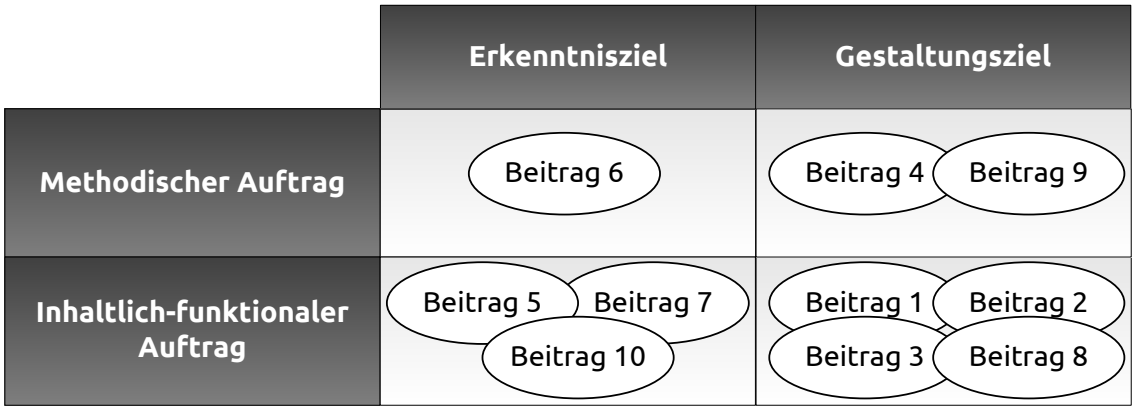
Aus diesem Grund sind in der WI viele verschiedene Theorien, Methoden und Perspektiven vorherrschend. Diese können grundsätzlich zwei Paradigmen zugerechnet werden. Die verhaltensorientierte Forschung (Behaviorismus) versucht Phänomene und Theorien zu entdecken und zu begründen (Hofmann 2010, S. 8; Baskerville et al. 2010). Demgegenüber steht die konstruktionsorientierte bzw. gestaltungsorientierte Wirtschaftsinformatik (Design Science Research, DSR), die das Finden Nutzen orientierter Lösungen anstrebt (Österle et al. 2011; Hofmann 2010, S. 8; Hevner et al. 2004). Dabei können IT-Artefakte verschiedene Formen haben (March und Smith 1995; Vaishnavi und Kuechler 2004): Konstrukte sind konzeptionelle Beschreibungen einer Domäne. Modelle können als Menge von Vorschlägen oder Stellungnahmen gesehen werden, die Beziehungen zwischen Konstrukten beschreiben. Methoden sind eine Menge von Schritten, die genutzt werden, um eine Aufgabe zu erfüllen (praktisches Wissen). Instanziierungen sind die Operationalisierung von Konstrukten, Modellen und Methoden. Das Ziel aller Design-Aktivitäten ist es, diese Artefakte zu entwickeln und zu evaluieren (March und Smith 1995, S. 255). Die vorliegende Arbeit versucht, Elemente beider Paradigmen aufzugreifen und diese im Forschungsprozess zu integrieren (vgl. Abschnitt 4.2). Dabei wird dem generellen Forschungszyklus der Wirtschaftsinformatik gefolgt (vgl. Abb. 3.1).



Quelle: Niehaves und Becker 2006, S. 12

Abb. 3.1 Forschungszyklus der Wirtschaftsinformatik

Die Dissertationsbeiträge können abschließend in der Ziel-Auftrag-Matrix von Becker et al. (2003) positioniert werden (vgl. Abb. 3.2). Danach gibt es in der Wirtschaftsinformatikforschung bestimmte Ziele und Aufträge, die zu unterscheiden sind. Erkenntnisziele versuchen Sachverhalte zu verstehen. Somit sollen Aussagen über Veränderungen gemacht werden können. Demgegenüber stehen Gestaltungsziele, die Sachverhalte gestalten bzw. bestehende verändern möchten, um auf diese Art und Weise neue Sachverhalte zu schaffen. Nach Becker et al. (2003) weisen die beiden Forschungsziele Interdependenzen auf und beeinflussen sich gegenseitig. Ferner können methodische und inhaltlich-funktionale Aufträge der Wirtschaftsinformatikforschung differenziert werden. Im methodischen Auftrag sind Verständnis (Erkenntnis) und die Entwicklung (Gestaltung) von Methoden und Techniken zur Beschreibung, Einführung und Nutzung von Informationssystemen einbegriffen. Der inhaltlich-funktionale Auftrag fokussiert auf Verständnis (Erkenntnis) und Gestaltung von Methoden und Techniken für einzelne Betriebe oder Branchen. Abb. 3.2 fasst nun die Aufträge und Ziele der Dissertationsbeiträge in einer Matrix zusammen. Es ist zu erkennen, dass alle Kombinationsmöglichkeiten abgedeckt werden. Somit kann die Bearbeitung aller Aspekte bejaht werden. Der Fokus wurde dennoch auf den inhaltlich-funktionalen Auftrag gelegt, da hier besonderer Forschungsbedarf besteht.



Quelle: Becker et al. 2003, S. 11

Abb. 3.2 Wissenschaftliche Positionierung der Dissertationsbeiträge

4 Methodik

4.1 Forschungsfragen und Erkenntnisinteresse

Nicht Wahrnehmungen, Beobachtungen oder die Sammlung von Daten oder von Tatsachen sind der Beginn der Erkenntnis, sondern die Identifikation von Problemen (Popper 2009, S. 80). Das Interesse, diese Probleme zu lösen und so neues Wissen zu generieren, wird Erkenntnisinteresse genannt. Es ist der auslösende Impuls des Erkenntnisprozesses, der idealtypisch durch die Problemanalyse bestimmt wird und das Ziel hat, der Praxis nutzenstiftende Ergebnisse zu liefern (Österle et al. 2011). Generell können in der Wissenschaft drei forschungsleitende Erkenntnisinteressen unterschieden werden (Eberhard 1999, S. 17–18):

- Das phänomenale Erkenntnisinteresse fragt nach den faktischen Gegebenheiten, ihren Merkmalen und Eigenschaften *(Was ist los? Was geschieht?)*,
- Das kausale Erkenntnisinteresse richtet sich auf die Ursachen der Phänomene *(Warum ist das so? Warum geschieht es?)* und
- Das aktionale Erkenntnisinteresse fragt nach Möglichkeiten des Handelns, der Praxis, der Intervention, ist also an der strategischen Beeinflussung der Phänomene interessiert *(Was ist zu tun?)*.

Wie bereits erläutert, ist die Forschung von der Frage geleitet, wie Wissen im ITMC heute und in Zukunft weitergegeben wird bzw. werden sollte. Dabei wird in der Regel die Perspektive der Universitäten als Anbieter von Weiterbildungsangeboten eingenommen. Um die generelle Frage zu operationalisieren, werden drei forschungsleitende Fragen entwickelt.

Die erste Forschungsfrage korrespondiert mit den phänomenalen und kausalen Erkenntnisinteressen nach Eberhard (1999) und untersucht den aktuellen Stand der ITMC-Weiterbildung. Charakteristika des Feldes aber auch Eigenschaften der beteiligten Stakeholder müssen analysiert werden. Danach ist der State-of-the-Art bezüglich Angeboten, Modulen und Vorgehensweisen darzustellen. Daher wurde folgende Forschungsfrage formuliert:

FF1: *Welches sind die spezifischen Charakteristika in der Weiterbildung im ITMC und wie findet diese aktuell statt?*

Die Rolle von (Produkt-) Service-System-Engineering und wie dies mit dem Weiterbildungsfeld zusammengebracht werden kann, wird mit Hilfe der zweiten Forschungsfrage dargelegt. Es ist zu untersuchen, wie ITMC und die entsprechenden Lernprozesse in das Service-Systems-Konzept integriert werden können. Dies geschieht im Rahmen des Forschungsprojektes IMUCON (Gestaltung einer Weiterbildungsveranstaltung IT-Management und -Consulting), welches am Lehrstuhl für Informationsmanagement und Wirtschaftsinformatik der Universität Osnabrück von Herbst 2011 bis Herbst 2013 durchgeführt wurde. Der Autor dieser Dissertation war in dieser Zeit als Projektmitarbeiter für die Planung, Durchführung, Evaluation und Weiterentwicklung des Weiterbildungskonzeptes verantwortlich. Dementsprechend korrespondiert die zweite Forschungsfrage mit dem aktionalen Erkenntnisinteresse nach Eberhard (1999):

FF2: *Wie können (Produkt-) Service-Systeme zur Entwicklung von Weiterbildungsangeboten im ITMC eingesetzt werden?*

Abschließend ist zu überprüfen, ob die entwickelten Artefakte tatsächlich die Weiterbildung verbessern. Die entsprechenden Strukturen müssen genauso wie dafür notwendige informationstechnische Systeme implementiert werden. Eine Überprüfung mittels Prototypenbau (Thomas 2006, S. 13) dient somit der Sicherstellung der praktischen Anwendbarkeit. Das IMUCON-Projekt stellte hierbei den Rahmen dar, in dem das zu entwickelnde System getestet und evaluiert werden konnte. Zusammengefasst wird diese Tatsache in der dritten Forschungsfrage, die wiederum dem aktionalen Erkenntnisinteresse nach Eberhard (1999) entspricht:

FF3: *Wie können Informationssysteme zur Unterstützung der Weiterbildung im ITMC zukünftig genutzt werden?*

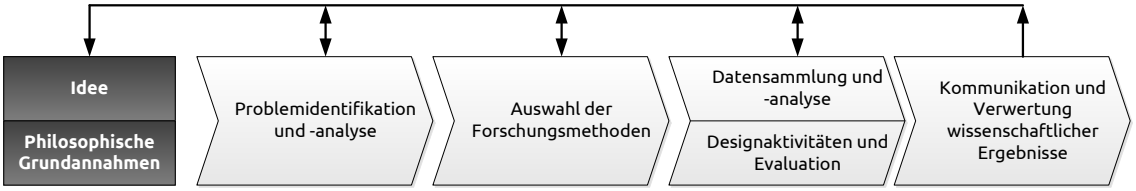
Auf eine explizite Beantwortung der Frage der Evaluation der entwickelten Artefakte wird verzichtet. Aufgrund des kumulativen Charakters dieser Dissertation wird jede einzelne Entwicklung für sich bereits ausführlich evaluiert (vgl. Abschnitt 5.1).

4.2 Forschungsprozess und Methodenspektrum

Zur Beantwortung der Forschungsfragen ist die Anwendung eines multimethodischen Vorgehens (Mingers 2001; Mingers 2003) notwendig. Eine methodenpluralistische Erkenntnisstrategie ist in der Wirtschaftsinformatik-

Disziplin, zu der diese Dissertation zu zählen ist (vgl. Abschnitt 3), üblich und aufgrund des fragmentierten aber pluralistischen wissenschaftlichen Feldes unumgänglich (Wilde und Hess 2007; Banville und Landry 1989, S. 58). Das Spektrum der verwendeten Forschungsmethoden der WI bewegt sich daher im Spannungsfeld der Mutter- und Schwesterdisziplinen, wobei die Methoden dem Erkenntnisobjekt – Informations- und Kommunikationssysteme in Wirtschaft und Verwaltung – gerecht werden müssen und dementsprechend adaptiert werden müssen (WKWI und GI FB WI 2011; Heinrich 1995, S. 33). Bevor jedoch Methoden ausgewählt und angewendet werden können, ist es notwendig, den Forschungsprozess darzulegen. Dieser hat in besonderem Maß dem Erkenntnisinteresse zu folgen (Jenkins 1985).

In der Literatur werden eine Reihe verschiedener Forschungsprozesse beschrieben, die ihre unterschiedlichen Anwendungsbereiche haben (vgl. beispielsweise Österle et al. 2011; Jenkins 1985; Carlsson et al. 2009; Myers 2009). Die Beiträge dieser kumulativen Dissertation sind einem spezifischen Prozess gefolgt, der an den Gedanken des WI-Forschungszyklus angelehnt ist (vgl. Abb. 3.1). Basierend darauf wurde der in Abb. 4.1 dargestellte Prozess entwickelt. Dieser beginnt mit einer Idee und der Festlegung der philosophischen Grundannahmen. Während die Idee bereits in den Abschnitten 1 und 2 dargelegt wurde, werden die philosophischen Grundannahmen im Folgenden weiter erörtert. Anschließend folgt eine Problemidentifikation und -analyse, in der das Gebiet weiter zu untersuchen ist und das Problem ggf. in lösbare Teilkomponenten zu zerlegen ist. Danach sind die geeigneten Forschungsmethoden für das jeweilige Problem auszuwählen. Wird eine Methode des verhaltensorientierten Paradigmas gewählt, finden im nächsten Schritt Datensammlung und -analyse statt. Designaktivitäten und Evaluation sind hingegen bei der Wahl des konstruktionsorientierten Paradigmas durchzuführen. Anschließend folgen in beiden Fällen die Kommunikation und Verwertung der wissenschaftlichen Ergebnisse. Es ist wichtig anzumerken, dass Rücksprünge im Prozess jederzeit möglich sind.



Quellen: Gregor und Hevner 2013; Österle et al. 2011; Hevner et al. 2004

Abb. 4.1 Forschungsprozess

Insgesamt folgt der Forschungsprozess einer Kombination von Induktion und Deduktion. Bei der induktiven Herangehensweise wird von einer Vielzahl von Beobachtungen ausgegangen, die beschrieben, geordnet und verglichen werden (Knoblich 1972, S. 141 f.). Dadurch wird versucht, basierend auf der Trennung von Wesentlichem und Unwesentlichem, Erklärungen der Wirklichkeit herzuleiten (Abdalla 2006, S. 13). Somit wird mit fortschreitender Zeit die Analyse zunehmend abstrakter. Diese Vorgehensweise trifft insbesondere auf die Teile der Arbeit zu, die auf empirischen Daten basieren. Es ist allerdings festzustellen, dass auch ein deduktives Vorgehen in der Arbeit vorhanden ist. Deduktion folgt einem der Induktion umgekehrten Prozess der Erkenntnisgewinnung (Abdalla 2006, S. 13). Mit abnehmender Abstraktion wird versucht, von allgemeinen Grundsätzen und Denkmodellen auf logische Schlussfolgerungen im Einzelfall zu schließen (Knoblich 1972, S. 141 f.). Diese Vorgehensweise trifft auf den grundlegenden Forschungsprozess zu, der deduktiv basierend auf den theoretischen Konzepten die Entwicklung des Service-Systems leitet. Somit wird im Folgenden eine Mischung beider Vorgehensweise angewendet, wobei sich Theorie und empirischer Beweis abwechseln und letzterer im relevanten theoretischen Kontext getestet wird (Abdalla 2006, S. 13).

Innerhalb der philosophischen Grundannahmen wird zwischen der Ontologie und Epistemologie unterschieden (Myers 2009). Während erstere sich auf Annahmen über den Status der Realwelt bezieht, beschäftigt sich die epistemologische Position mit der Fragestellung, was wird (oder sollte) als akzeptables Wissen in einer Disziplin behandelt werden (Bryman und Bell 2007, S. 11, 19). Abb. 4.2 zeigt die entsprechenden Kombinationsmöglichkeiten ontologischer und epistemologischer Positionen.

		Epistemologische Position	
		Ein objektives (subjektunabhängiges) Erkennen ist nicht möglich.	**Ein objektives Erkennen ist möglich.**
Ontologische Position	**Es gibt eine objektive Welt.**	**Interpretivismus**	**Positivismus**
	Es gibt keine objektive Welt.	**Radikaler Konstruktivismus**	

Quelle: Becker et al. 2003, S. 8

Abb. 4.2 Einordnung ontologischer und epistemologischer Positionen

Der Positivismus versucht Dinge zu beschreiben, zu kontrollieren und vorherzusehen (Lather 1992). Es wird davon ausgegangen, dass eine objektive Sichtweise möglich ist und somit Methoden der Naturwissenschaften genutzt werden können, um die soziale Welt zu untersuchen (Bryman und Bell 2007, S. 11). Der Gedanke dabei ist, dass nur Phänomene und somit Wissen bewiesen werden können, die mit den Sinnen wahrnehmbar sind. Dazu werden Hypothesen objektiv und wertfrei getestet. Viele Autoren nehmen diese Grundannahme ein.

Im Interpretivismus sind Empathie und Verständnis von zentraler Bedeutung (Lather 1992). Es wird davon ausgegangen, dass eine objektive Sichtweise nicht möglich ist und somit Thema und Theorie explorativ erforscht werden müssen (Bryman und Bell 2007, S. 15). Für den Forscher ist es somit wichtig, die Bedeutung sozialen Handelns zu erkennen und sich nicht einfach auf die Naturwissenschaften zu verlassen. Diese Strömung basiert vornehmlich auf Autoren, die von verschiedenen intellektuellen Traditionen beeinflusst sind und die davon ausgehen, dass die Welt sozial konstruiert ist (Walsham 1995). Interpretivismus gilt somit als Gegenstück und Alternative zur jahrzehntelangen vorherrschenden positivistischen Rechtgläubigkeit (Bryman und Bell 2007, S. 15). Es werden ausschließlich qualitative Forschungsmethoden verwendet (Walsham 1995).

Der radikale Konstruktivist versucht zu verändern (Lather 1992). Im Konstruktivismus wird behauptet, dass soziale Phänomene und ihre Bedeutung kontinuierlich durch soziale Akteure erreicht werden (Bryman und Bell 2007, S. 20). Dies impliziert, dass diese nicht nur durch soziale Interaktion produziert sondern auch laufend revidiert werden. Ziel ist es, den Status Quo zu kritisieren und so dabei zu helfen, die Menschen zu emanzipieren. Radikale Konstruktivisten sind weniger in der Forschung als in der Philosophie zu finden.

Jede Forschung kann in die drei Kategorien Positivismus, Interpretivismus und radikaler Konstruktivismus eingeordnet werden (Myers 2009). In der vorliegenden Arbeit wird vornehmlich eine interpretivistische Perspektive eingenommen. Es wird somit davon ausgegangen, dass das Erkennen der Welt nicht objektiv möglich ist, es eine solche objektive Welt aber durchaus gibt.

Die Auswahl der Forschungsmethoden ist ein wichtiger Teil des Forschungsprozesses (vgl. Abb. 4.1). Zur Einordnung der Methoden wird zunächst zwischen qualitativer Forschung und quantitativer Forschung differenziert, wobei sie sich in Bezug auf ihren Umgang mit der Realität unterscheiden (Myers

2009; Bryman und Bell 2007, S. 25). Beide Ansätze finden sowohl im Behaviorismus als auch im Design Science statt. Während quantitative Forschung die Realität mit Hilfe von Zahlen und Statistiken beschreibt, versucht qualitative Forschung diese zunächst zu verbalisieren. Grundsätzlich kann beispielsweise qualitative Forschung auf allen drei philosophischen Grundannahmen aufbauen (Myers 2009).

Innerhalb der vorliegenden Arbeit werden Methoden der qualitativen und quantitativen Forschung kombiniert, um auf diese Art und Weise das gleiche Thema aus verschiedenen Perspektiven zu analysieren. Dieses Vorgehen wird auch Triangulation genannt (Myers 2009; Hassard 1991; Jick 1979) und ist lohnender als ein epistemologischer Dogmatismus in der Methodenwahl (Riemann et al. 2000, S. 220). Vielmehr sollte die Wahl der Forschungsmethode eine rationale Entscheidung des Forschers sein, um einen bestimmten Erkenntnisfortschritt zu erreichen (Radnitzky 1989, S. 471). Aus diesem Grund umfasst das genutzte Methodenspektrum beispielsweise strukturierte Literaturreviews, Expertenbefragung, Prototypenbau und Informationsmodellierung. Ein genauer Überblick über die verwendeten Methoden wird im folgenden Abschnitt gegeben. Es ist jedoch wichtig zu erwähnen, dass ein Großteil der Erkenntnisse auf der tatsächlichen Implementierung der theoretischen Konzepte in der Praxis beruht. Im IMUCON-Forschungsprojekt wurde das Konzept im Herbst 2011 und Herbst 2012 vom Autor dieser Dissertation jeweils angewendet, schrittweise umgesetzt und so verbessert.

4.3 Forschungsplan

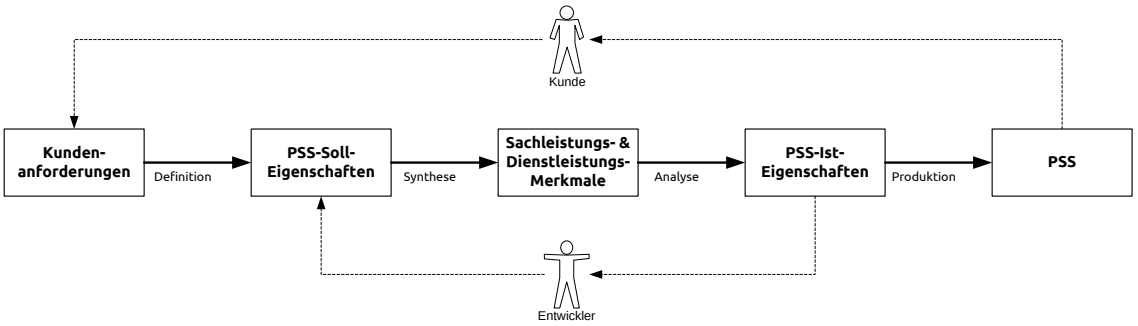
Kunden möchten keine Produkte per se kaufen, sondern sind vielmehr an der Erfüllung einer bestimmten Funktion interessiert (Levitt 1969). Diese Tatsache ist Ausdruck des Wandels hin zu einer „Service Economy“ (Fuchs 1965). Informations- und Kommunikationstechnologie spielt hierbei eine entscheidende Rolle (Vandermerwe und Rada 1988, S. 314): Sie ist die Grundlage für neue Geschäftsmodelle, die eine dienstleistungsorientierte Entwicklung von Produkten ermöglicht. Heute ist die Technologie die Schnittstelle zwischen Produkten und Dienstleistungen (Geum et al. 2011, S. 131). Hinzu kommt, dass die Globalisierung die Produktion oft in Niedrigkostenländer verschiebt, der Wettbewerb deutlich zugenommen hat und die Anforderungen der Kunden mehr und mehr steigen (van Halen et al. 2005, S. 10–11).

Charakteristische Merkmale von Dienstleistungen sind Immaterialität und Intangibilität (leistungsergebnisbezogene Begriffsabgrenzung), Vermarktung

von Leistungsversprechen (potenzialorientierte Abgrenzung) sowie Integration von internen und externen Produktionsfaktoren im Prozess der Leistungserstellung (prozessbezogene Abgrenzung) (Kleinaltenkamp 2001, S. 32–37). KIM UND NAM gehen einen Schritt weiter und fassen Dienstleistungen zu so genannten Service-Systemen zusammen. Dieser Mechanismus erlaubt die integrierte Betrachtung aller Phasen einer Dienstleistung (Design, Produktion, Vertrieb und Konsum) sowie aller Komponenten (Kunden, Lieferanten, Partnern und ihre Beziehungen zu Ressourcen und Fähigkeiten). Dabei werden besonders die mit Dienstleistungen verbundenen und zugrundeliegenden Produkte sowie unterstützende IT-Systeme betrachtet. Im Ergebnis sollen Dienstleistungsqualität und -produktivität gesteigert und somit Innovationen ermöglicht werden (Kim und Nam 2009). Das Konzept der hybriden Produkte (Produkt-Service-Systeme, PSS, engl. Product-Service Systems) geht in eine ähnliche Richtung, indem Produkte und Dienstleistungen als integrierte Systeme betrachtet werden (Thomas et al. 2010). PSS-Engineering (PSSE) wird dann als systematische und integrierte Entwicklung von PSS gesehen (Weber et al. 2004, S. 553). Auch im Bereich Weiterbildung wurde der PSSE-Ansatz übertragen, in dem Lehre als hybrides Paket von Produkten (Ressourcen) und Dienstleistungen (Lehrtätigkeit) beschrieben wurde (Herzfeldt et al. 2011).

In der Literatur werden eine Reihe von Ansätzen zur Entwicklung von Service Systems bzw. PSS beschrieben. Es gibt jedoch keinen standardisierten PSS-Engineering Ansatz (Sadek und Köster 2011). Beispielsweise wird das Vorgehensmodell von Botta (2007), Steinbach (2005) und Weber (2004) häufig verwendet – vgl. z.B. Stolze et al. (2011b). Dieses Modell hat jedoch u.a. den Nachteil, dass der Zyklus zur Verbesserung des PSS nicht detailliert genug herausgearbeitet wurde. Aus diesem Grund haben Thomas et al. (2008) auf Basis des Modells von Botta, Steinbach und Weber ein weiterentwickeltes Vorgehensmodell zum PSS-Engineering beschrieben (vgl. Abb. 4.3). Vorteil dieses Ansatzes ist, dass er iterativ aufgebaut ist und aus mehreren Zyklen besteht. Zunächst werden auf Basis der Kundenanforderungen die Soll-Eigenschaften des PSS definiert. Diese Eigenschaften beschreiben das Produktverhalten, können jedoch nur indirekt beeinflusst werden. Die (Sachleistungs- & Dienstleistungs-) Merkmale hingegen können direkt vom Entwickler festgelegt werden. Nachdem diese durch Synthese der Soll-Eigenschaften beschrieben wurden, ist im nächsten Schritt zu analysieren, ob die Ist-Eigenschaften mit den Soll-Eigenschaften korrespondieren. Dies ist explizite Aufgabe des Entwicklers, der in seinem eigenen Zyklus so die Diskrepanz

zwischen Soll- und Ist-Eigenschaften minimiert. Dem Kunden wird später das fertig produzierte PSS präsentiert. Dieser hat dann die Möglichkeit, es auf die Erfüllung seiner Anforderungen hin zu überprüfen. Besteht die Notwendigkeit der Weiterentwicklung, startet der Prozess erneut. Auf diese Weise können sich Kunde und Entwickler schrittweise annähern und so das zugrunde liegende Problem lösen.



Quelle: Thomas et al. 2008, S. 210

Abb. 4.3 Vorgehensmodell zum PSS-Engineering

Das Vorgehensmodell von Thomas et al. (2008) eignet sich somit besonders gut, um die Entwicklung und Anwendung von (Produkt-) Service-Systemen zu strukturieren. Aus diesem Grund wird es in der vorliegenden Arbeit – neben den Richtlinien der Design Science Forschung – genutzt. Dabei agierte der Autor dieser Dissertation vornehmlich als Entwickler, der im inneren Zyklus die Eigenschaften und Merkmale des Service-Systems verbessert. Die Kunden sind im vorliegenden Falle in erster Linie die Teilnehmer, die die Dienstleistung empfangen und diese bewerten. Somit ist das Vorgehensmodell zum PSS-Engineering eine idealtypische Darstellung der Vorgehensweise zur Entwicklung des Service-Systems in dieser Dissertation.

Die Frage, wie Wissen heute im ITMC weitergegeben wird bzw. werden sollte, ist die Hauptforschungsfrage dieser Arbeit. Daher hat der Forschungsplan das Ziel, die Lösung dieses praktischen Problems sowie die Beantwortung der entsprechenden Forschungsfragen zu ermöglichen. Die Aspekte sind ineinander verschachtelt, was eine gemeinsame Betrachtung notwendig macht (Wieringa 2010). Der bisher skizzierte Forschungsprozess, welcher in Abb. 4.4 dargestellt ist, bestimmte grundlegend den Forschungsplan dieser Dissertation. Die drei Forschungsfragen wurden dazu in Teilbereiche unterteilt, welchen dann wiederum die zu unternehmenden Aktionen bzw. Forschungsleistungen zugeordnet wurden.

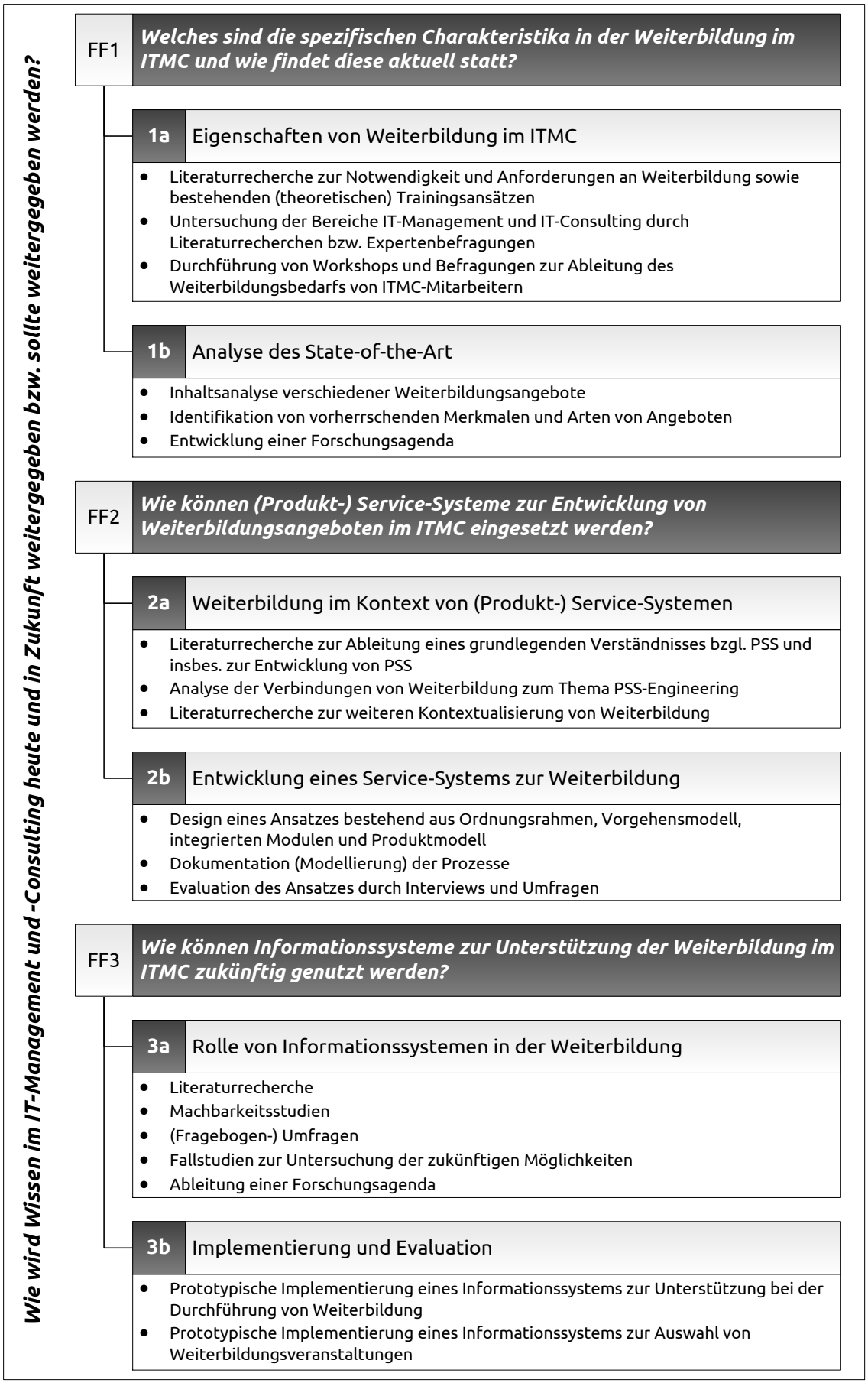


Abb. 4.4 Forschungsplan

Folgende Forschungsmethoden werden in den Beiträgen dieser kumulativen Dissertation verwendet (Verwendung der Terminologie von Palvia et al. 2004):

- Literaturrecherche: Forschung, die bestehende Literatur kritisiert, analysiert und erweitert und so versucht, neue Grundlagen inklusive Meta-Analysen zu legen. Dabei wird Richtlinien zur Durchführung strukturierter Recherchen gefolgt (Webster und Watson 2002; vom Brocke et al. 2009).

- Ordnungsrahmen und konzeptionelle Modelle: Forschung zur Entwicklung von Ordnungsrahmen (Frameworks) und konzeptionellen Modellen, wie beispielsweise Vorgehens- und Produktmodellen.

- Interview: Forschung, die Informationen durch direkte Befragung bezieht. Die Fragen und Antworten können frei und offen formuliert werden. Interviewte können einzelne Experten oder Fokusgruppen sein.

- Umfrage: Forschung, die vordefinierte und strukturierte Fragebögen nutzt, um Daten von Individuen zu erhalten. Die Fragebögen können in Papierform vorliegen oder online ausgefüllt werden.

- Inhaltsanalyse: Methode der systematischen Analyse von Texten oder sonstigen Dokumenten und Notizen. Dabei werden Themen identifiziert und gruppiert, so dass Codes zur Entwicklung von Kategorien verwendet werden können.

- Fallstudie: Studie von bestimmten Phänomenen, beispielsweise eine Anwendung, eine Technologie oder eine Entscheidung, in einer Organisation über eine bestimmte logische Zeitspanne.

Eine besonders wichtige Methode, die in dieser Arbeit Anwendung findet, ist die des Prototypenbaus. Ein Prototyp ist dabei ein „ausführbares Modell eines zu entwickelnden Softwaresystems […] auf dessen Basis das System bzw. wesentliche Funktionalitäten des Systems analysiert werden können“ (Thomas 2006, S. 13). Für die Wirtschaftsinformatik stellt diese Methode ein methodologisches Spezifikum dar, da sie zum einen zur Evaluation argumentativ-deduktiv hergestellter Forschungsergebnisse dient (Proof-of-concept) und zum anderen selbst eine Forschungsleistung darstellt (Wilde und Hess 2007, S. 285; Gregor 2007, S. 20). Zusätzlich wird die Workshop-Methode als Kombination von Interview und Umfrage eingesetzt. Weiterhin werden Machbarkeitsstudien durchgeführt, Prozesse modelliert und Forschungsagenden aufgestellt.

5 Ergebnisse

5.1 Überblick

Die Beiträge, die im Rahmen dieser Dissertation verfasst wurden, können anhand des Vorgehensmodells zum PSS-Engineering von Thomas et al. (2008) eingeordnet werden (vgl. Abb. 5.1). Dabei wird deutlich, dass zwei Zyklen durchlaufen werden. Die blau hinterlegten Beiträge beschreiben den ersten Zyklus, der den Großteil der Entwicklung beinhaltet. Im zweiten Zyklus symbolisieren die grün hinterlegten Beiträge den Schritt der Weiterentwicklung und umfangreichen Anwendung sowie Analyse der Artefakte. Beitrag 6 (orange hinterlegt) nimmt insofern eine Sonderstellung ein, als dass hier eine umfassende und grundlegende Begriffs- und Standortbestimmung vorgenommen wird.

Es wird deutlich, dass alle relevanten Bereiche abgedeckt werden. Insbesondere die Entwicklung und Anwendung des Service-Systems werden vollständig durchlaufen. Die Beiträge 4, 5 und 7 respektive 8, 9 und 10 konzentrieren sich aber auch auf die Entwickler- bzw. Kundenzyklen.

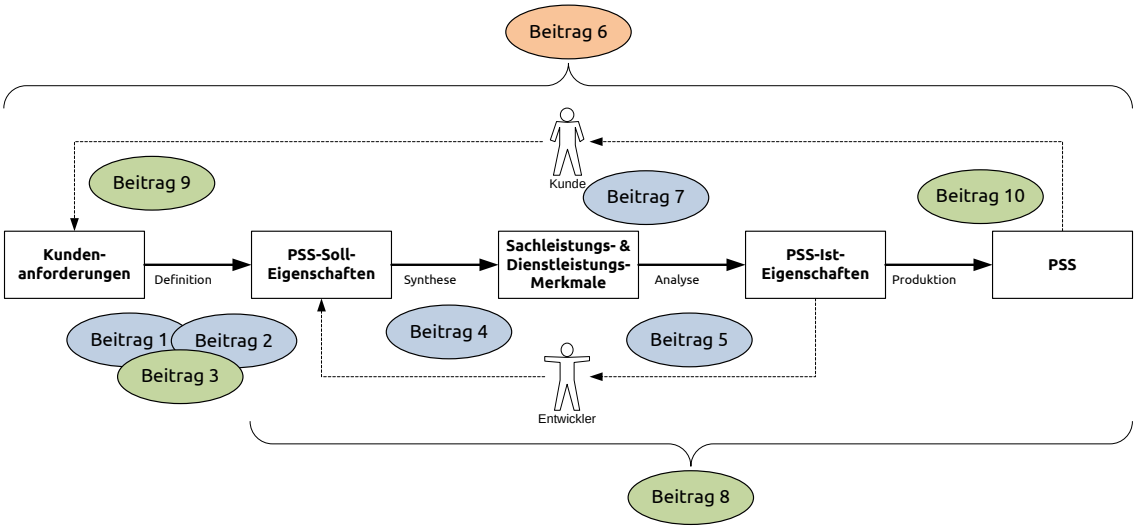


Abb. 5.1 Einordnung der Beiträge

Tab. 5.1 stellt eine Gesamtübersicht über die eingereichten Beiträge inklusive der bibliographischen Informationen und dazugehörigen Erläuterungen dar. Im Folgenden werden die jeweiligen Teilergebnisse beschrieben. Dabei werden jeweils Vorgehen, die verwendeten Methoden und der inhaltliche Zusammenhang der einzelnen Beiträge dargelegt.

Beitrag	Publikationstyp	Publikationsorgan	Ranking		Publikations-information
			VHB JQ 2.1	WKWI	
1	T	17th Americas Conference on Information Systems (AMCIS 2011)	D	B	**Boehm, M.**; Stolze, C.; Breitschwerdt, R.; Zarvić, N.; Thomas, O. (2011): An Integrated Approach for Teaching Professionals IT Management and IT Consulting. In: Proceedings of the 17th Americas Conference on Information Systems : Detroit, Michigan, August 4-7, 2011. Atlanta, Georgia, USA : AIS, Paper 72. *[1], *[2], *[3]
2	T	IFIP WG 8.6 Working Conference (2011)	-	B	Stolze, C.; **Boehm, M.**; Zarvić, N.; Thomas, O. (2011): Towards Sustainable IT by Teaching Governance Practices for Inter-Organizational Dependencies. In: Proceedings of IFIP WG 8.6 Working Conference, IFIP AICT 366. Berlin : Springer, S. 70-88. *[1], *[4]
3	T	Informatik 2011, 41. Jahrestagung der Gesellschaft für Informatik e.V. (GI)	C	B	**Boehm, M.**; Stolze, C.; Thomas, O. (2011): Berufsbegleitende Weiterbildung im Spannungsfeld von Wissenschaft und IT-Beratung: State-of-the-Art und Entwicklung eines Vorgehensmodells. In: Heiß, H.-U.; Pepper, P.; Schlingloff, H. (Hrsg.): Informatik 2011 : Informatik schafft Communities, 41. Jahrestagung der Gesellschaft für Informatik e.V. (GI), 4.-7.10.2011, Berlin. Bonn : Köllen (GI LNI, P–192). *[1], *[5]
4	T	4th International Workshop on Enterprise Modelling and Information Systems Architectures (EMISA 2011)	C	B	**Boehm, M.**; Stolze, C.; Thomas, O. (2011): Understanding IT-Management and IT-Consulting Teaching as Product Service System: Application of an Engineering Model. In: Nüttgens, M.; Thomas, O.; Weber, B. (Hrsg.): Enterprise Modelling and Information Systems Architectures (EMISA 2011), Hamburg, Germany, September 22-23, 2011. Bonn : Köllen (GI LNI, P-190), S. 219–224. *[1], *[6]
5	J	IM – Information Management und Consulting	E	-	**Boehm, M.**; Stolze, C.; Thomas, O. (2012): Zwischen Information und Innovation: CIO-Weiterbildungskonzepte im Wandel. In: Information Management und Consulting 28, Nr. 2, S. 48–56. *[1], *[7]
6	J	Journal of Cleaner Production	C	-	**Boehm, M.**; Thomas, O. (2013): Looking beyond the rim of one's teacup: A multidisciplinary literature review of Product-Service Systems in Information Systems, Business Management, and Engineering & Design. In: Journal of Cleaner Production, Vol. 51, S. 245-260. *[1]
7	T	11th International Conference on Wirtschafts-informatik (WI 2013)	C	A	**Boehm, M.**; Stolze, C.; Thomas, O. (2013): Teaching the Chief Information Officers: An Assessment of the Interrelations within their Skill Set. In: Alt, R.; Franczyk, B. (Hrsg.): Proceedings of the 11th International Conference on Wirtschaftsinformatik (WI 2013), Volume 2. Leipzig, S. 1573-1587. *[1], *[8]
8	J	Living Lab Business Process Management Research Report	-	-	**Boehm, M.**; Stolze, C.; Ludwig, S.; Müller, H. J.; Thomas, O. (2013): Developing IS Leaders through Integrated Teaching Processes – Design and Engineering of a Product-Service System. In Living Lab Business Process Management Research Report, Nr. 3, Osnabrück, Living Lab BPM e.V. *[1], *[9], *[10]
9	T	19th Americas Conference on Information Systems (AMCIS 2013)	D	B	**Boehm, M.**; Jasper, M.; Thomas, O. (2013): The Further Education Maturity Model: Development and Implementation of a Maturity Model for the Selection of Further Education Offerings in the Field of IT Management and IT Consulting. In: Proceedings of the 19th Americas Conference on Information Systems : Chicago, Michigan, August 15-17, 2013. Atlanta, Georgia, USA : AIS, Human Capital in Information Systems, Paper 4. *[1], *[11]
10	J	Living Lab Business Process Management Research Report	-	-	**Boehm, M.**; Stolze, C.; Fuchs, A.; Thomas, O. (2013): Enabling IT-Professionals to Cope with Technological Change through Skill-based Coaching. In Living Lab Business Process Management Research Report, Nr. 8, Osnabrück, Living Lab BPM e.V. *[1], *[12], *[13]

Erläuterungen

*[1] Herr Prof. Dr. Oliver Thomas hat als Koautor die inhaltliche und methodische Ausrichtung des Beitrags kritisch reflektiert und gemeinsam mit dem Verfasser dieser Dissertation diskutiert.

*[2] Herr Carl Stolze hat als Koautor insbesondere die Modulbeschreibung des Business-Process-Management-Moduls verfasst sowie die inhaltliche und methodische Ausrichtung des Beitrags kritisch reflektiert und gemeinsam mit dem Verfasser dieser Dissertation diskutiert.

*[3] Herr Rüdiger Breitschwerdt und Herr Novica Zarvić haben als Koautoren einen Beitrag bei der Durchführung der Experteninterviews geleistet.

*[4] Herr Carl Stolze hat als Erstautor zusammen mit Herrn Novica Zarvić die empirische Umfrage durchgeführt und ausgewertet sowie einen maßgeblichen Beitrag im Grundlagenteil erbracht. Herr Novica Zarvić hat als Koautor insbesondere die Evaluation in Form eines

Experimentes mit Masterstudenten zur Allokation von Verantwortungsbereichen leitender Angestellter durchgeführt. Der curriculare Ordnungsrahmen zur Weiterbildung wurde hauptsächlich von Herrn Carl Stolze und dem Verfasser dieser Dissertation erarbeitet.

*[5] Herr Carl Stolze hat als Koautor zu der Entwicklung des Vorgehensmodells maßgeblich beigetragen sowie die inhaltliche und methodische Ausrichtung des Beitrags kritisch reflektiert und gemeinsam mit dem Verfasser dieser Dissertation diskutiert.

*[6] Herr Carl Stolze hat als Koautor insbesondere die Kundenanforderungen aufgenommen und das Datenmodell mitentwickelt sowie die inhaltliche und methodische Ausrichtung des Beitrags kritisch reflektiert und gemeinsam mit dem Verfasser dieser Dissertation diskutiert.

*[7] Herr Carl Stolze hat als Koautor insbesondere die Einleitung/Motivation und Evaluation verfasst sowie die inhaltliche und methodische Ausrichtung des Beitrags kritisch reflektiert und gemeinsam mit dem Verfasser dieser Dissertation diskutiert.

*[8] Herr Carl Stolze hat als Koautor insbesondere bei der Korrelationsanalyse intensiv mitgewirkt sowie die inhaltliche und methodische Ausrichtung des Beitrags kritisch reflektiert und gemeinsam mit dem Verfasser dieser Dissertation diskutiert.

*[9] Herr Carl Stolze hat als Koautor insbesondere die Grundlagen zum Thema Business Process Management verfasst sowie die inhaltliche und methodische Ausrichtung des Beitrags kritisch reflektiert und gemeinsam mit dem Verfasser dieser Dissertation diskutiert.

*[10] Herr Sven Ludwig und Frau Heidrun Jessica Müller wurden als Koautoren bei der Programmierung des Prototypen bzw. bei der Durchführung der Experteninterviews vom Verfasser dieser Dissertation angeleitet.

*[11] Herr Michael Jasper hat als Koautor die iterative Reifegradmodellentwicklung durchgeführt. Bei der Dokumentation der Ergebnisse sowie bei der von ihm getätigten Implementierung der Transfermittel wurde er vom Verfasser dieser Dissertation angeleitet.

*[12] Herr Carl Stolze hat als Koautor insbesondere die Grundlagen zu den Coaching-Ansätzen und die Fallstudie der agilen Softwareentwicklung verfasst. Ferner hat er zu gleichen Teilen mit dem Verfasser dieser Dissertation die Diskussion dokumentiert sowie die inhaltliche und methodische Ausrichtung des Beitrags kritisch reflektiert und gemeinsam mit dem Verfasser dieser Dissertation diskutiert.

*[13] Herr Alexander Fuchs hat als Koautor insbesondere Informationen zur Fallstudie der agilen Softwareentwicklung beigetragen.

Legende

T = Tagung

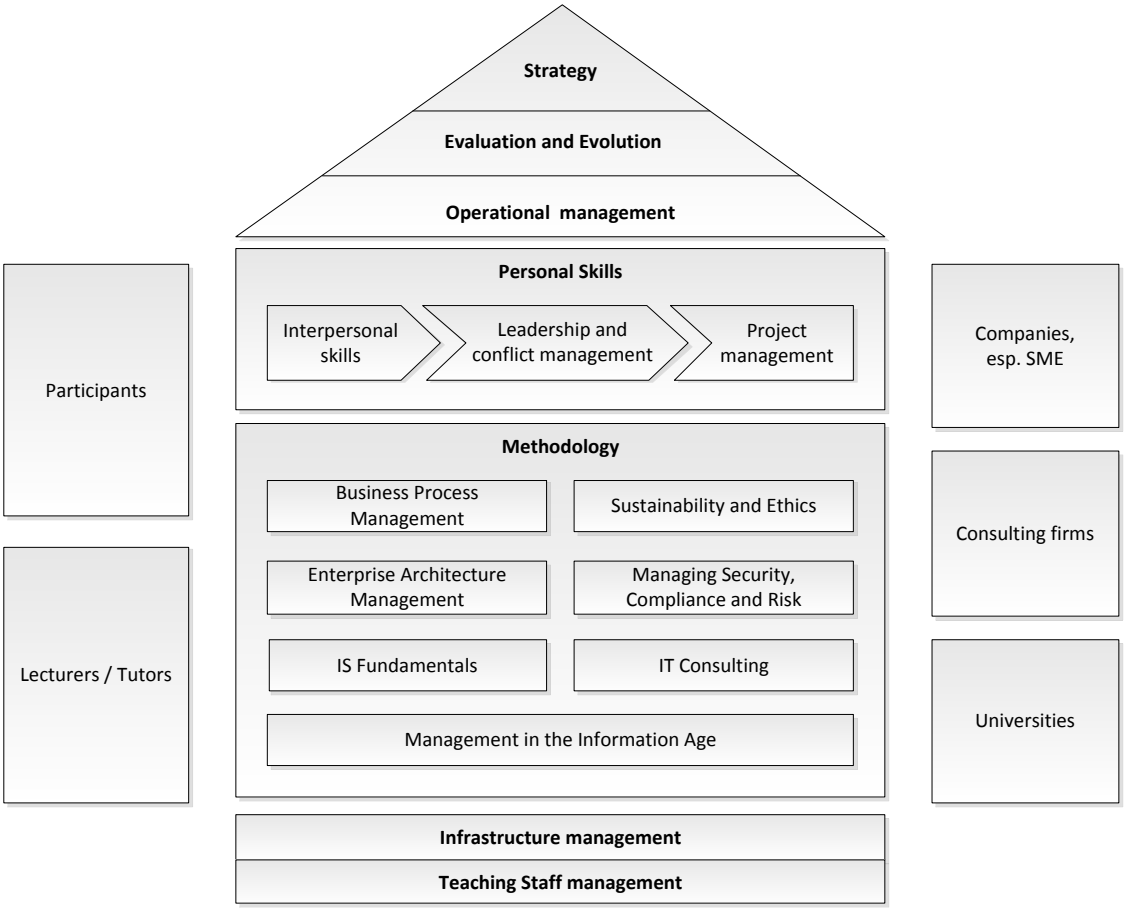
J = Journal

VHB JQ 2.1 = Verband der Hochschullehrer für Betriebswirtschaftslehrer e. V. – Journal Quality Index 2.1 (2011)

WKWI = Wissenschaftliche Kommission Wirtschaftsinformatik im VHB e. V.

Tab. 5.1 Gesamtüberblick über die eingereichten Beiträge

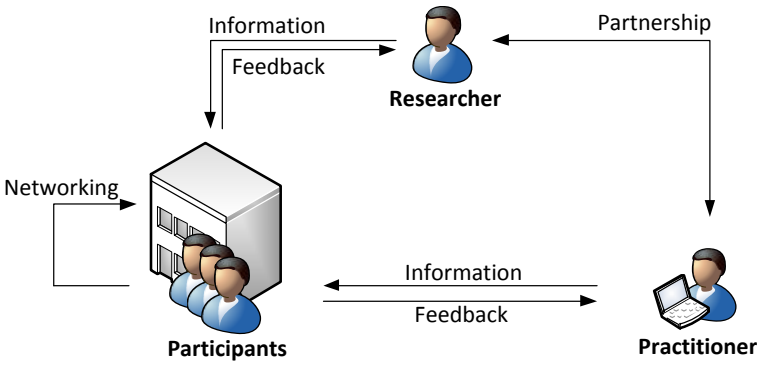
In Beitrag 1 (Boehm et al. 2011a) werden die Teilforschungsfragen 1a (Eigenschaften von Weiterbildung im ITMC) und 2b (Entwicklung eines Service-Systems zur Weiterbildung) des Forschungsplans (vgl. Abb. 4.4) bearbeitet. Es findet eine grundlegende Entwicklung des integrierten Ansatzes zur Weiterbildung statt. Basierend auf umfangreicher Literaturrecherche und Expertenbefragung werden Anforderungen an einen solchen Ansatz abgeleitet. Anschließend werden bestehende universitäre Angebote ausführlich analysiert und verglichen. So wird ein Ordnungsrahmen für den integrierten Ansatz beschrieben, der alle wichtigen inhaltlichen und organisatorischen Bereiche von Weiterbildung im ITMC enthält (vgl. Abb. 5.2). Zusätzlich werden in diesem Beitrag die Module ausführlich diskutiert. Im Ergebnis wird das Design Artefakt bestehend aus Ordnungsrahmen und Modulbeschreibungen evaluiert und als Ausgangspunkt für weitere Arbeiten verwendet.



Quelle: Boehm et al. 2011a

Abb. 5.2 Ordnungsrahmen des integrierten Ansatzes

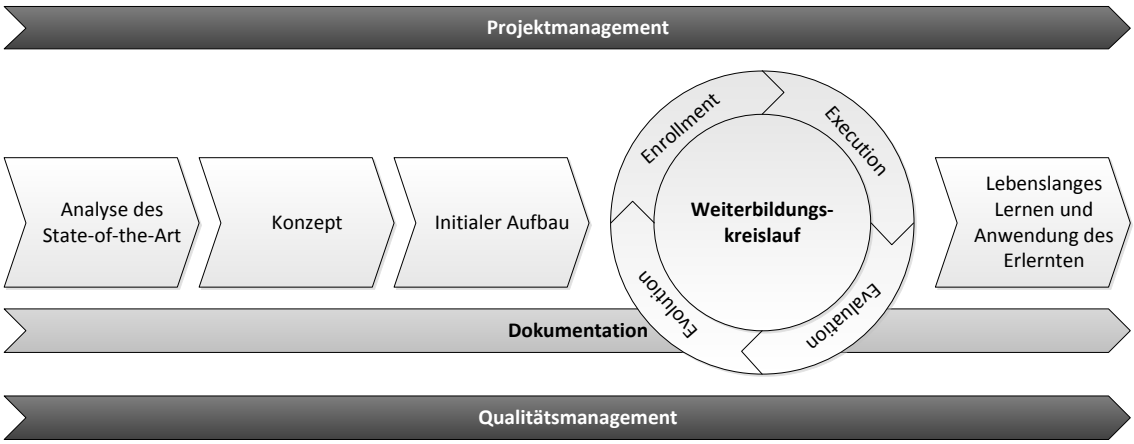
Beitrag 2 (Stolze et al. 2011a) erweitert die Ergebnisse aus Boehm et al. (2011a) und ordnet diese in den Kontext der nachhaltigen Unternehmensgestaltung und interorganisationaler Abhängigkeiten ein. Aspekte der Steuerung und Kontrolle, Qualitätssicherung (Evaluation/Evolution) sowie Projektmanagementthemen werden hier aufgegriffen und vertieft. So wird beispielsweise das Modell der Forscher-Praktiker-Zusammenarbeit dargestellt und erläutert (vgl. Abb. 5.3). Dieses Modell basiert auf den Ideen der sog. Collaborative Practice Research (Mathiassen 2002). Demnach arbeiten Forscher und Praktiker zusammen, um gemeinsam ihr Wissen zu teilen. Aus Teilnehmersicht spielt nicht nur der Wissenserwerb sondern auch der Austausch untereinander (Networking) eine große Rolle. Im Beitrag wird insbesondere der integrative Charakter des Ansatzes verdeutlicht, indem das integrierte weil interdisziplinäre Modul zur Weiterbildung beschrieben wird (Titel: Governance Practices for IORs in the Context of Sustainable IT). Somit leistet dieser Artikel einen Beitrag zur Forschungsfrage 2.



Quelle: Stolze et al. 2011a

Abb. 5.3 Modell der Forscher-Praktiker-Zusammenarbeit

Im 3. Beitrag (Boehm et al. 2011b) werden ähnlich wie in Boehm et al. (2011a) die Teilforschungsfragen 1a und 2b des Forschungsplans bearbeitet. Allerdings liegt hier der Fokus speziell auf dem Themenfeld der IT-Beratung. Mit Hilfe einer Literaturanalyse sowie einer State-of-the-Art-Erhebung von Angeboten der universitären Weiterbildung wird ein Vorgehensmodell für die Kooperation zwischen Wissenschaft und Praxis beschrieben (vgl. Abb. 5.4). Somit wird aufgezeigt, dass gerade Wissenschaftler und IT-Berater voneinander profitieren können, um gemeinsam Trends zu erkennen, zu verstehen und zu analysieren.

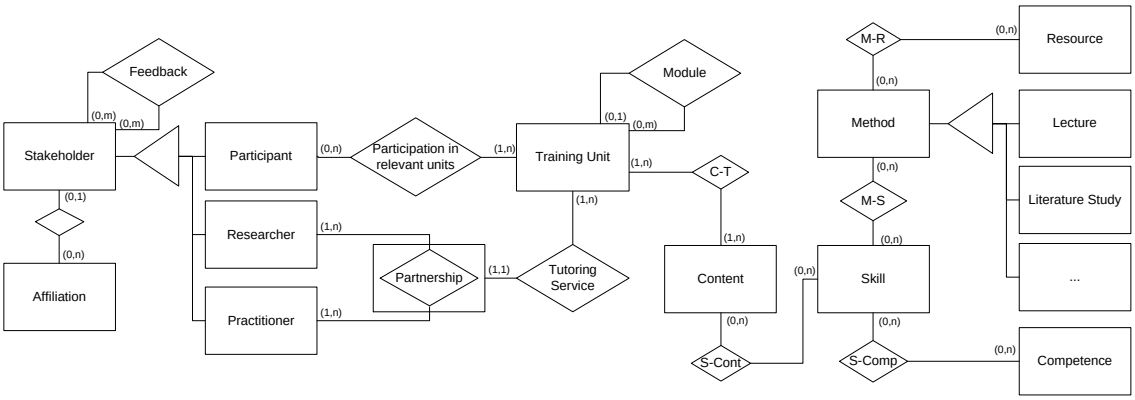


Quelle: Boehm et al. 2011b

Abb. 5.4 Vorgehensmodell zur Gestaltung des integrierten Weiterbildungsansatzes

Beitrag 4 (Boehm et al. 2011c) fokussiert die Teilforschungsfragen 2a (Weiterbildung im Kontext von (Produkt-) Service-Systemen) und 3a (Rolle von Informationssystemen in der Weiterbildung) des Forschungsplans. Ziel ist es zu untersuchen, ob Methoden des PSSE auf die Entwicklung von Weiterbildungsveranstaltungen angewendet werden können. Es werden mit Hilfe von

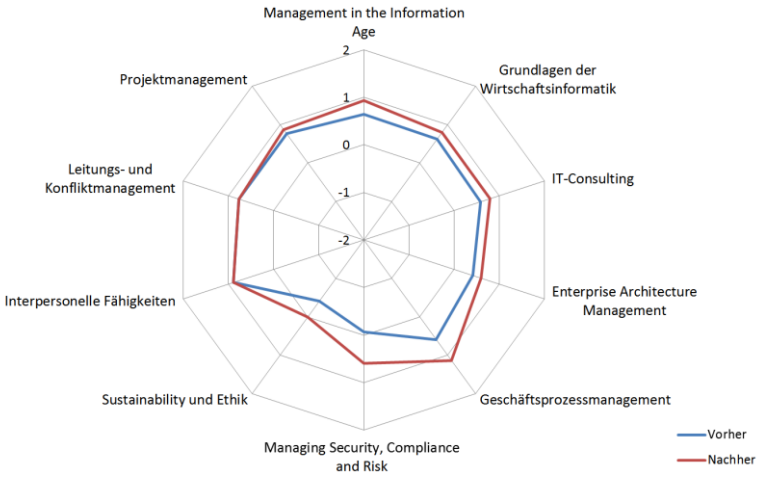
qualitativen Experteninterviews Kundenanforderungen abgeleitet und ein Produktmodell dargestellt. Eine prototypische Umsetzung eines Systems zur Unterstützung von Weiterbildung wird beschrieben (vgl. Abb. 5.5).



Quelle: Boehm et al. 2011c, S. 223

Abb. 5.5 Datenmodell des Prototypen

Im Gegensatz zu Boehm et al. (2011b), welcher den Themenbereich der IT-Beratung detailliert untersucht, konzentriert sich der 5. Beitrag (Boehm et al. 2012) auf den CIO. So wird u.a. die neue Rolle als Chief Innovation Officer diskutiert. Darauf aufbauend beschreibt der Beitrag die erfolgreiche Durchführung des in den vorherigen Beiträgen entwickelten Ansatzes. Es wird darüber hinaus beispielsweise das Vorgehensmodell von Boehm et al. (2011b) weiterentwickelt und evaluiert (vgl. Abb. 5.6). Insgesamt liefert dieser Artikel Antworten auf die Teilforschungsfragen 1a und 2b.



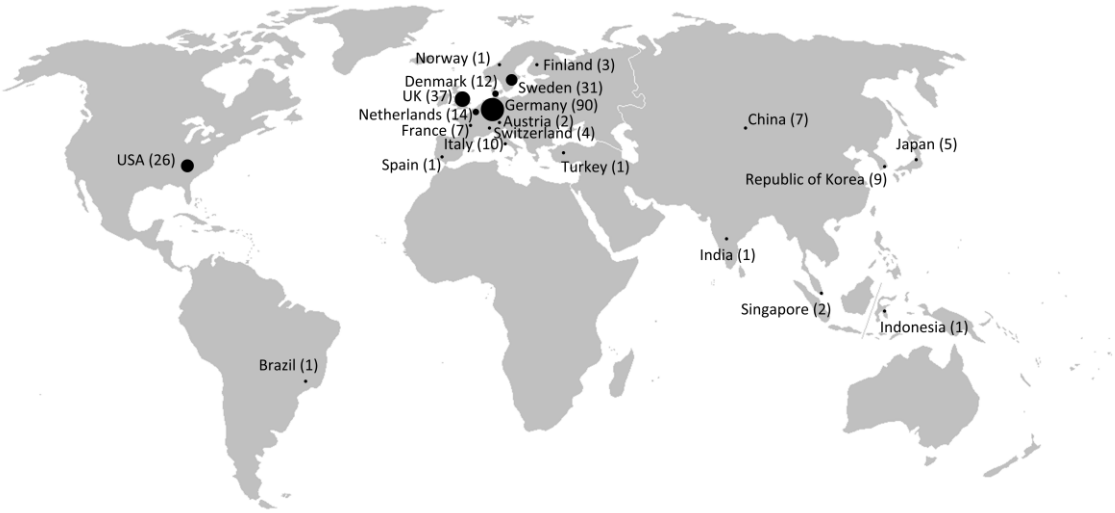
Quelle: Boehm et al. 2012, S. 54

Abb. 5.6 Fähigkeiten der ITMC-Mitarbeiter vor und nach der Teilnahme an IMUCON

Beitrag 6 (Boehm und Thomas 2013) kann als Grundlagenartikel zum Thema (Entwicklung von) PSS gesehen werden. Daher liegt der Fokus hier vollkommen auf der Beantwortung der Teilforschungsfrage 2a. Es handelt sich um eine umfangreiche und strukturierte Literaturstudie von insgesamt 265 Artikeln, die den Richtlinien von Webster und Watson (2002) sowie Vom Brocke et al. (2009) folgt. Dabei wird u.a. eine Weltkarte aller Artikel zum Thema PSS erstellt (vgl. Abb. 5.7). Zusätzlich wird die PSS-Forschung in den Disziplinen Wirtschaftsinformatik, Betriebswirtschaftslehre und Ingenieurwissenschaften miteinander mit Hilfe sog. Definitionsgraphen (Zarvić et al. 2011) verglichen. Dadurch kann die disziplinübergreifende Kerndefinition von PSS entwickelt werden. Demnach ist ein PSS:

> „an integrated bundle of products and services which aims at creating customer utility and generating value“ (Boehm und Thomas 2013, S. 9).

Zusammen mit der präsentierten Forschungsagenda – insbesondere zur Entwicklung von PSS – liefert der Beitrag ein besseres Verständnis des Forschungsfeldes und stellt somit die Grundlage für die vorliegende Dissertation dar.

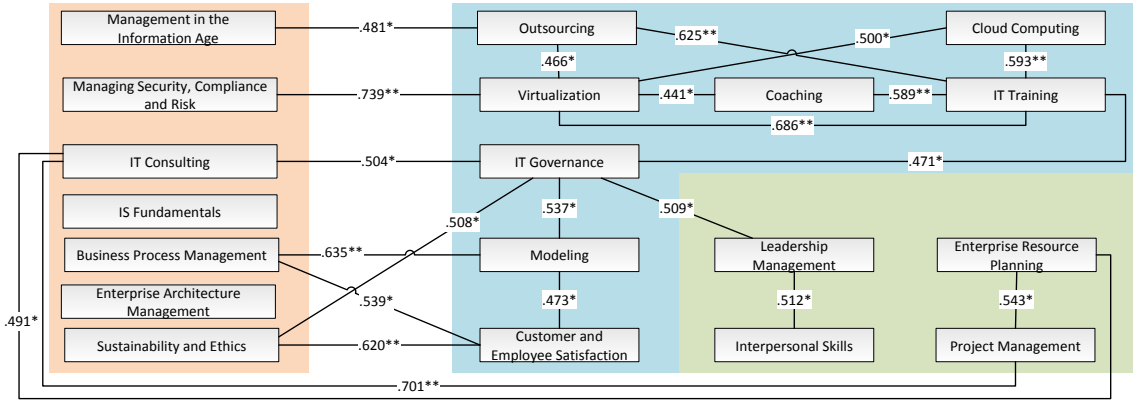


Quelle: Boehm und Thomas 2013, S. 250

Abb. 5.7 Weltkarte von Veröffentlichungen zum Thema PSS

Im 7. Beitrag (Boehm et al. 2013d) wird abschließend Teilforschungsfrage 1a beantwortet. Mit Hilfe mehrerer qualitativer und quantitativer Workshops werden die Fähigkeiten von ITMC-Mitarbeitern analysiert und der Nachholbedarf identifiziert. Zunächst wird basierend auf einem Soll-Profil eine Liste mit notwendigen Fähigkeiten abgeleitet. Darauf wird der Kenntnisstand von 21 CIOs in diesen Bereichen überprüft. Zusammenhänge zwischen den Fähigkeiten werden untersucht (vgl. Abb. 5.8), um diese für die Weiterentwicklung des

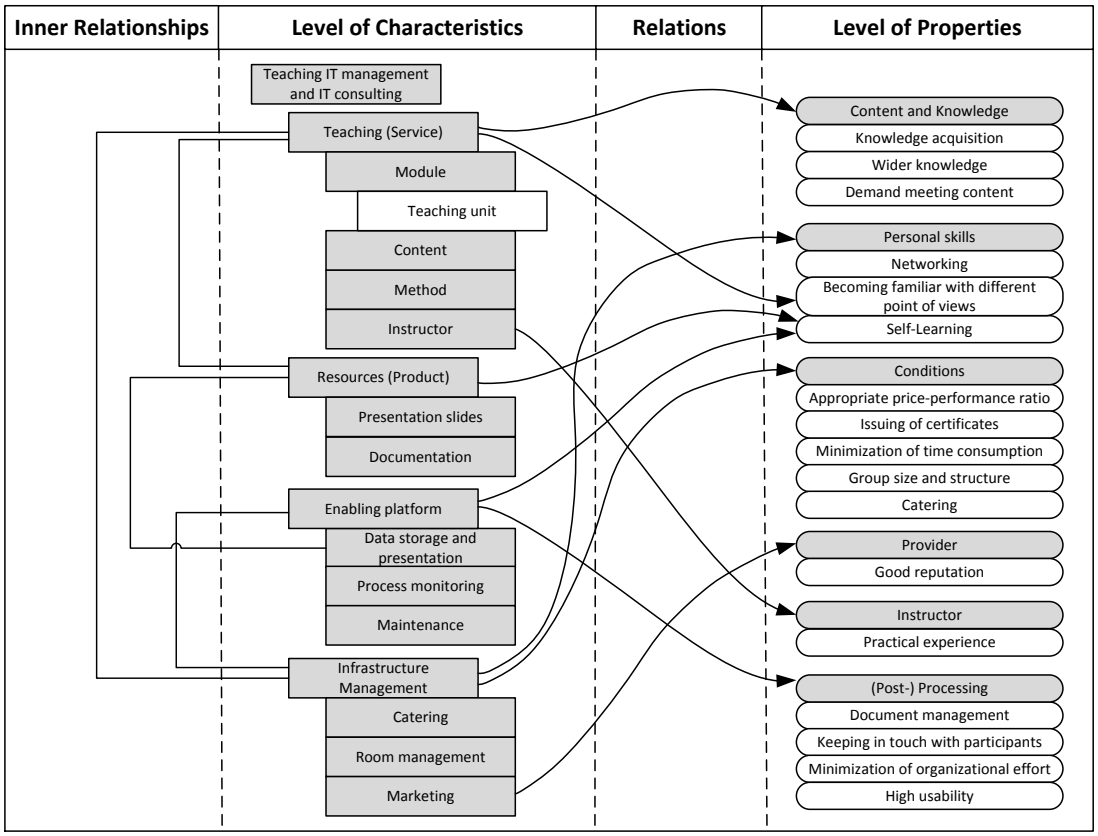
integrierten Ansatzes zu nutzen. Das Netzwerkdiagramm liefert einen wichtigen Beitrag, um Zusammenhänge zwischen den Fähigkeiten besser zu verstehen und so passende Angebote entwickeln zu können.



Quelle: Boehm et al. 2013d, S. 1582

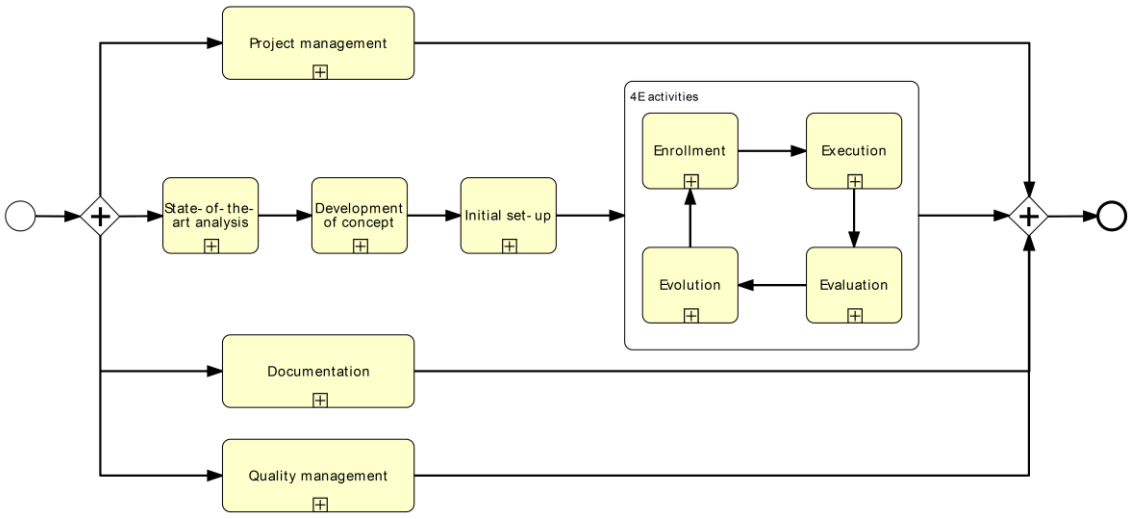
Abb. 5.8 Netzwerkdiagramm der Korrelationen der Fähigkeiten

Beitrag 8 (Boehm et al. 2013c) kombiniert DSR und PSSE, um den bisher dokumentierten Ansatz weiterzuentwickeln. Der Fokus liegt dabei auf Weiterbildungsprozessen und deren informationstechnischer Unterstützung. Zunächst wird mit Hilfe von Interviews ein Produktmodell für Weiterbildung im ITMC entwickelt (vgl. Abb. 5.9). Das in Boehm et al. (2011b) vorgestellte Vorgehensmodell wird anschließend in eine prozessorientierte Darstellung überführt (vgl. Abb. 5.10). Anschließend werden für jeden Teilprozess detaillierte Modelle entwickelt und hinterlegt. Abb. 5.11 enthält dazu beispielhaft den Prozess des Aufsetzens einer Weiterbildungsveranstaltung (Enrollment). Für viele der in diesem und den anderen Modellen hinterlegten Prozessschritte sind weitere verfeinerte Modelle, die den jeweiligen Sachverhalt detaillieren, erstellt worden. Der in Boehm et al. (2011c) präsentierte Prototyp wird hier erweitert und verbessert (vgl. Abb. 5.12). In einer praktischen Anwendung wird die Nützlichkeit gezeigt. Daher dient dieser Beitrag zur Beantwortung der Teilforschungsfragen 2b und 3b.



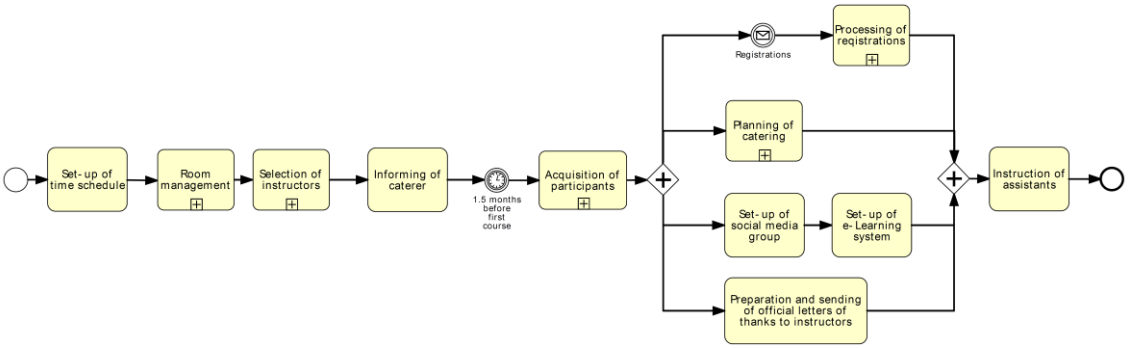
Quelle: Boehm et al. 2013c, S. 7

Abb. 5.9 Produktmodell



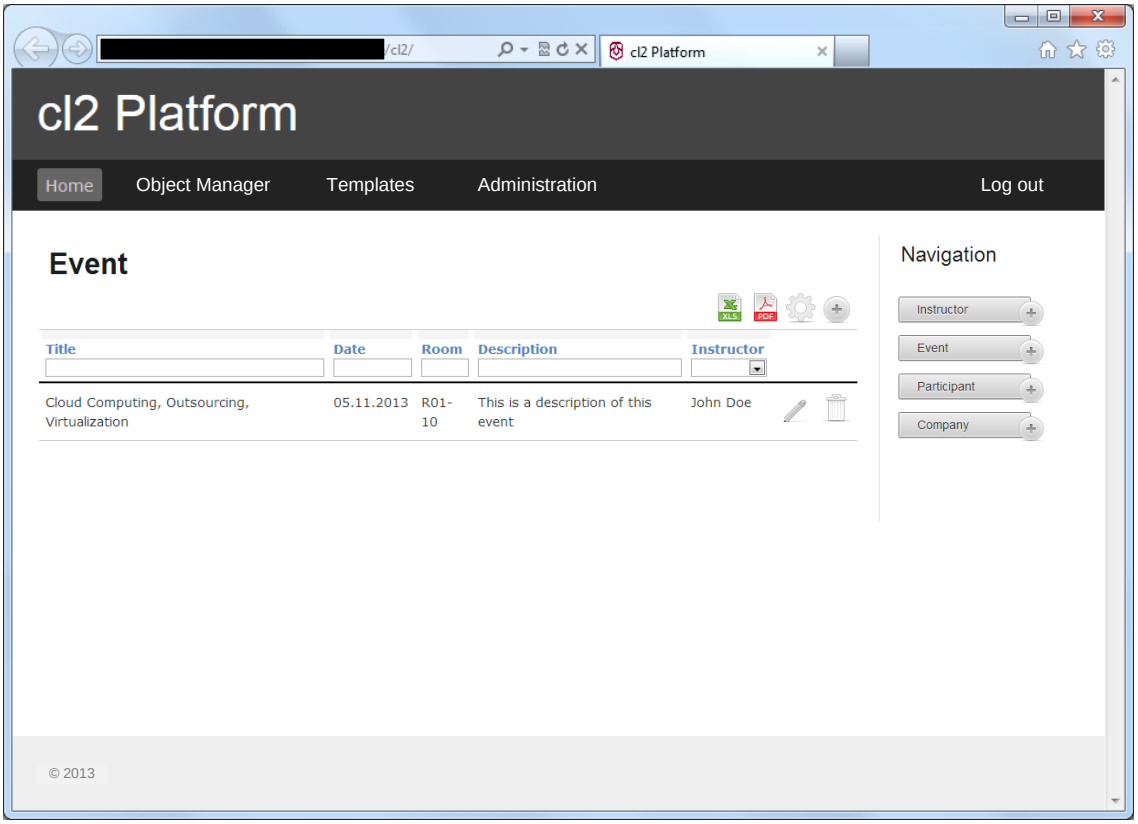
Quelle: Boehm et al. 2013c, S. 8

Abb. 5.10 Vorgehensmodell



Quelle: Boehm et al. 2013c, S. 8

Abb. 5.11 Modell des Enrollments einer Weiterbildungsveranstaltung

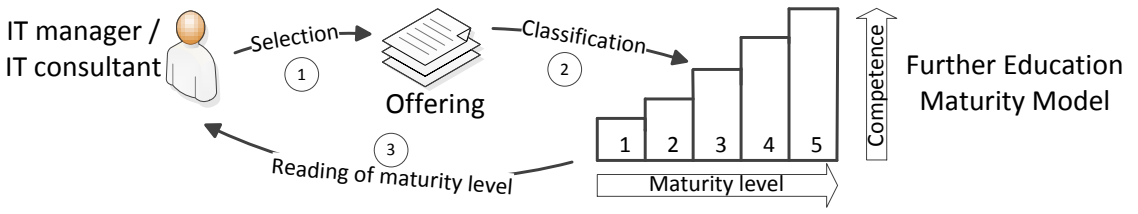


Quelle: Boehm et al. 2013c, S. 10

Abb. 5.12 Screenshot des Prototypen

Beitrag 9 (Boehm et al. 2013a) trägt zur Beantwortung der Teilforschungsfragen 1b sowie 3b bei, indem ein Reifegradmodell zur Auswahl und Bewertung von Weiterbildungsveranstaltungen konzipiert und implementiert wird. Dieses Further Education Maturity Modell (FEMM) hilft dem ITMC-Mitarbeiter dabei, einen Überblick über den Weiterbildungsmarkt zu bekommen. Es ermöglicht eine schnelle Einschätzung der Qualität von Angeboten (vgl. Abb. 5.13). Die Entwicklung des Modells basiert auf einem anerkannten Verfahren

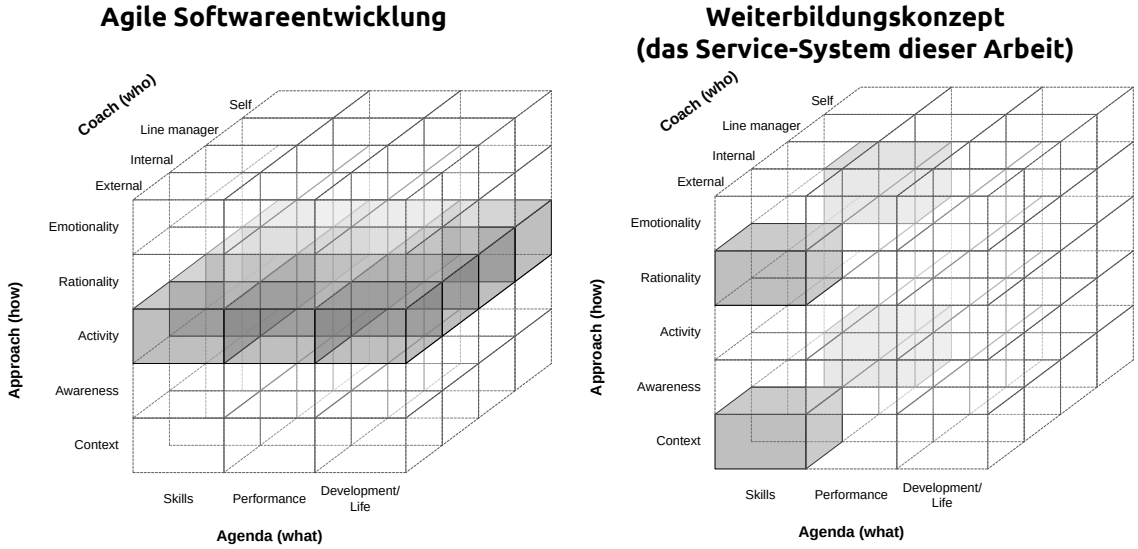
von Becker et al. (2009). Implementiert wurde das Reifegradmodell in einem Online-Tool, welches unter der Adresse `http://www.imwi.uos.de/femm/` frei verfügbar ist.



Quelle: Boehm et al. 2013a

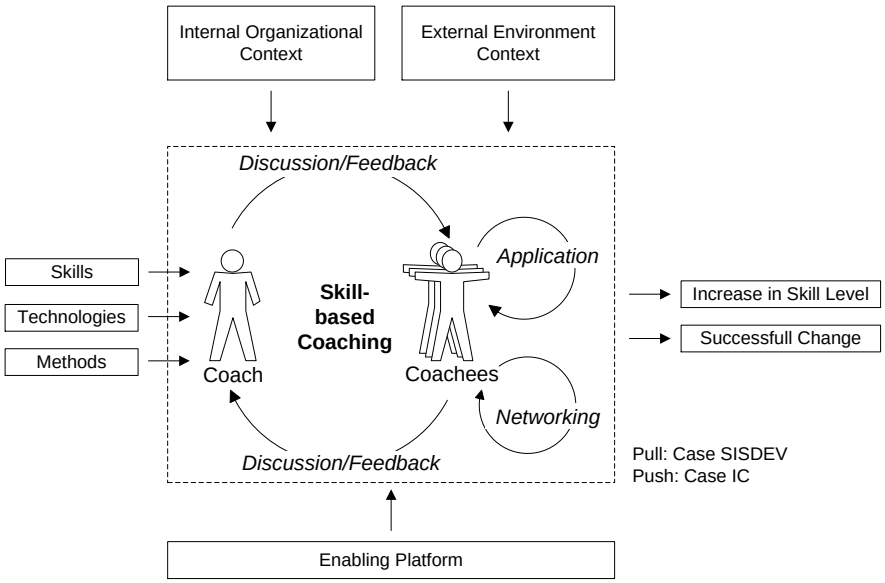
Abb. 5.13 Vorgehen zur Nutzung des Further Education Maturity Model

Abschließend wird im 10. Beitrag (Boehm et al. 2013b) das entwickelte Weiterbildungskonzept ausführlich analysiert. Die Durchführung des in dieser Dissertation entwickelten Ansatzes sowie die Anwendung einer Coaching-Maßnahme zur agilen Softwareentwicklung werden miteinander verglichen und unter dem Stichwort des Skill-based Coaching zusammengefasst. Die Vorteile werden beschrieben und Erfolgsfaktoren dargelegt. Außerdem zeigt die Anwendung des sog. Coaching-Cube (Segers et al. 2011), welche Bereiche beim Skill-based Coaching von besonderer Relevanz sind (vgl. Abb. 5.14). Hinzu kommt, dass in dem Beitrag Skill-based Coaching theoretisch konzeptuell erfasst und dargestellt wird (vgl. Abb. 5.15).



Quelle: Boehm et al. 2013b

Abb. 5.14 Anwendung des Coaching-Cube auf die beiden Fallstudien



Quelle: Boehm et al. 2013b

Abb. 5.15 Konzeptualisierung des Skill-based Coaching

5.2 Theoretische Implikationen

Berufsbegleitende Weiterbildung ist wichtig, um auch zukünftig erfolgreich am Markt tätig zu sein (Hentschel 2012). Aus diesem Grund bedarf es neben praktisch verwertbaren Ergebnissen auch wissenschaftlicher Resultate, die einen nützlichen Beitrag für Wissenschaft und Theorie leisten. Die Frage, die sich dabei stellt, ist, wie DSR einen signifikanten Beitrag zum Wissen generieren und beweisen kann (Gregor und Hevner 2013). Die Beiträge dieser Dissertation geben darauf eine Antwort, indem sie zeigen, welche Möglichkeiten sich durch die Anwendung von DSR ergeben.

Beitrag 1 (Boehm et al. 2011a) beschreibt dazu ein neues Coaching- und Lehrkonzept für ITMC-Mitarbeiter, welches ein Framework sowie Modulbeschreibungen des integrierten Ansatzes enthält. Diese Idee wird in Beitrag 2 (Stolze et al. 2011a) und 3 (Boehm et al. 2011b) erweitert. Während im 2. Beitrag die Interdisziplinarität im Vordergrund steht und im Detail erläutert wird, beschreibt der 3. Beitrag u.a. ein Vorgehensmodell als Teil des Ansatzes. Diese drei Beiträge zusammen beinhalten darüber hinaus eine umfangreiche Analyse des State-of-the-Art bestehender Angebote. Zusammen bilden sie somit einen optimalen Ausgangspunkt für zukünftige Arbeiten in diesem Bereich. Beitrag 4 (Boehm et al. 2011c) und Beitrag 5 (Boehm et al. 2012) beschreiben die weitergehende Entwicklung und Evaluation der Artefakte. Anwendbarkeit und Nützlichkeit werden somit dargelegt und kontrolliert. So können in Zukunft andere Arbeiten auf dem geprüften Ansatz aufbauen.

Beitrag 6 (Boehm und Thomas 2013) nimmt in gewisser Weise eine Sonderstellung ein. Hier wird grundlegend das Thema PSS und PSSE mit Hilfe eines umfangreichen Literaturreviews aufgearbeitet. Darauf aufbauend wird eine Definition für PSS entwickelt und eine Forschungsagenda mit elf Punkten beschrieben. Dieser Artikel liefert besonders auch für Forscher anderer Disziplinen, wie den Betriebswirtschaften oder Ingenieurswissenschaften, wertvolle Informationen zum PSS-Forschungsfeld und stellt somit eine solide Basis für zukünftige Forschungsarbeiten dar. Zusätzlich hilft der Vergleich der Literatur anderen Forschern, die einen schnellen Überblick über alle relevanten Artikel des Feldes bekommen möchten.

Im Beitrag 7 (Boehm et al. 2013d) wird eine Antwort auf die Frage gegeben, welche Fähigkeiten CIOs heute besitzen und wie diese miteinander verbunden sind. Das Netzwerkdiagramm liefert einen wertvollen Beitrag über die Zusammenhänge zwischen Fähigkeiten von CIOs. Es kann zudem zukünftig für weitergehende Analysen genutzt werden. Der vorliegende Beitrag kann jedoch schon jetzt als Know-how-Basis für die Lehre von CIOs in der Zukunft betrachtet werden.

Die in den vorherigen Beiträgen entwickelten Artefakte werden im Beitrag 8 (Boehm et al. 2013c) zusammengeführt. Darauf aufbauend wird ein Service-System in Form eines Produkt- und Prozessmodells zur berufsbegleitenden Weiterbildung von ITMC-Mitarbeitern entwickelt. Der darin enthaltene Prototyp sowie das Integrationskonzept können auch von anderen Forschern für ihre Arbeiten genutzt werden. Dies trifft ebenso auf Beitrag 9 (Boehm et al. 2013a) zu, welcher ein Reifegradmodell zur Auswahl von Weiterbildungsveranstaltungen beschreibt und dessen Implementierung in Form eines Online-Tools von der Wissenschaftsgemeinschaft frei genutzt werden kann. Somit können weitere Modelle entwickelt werden, die sich beispielsweise auf andere Zielgruppen konzentrieren. Abschließend stellt die Anwendung des Coaching Cube, die Evaluation der in dieser Dissertation entwickelten Artefakte sowie die Konzeptualisierung von Skill-based Coaching in Beitrag 10 (Boehm et al. 2013b) einen Ausgangspunkt für zukünftige Forschung dar. So kann z.B. die Anwendbarkeit in anderen Szenarien überprüft werden.

Insgesamt ist festzuhalten, dass die Implikationen und Auswertungsmöglichkeiten der Beiträge dieser kumulativen Dissertation sehr vielfältig sind. Die rigorose Entwicklung des Service-Systems kann als Basis für zukünftige und weitergehende Forschungsarbeiten dienen.

5.3 Praktische Implikationen

Neben dem Beitrag zu theoretischen Fragestellungen liefert diese Dissertation auch Lösungen zu praxisrelevanten Problemen. So wurde beispielsweise der 5. Beitrag (Boehm et al. 2012) in einem besonders für Praktiker relevanten Journal veröffentlicht. Durch die Kommunikation von Forschungsergebnissen an die Praxis kann so die Relevanz der Arbeit sichergestellt werden. Außerdem wird die Anwendung des entwickelten Service-Systems in vielen Beiträgen beschrieben. Somit wird die unmittelbare Umsetzbarkeit sichergestellt. Besonders Beitrag 6 (Boehm und Thomas 2013) kann als Grundlagenartikel auch für Praktiker dienen, die das PSS-Konzept umsetzen möchten.

Darüber hinaus liefert Beitrag 1 (Boehm et al. 2011a) beispielsweise eine Übersicht über konkrete Weiterbildungsangebote. Beitrag 7 (Boehm et al. 2013d) hilft ITMC-Mitarbeiten zu verstehen, welche Fähigkeiten miteinander zusammenhängen und ggf. gemeinsam in einem Weiterbildungsangebot behandelt werden sollten. Beitrag 8 (Boehm et al. 2013c) liefert praktisch verwertbare Vorgehensmodelle zur Anwendung des Service-Systems in der Praxis. Das Reifegradmodell, welches im 9. Beitrag (Boehm et al. 2013a) erläutert wird, hilft Praktikern unkompliziert beim Vergleich von Weiterbildungsangeboten. Diese Transparenz ist ein großer Fortschritt im sonst unübersichtlichen Weiterbildungsmarkt. Somit können Fehlentscheidungen bei der Auswahl vermieden werden. Kostenersparnis ist die Folge. Ferner ist festzuhalten, dass durch die Anwendung des FEMM der Trainingseffekt verbessert werden kann und somit höhere Kompetenzen in kürzerer Zeit erreicht werden können. Abschließend zeigt die Konzeptualisierung von Skill-based Coaching in Beitrag 10 (Boehm et al. 2013b) die Anwendungsmöglichkeiten und das Potenzial des Service-Systems für die Praxis.

5.4 Limitationen

Die wissenschaftlichen Beiträge dieser Dissertation haben einen rigorosen Begutachtungsprozess durchlaufen. Dennoch sind Grenzen der Entwicklung und Anwendung des Service-Systems festzuhalten. Zunächst wurde das entwickelte Service-System nur in einem konkreten Fall angewendet. Obwohl wertvolle und nützliche Erkenntnisse gewonnen wurden, ist eine Anwendung in weiteren Fällen notwendig. Generell ist eine weitergehende Evaluation und Verbesserung des Ansatzes mit Hilfe von zusätzlichem Feedback notwendig. Empirische, analytische, experimentelle oder testende Evaluationsmethoden sollten eingesetzt werden. Frank (2006) argumentiert jedoch, dass innovative

DSR-Artefakte ausreichend Zeit benötigen, um in der Praxis anerkannt zu werden, und die Evaluation meist durch die Praxis selbst durchgeführt wird.

Darüber hinaus ist anzumerken, dass die Weiterbildung an sich nicht im Kern evaluiert werden konnte. Die Messung des Lernerfolgs ist jedoch häufig nicht trivial und bedarf umfangreicher Forschungsarbeiten. Hier sind weitere Ansätze – beispielsweise die Balanced Scorecard (Kaplan und Norton 1992) – vielversprechend.

Aufgrund des dynamischen Umfeldes sind abschließend laufend weitere Anpassungen an den Artefakten notwendig. Das betrifft insbesondere die vermittelten Lehrinhalte. Änderungen müssen daher permanent beobachtet, dokumentiert und zeitnah auf allen Ebenen abgestimmt werden. Langzeitstudien über mehrere Jahre können die notwendigen Daten liefern.

6 Fazit und Ausblick

„If all learning were to be represented by an iceberg,
then the section above the surface of the water
would be sufficient to cover formal learning.“
FRANK COFFIELD (1999), S. 1

Das Ziel dieser Forschungsarbeit, die von einer Kombination von DSR und PSSE geleitet wurde, ist die Entwicklung und Anwendung eines Service-Systems zur berufsbegleitenden Weiterbildung im ITMC. Dieser Ansatz ermöglicht und verbessert den Informationsaustausch sowie die Zusammenarbeit zwischen Forschung und Praxis. Erfahrene und erfolgreiche Referenten schaffen darüber hinaus durch Weitergabe von Wissen und Erfahrungen eine Möglichkeit zur Selbstreflektion der Teilnehmer. Die erfolgreiche Anwendung der Artefakte im Forschungsprojekt IMUCON belegt die Nützlichkeit des beschriebenen Service-Systems.

Die Beiträge 1 bis 7 sowie 9 wurden national und international bei renommierten wissenschaftlichen Konferenzen und Journals veröffentlicht. Bezüglich der Autorenreihenfolge (vgl. Tab. 5.1) ist anzumerken, dass der Verfasser dieser Dissertation bei den meisten Beiträgen die Erstautorenschaft innehat. Das bedeutet, dass er jeweils den Hauptanteil bei der Durchführung der Forschungsleistungen erbracht hat. Die vollständigen bibliographischen Angaben der für diese Dissertation in Anrechnung gebrachten Leistungen sind sowohl der Gesamtübersicht (vgl. Tab. 5.1) als auch Teil B zu entnehmen.

Der zukünftige Forschungsbedarf wurde bereits im vorherigen Abschnitt deutlich. Eine weitergehende Evaluation des Erfolgs der Weiterbildungsmaßnahme scheint ebenso angebracht wie die fortlaufende Anpassung der Weiterbildungsinhalte. Darüber hinaus ist es notwendig, den Wissenstransfer zwischen ITMC-Mitarbeitern und Wissenschaftlern zu untersuchen und zu verbessern. Der im Rahmen dieser Dissertation entwickelte Prototyp sollte kontinuierlich weiterentwickelt werden, um ihn in ein marktfähiges Produkt zu transformieren. Aktuell werden die Erkenntnisse aus dem IMUCON-Projekt genutzt, um das Konzept zu verstetigen. Es ist somit festzuhalten, dass die erreichten Ergebnisse abschließend einen guten Überblick darüber geben, wie wir mit unserem Wissen heute und in Zukunft umgehen sollten.

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Teil B – Einzelbeiträge

Beitrag 1: An Integrated Approach for Teaching Professionals IT Management and IT Consulting

Titel	An Integrated Approach for Teaching Professionals IT Management and IT Consulting
Autoren	Matthias Boehm Carl Stolze Rüdiger Breitschwerdt Novica Zarvić Oliver Thomas
Publikationsorgan	Proceedings of the 17th Americas Conference on Information Systems
Ranking	VHB: D WKWI: B
Status	Veröffentlicht
Bibliographische Information	Boehm, M.; Stolze, C.; Breitschwerdt, R.; Zarvić, N.; Thomas, O. (2011): An Integrated Approach for Teaching Professionals IT Management and IT Consulting. In: Proceedings of the 17th Americas Conference on Information Systems : Detroit, Michigan, August 4-7, 2011. Atlanta, Georgia, USA : AIS, Paper 72.
URL	http://aisel.aisnet.org/amcis2011_submissions/72/
Abstract	In this paper, we develop an integrated approach for teaching professionals IT management and IT consulting (ITMC). With the help of a design science research methodology, we aim to facilitate and improve the collaboration between research and practice. After a comprehensive literature study we conduct interviews in order to identify problems and requirements for an integrated teaching approach. Furthermore, we analyze existing offerings from universities all over the world. Based on this, we present the framework for our approach and describe an exemplary module. Finally, we evaluate the concept and its applicability. By reviewing our approach one can say that all derived requirements are fulfilled and the feasibility can be shown.

Beitrag 2: Towards Sustainable IT by Teaching Governance Practices for Inter-Organizational Dependencies

Titel	Towards Sustainable IT by Teaching Governance Practices for Inter-Organizational Dependencies
Autoren	Carl Stolze Matthias Boehm Novica Zarvić Oliver Thomas
Publikationsorgan	Proceedings of IFIP WG 8.6 Working Conference 2011
Ranking	WKWI: B
Status	Veröffentlicht
Bibliographische Information	Stolze, C.; Boehm, M.; Zarvić, N.; Thomas, O. (2011): Towards Sustainable IT by Teaching Governance Practices for Inter-Organizational Dependencies. In: Proceedings of IFIP WG 8.6 Working Conference, IFIP AICT 366. Berlin : Springer, S. 70-88.
DOI	10.1007/978-3-642-24148-2_5
Abstract	The issue of sustainability has been among the top concerns of IT practitioners for some time now. Although sustainability of and through IT can only be reached if all stakeholders work together, current teaching and on-the-job training approaches do not provide the required understanding of how to govern the cooperation. Furthermore, there is a general gap between IS academia and practice regarding skill teaching, stakeholder informing and contributions towards sustainable business practices. In this paper, we adopt a design science research methodology to develop and evaluate a first approach to close this threefold gap.

Beitrag 3: Berufsbegleitende Weiterbildung im Spannungsfeld von Wissenschaft und IT-Beratung: State-of-the-Art und Entwicklung eines Vorgehensmodells

Titel	Berufsbegleitende Weiterbildung im Spannungsfeld von Wissenschaft und IT-Beratung: State-of-the-Art und Entwicklung eines Vorgehensmodells
Autoren	Matthias Boehm Carl Stolze Oliver Thomas
Publikationsorgan	Informatik 2011 : Informatik schafft Communities, 41. Jahrestagung der Gesellschaft für Informatik e.V. (GI), 4.-7.10.2011, Berlin. Bonn : Köllen (GI LNI, P–192).
Ranking	VHB: C WKWI: B
Status	Veröffentlicht
Bibliographische Information	Boehm, M.; Stolze, C.; Thomas, O. (2011): Berufsbegleitende Weiterbildung im Spannungsfeld von Wissenschaft und IT-Beratung: State-of-the-Art und Entwicklung eines Vorgehensmodells. In: Heiß, H.-U.; Pepper, P.; Schlingloff, H. (Hrsg.): Informatik 2011 : Informatik schafft Communities, 41. Jahrestagung der Gesellschaft für Informatik e.V. (GI), 4.-7.10.2011, Berlin. Bonn : Köllen (GI LNI, P–192).
URL	http://www.user.tu-berlin.de/komm/CD/paper/050233.pdf
Abstract	In diesem Beitrag wird anhand eines integrierten Ansatzes zur berufsbegleitenden Weiterbildung die Möglichkeit einer engeren Zusammenarbeit von Wissenschaft und IT-Beratung aufgezeigt. Die Entwicklung beruht auf einer umfangreichen Literaturanalyse sowie einer State-of-the-Art-Erhebung von Angeboten der universitären Weiterbildung. Anschließend wird ein Vorgehensmodell für die Kooperation zwischen Wissenschaft und Praxis beschrieben. Schlussendlich wird aufgezeigt, dass gerade Wissenschaftler und IT-Berater voneinander profitieren können, um gemeinsam Trends zu erkennen, zu verstehen und zu analysieren.

Beitrag 4: Understanding IT Management and IT Consulting Teaching as Product Service System: Application of an Engineering Model

Titel	Understanding IT Management and IT Consulting Teaching as Product Service System: Application of an Engineering Model
Autoren	Matthias Boehm Carl Stolze Oliver Thomas
Publikationsorgan	Enterprise Modelling and Information Systems Architectures (EMISA 2011), Hamburg, Germany, September 22-23, 2011. Bonn : Köllen (GI LNI, P-190)
Ranking	VHB: C WKWI: B
Status	Veröffentlicht
Bibliographische Information	Boehm, M.; Stolze, C.; Thomas, O. (2011): Understanding IT-Management and IT-Consulting Teaching as Product Service System: Application of an Engineering Model. In: Nüttgens, M.; Thomas, O.; Weber, B. (Hrsg.): Enterprise Modelling and Information Systems Architectures (EMISA 2011), Hamburg, Germany, September 22-23, 2011. Bonn : Köllen (GI LNI, P-190), S. 219–224.
URL	http://subs.emis.de/LNI/Proceedings/Proceedings190/219.pdf
Abstract	In this research-in-progress paper we conceptualize the teaching of IT Management and IT Consulting as a hybrid package of products (resources) and services (teaching). This understanding offers a new perspective on teaching approaches and creates new opportunities for all stakeholders. Following a well-established procedure model for product-service systems (PSS) engineering, we derive the customer requirements to the hybrid package. Than a product model is developed. Based on these findings, an Education Integration Platform Solution (EIPS) is prototypically designed. Finally, a conclusion and outlook are given.

Beitrag 5: Zwischen Information und Innovation: CIO-Weiterbildungskonzepte im Wandel

Titel	Zwischen Information und Innovation: CIO-Weiterbildungskonzepte im Wandel
Autoren	Matthias Boehm Carl Stolze Oliver Thomas
Publikationsorgan	IM – Information Management und Consulting
Ranking	VHB: E
Status	Veröffentlicht
Bibliographische Information	Boehm, M.; Stolze, C.; Thomas, O. (2012): Zwischen Information und Innovation: CIO-Weiterbildungskonzepte im Wandel. In: Information Management und Consulting 28, Nr. 2, S. 48–56.
URL	http://www.imucon.de/fileadmin/Imucon_Storage/2012-06-14_-_IM_Artikel_2012-02_-_IMUCON.pdf
Abstract	Weiterbildung ist nicht gleich Weiterbildung. Präsenzschulungen oder das Selbststudium sind häufig zeit- und kostenintensiv. Daher werden nach Jahren der Durchführung eindimensionaler Schulungen in Hotelsälen neue Ansätze und Formate, wie zum Beispiel lernaktive, multimediale und fallstudienbasierte Seminare, für ein effektiveres und effizienteres Lernen benötigt. IT-Management und Consulting sind personalintensive Bereiche der Beratungsindustrie. Daher ist die Weiterbildung in diesem Bereich von großer Bedeutung für die Unternehmen.

Beitrag 6: Looking beyond the rim of one’s teacup: A multidisciplinary literature review of Product-Service Systems in Information Systems, Business Management, and Engineering & Design

Titel	Looking beyond the rim of one's teacup: A multidisciplinary literature review of Product-Service Systems in Information Systems, Business Management, and Engineering & Design
Autoren	Matthias Boehm Oliver Thomas
Publikationsorgan	Journal of Cleaner Production
Ranking	VHB: C
Status	Veröffentlicht
Bibliographische Information	Boehm, M.; Thomas, O. (2013): Looking beyond the rim of one's teacup: A multidisciplinary literature review of Product-Service Systems in Information Systems, Business Management, and Engineering & Design. In: Journal of Cleaner Production, Vol. 51, S. 245-260.
DOI	10.1016/j.jclepro.2013.01.019
Abstract	In the past, there has been a lot of research on Product-Service Systems (PSS) – integrated bundles of products and services. However, the topic has been basically independently discussed by researchers of different disciplines. The purpose of this paper is to integrate the results of the fields of Information Systems, Business Management, and Engineering & Design and hence to investigate the state-of-the-art in PSS research by conducting a structured literature review. In total 265 articles have been intensively analyzed. A unified core definition of the PSS term is derived as well as the notion of the concept in the three disciplines is explained and summarized. A meta-analysis of previous literature reviews completes the picture. Based on our data it is shown that the understanding of PSS is very different in the three disciplines. Therefore, a research agenda for future research is developed which includes for example the need for clarifying the terminology, changing perspectives, and conducting more evaluations.

Beitrag 7: Teaching the Chief Information Officers: An Assessment of the Interrelations within their Skill Set

Titel	Teaching the Chief Information Officers: An Assessment of the Interrelations within their Skill Set
Autoren	Matthias Boehm Carl Stolze Oliver Thomas
Publikationsorgan	Proceedings of the 11th International Conference on Wirtschaftsinformatik (WI 2013), 27.02.-01.03.2013, Universität Leipzig
Ranking	VHB: C WKWI: A
Status	Veröffentlicht
Bibliographische Information	Boehm, M.; Stolze, C.; Thomas, O. (2013): Teaching the Chief Information Officers: An Assessment of the Interrelations within their Skill Set. In: Alt, R.; Franczyk, B. (Hrsg.): Proceedings of the 11th International Conference on Wirtschaftsinformatik (WI 2013), Volume 2. Leipzig, S. 1573-1587.
URL	http://aisel.aisnet.org/wi2013/98/
Abstract	Due to the high volatility in the field of information technology (IT) and the rapid technological advancements, all IT professionals constantly have to be able to evaluate trends and put them into context. This is especially true for those who fulfill the role of a company's chief information officer (CIO). But if there is a gap between the required set of skills and those needed, training becomes necessary. In order to plan training programs, one has to know the skill set of current CIOs. We investigate this by conducting workshops with 21 CIOs from a diverse set of companies. The purpose of this paper is to better understand the skill items of CIOs and how they interrelate.

Beitrag 8: Developing IS Leaders through Integrated Teaching Processes – Design and Engineering of a Product-Service System

Titel	Developing IS Leaders through Integrated Teaching Processes – Design and Engineering of a Product-Service System
Autoren	Matthias Boehm Carl Stolze Sven Ludwig Heidrun Jessica Müller Oliver Thomas
Publikationsorgan	Living Lab Business Process Management Research Report
Ranking	-
Status	Veröffentlicht
Bibliographische Information	Boehm, M.; Stolze, C.; Ludwig, S.; Müller, H. J.; Thomas, O. (2013): Developing IS Leaders through Integrated Teaching Processes – Design and Engineering of a Product-Service System. In Living Lab Business Process Management Research Report, Nr. 3, Osnabrück, Living Lab BPM e.V.
URL	http://repositorium.uni-osnabrueck.de/handle/urn:nbn:de:gbv:700-2013052910863
Abstract	In today's world, no company can survive without innovation and nearly all modern forms of innovation relay on IT in some way. It is the task of IS professionals, to cope with these trends and enable innovation. New teaching approaches are said to be required in order to empower IS professionals to become leaders in their business. The purpose of this paper is show how integrated teaching processes for developing IS leaders can do so. A combination of a Design Science Research (DSR) approach and a Product-Service Systems (PSS) Engineering Method is used to develop and evaluate this teaching approach. We present the product model, process models for the approach and a prototype that supports the processes as well as we explain the concept of integrated modules. The approach is evaluated by application in reality. Results show the usefulness of both, the applied methodology and the approach itself for research and practice.

Introduction

After years of oversupply, IS (Information Systems) professionals such as Chief Information Officers (CIOs), IS project staff, or external consultants, are rare (Carter et al. 2011, p. 27). A so-called “war for talent” can be observed, which only can be overcome by suitable (on-the-job) training and further education (Peppard 2010; Boehm et al. 2011b). This is rather difficult because the importance of technical, personal, administrative and conceptual skills varies from step to step on the career ladder (Luftman 2004, p. 110). However, often IT training programs are targeted at starters and pure technical skills whilst neglecting skills required for leadership positions with their lifelong learning requirement (Smid 2001).

As companies often cannot manage training programs on their own, universities complement the internal education offerings to foster the dialogue between research and practice (Elliot 2011) by offering open or customized programs, especially for on-the-job training of IS professionals (Boehm et al. 2011b). This is a win-win-situation for both sides: While universities get in close contact with practitioners, participants of the programs get an optimal partner for questions concerning further education. However, often the design of teaching processes is difficult as service modeling – and teaching can be seen as the provision of a service (Shostack 1977) – is often a complex task (Weber et al. 2004).

Services are defined as a change of the state of the service receiver by a service provider with the help of a contract (Hara et al. 2009). Intangibility, heterogeneity, perishability, and simultaneity are the best characterizations for services (Fitzsimmons and Fitzsimmons 1994). Services always have to be seen in conjunction with products because both are existing together (Shostack 1977). The joint development of products and services is also called Product-Service Systems Engineering (PSSE) (Weber et al. 2004).

The question of how to transfer process thinking to new areas has been asked for some time now within the field of business process management (BPM) (vom Brocke et al. 2011, 403). In the following, we combine PSSE and the Design Science Research (DSR) paradigm (Hevner et al. 2004) to design teaching processes. We strive to integrate coaching and personal development aspects with the flow perspective of processes to cross the borders of classic BPM. Therefore, we answer our research question: *How to design integrated teaching processes for developing IS leaders?*

For doing so, the paper is structured as follows: In the second section background information on process-oriented management of teaching and developing IS leaders is given. In section three, our applied methodology is explained – including reasoning for combining PSSE and DSR. Section four presents the results of the paper. After this, we evaluate our artifacts. Finally, a conclusion and an outlook are given.

Background

Process-oriented Management of Teaching

The roots of modern business process management (BPM) date back to the 1980s and early 1990s. Hammer (1990) discussed for the first time business process reengineering (BPR) and Davenport (1993) presented his concept of integrating BPR with total quality management (TQM). Today, BPM can be seen from either a pure IT perspective or be understood as a holistic management practice (vom Brocke et al. 2011). The essential BPM cycle starts with the creation of formal processes and then ensures an on-going management and refinement of these processes (Hammer 2010). Moreover, literature has discussed different aspects of BPM, for example related to maturity models (Pöppelbuß and Röglinger 2011), the support of business processes by software services (Kohlborn et al. 2009), sustainability (Stolze et al. 2012), and process monitoring (Janiesch et al. 2012). Within this article we follow a broad understanding of BPM as a way of thinking, shaping, designing, and managing organisations through their activity chains (processes). This inclusive understanding also allows subsuming more aspects into BPM.

An example for a management framework in the field of teaching IS professionals is depicted in Figure 1. It is based on an iterative assessment of 116 existing training programs together with expert interviews of researchers and practitioners (Boehm et al. 2011b). The authors identified core modules which can be grouped into methodology courses and personal skills modules. The first methodology module, Management in the Information Age (MIA), integrates aspects like internet economics, management basics as well as methods and approaches. In the field of IS Fundamentals (ISF), the basics of IS/IT, enterprise software, business intelligence, and operations research are covered. Enterprise Architecture Management (EAM) discusses all aspects of IT- and business-alignment and IT service management. Process-oriented approaches and methods belong to the field of Business Process Management (BPM). The IT Consulting (ITC) module focuses on knowledge and

methods related to business and IT advice. Within the field of Managing Security, Compliance and Risk (MSCR) subjects like IT security, legislation, contracts, and risk management are discussed. Sustainability and Ethics (SE) deal with green IT, management ethics, and social aspects of information management as well as intercultural studies. Finally, the personal skill modules cover aspects on Interpersonal skills, Leadership and conflict management as well as Project management.

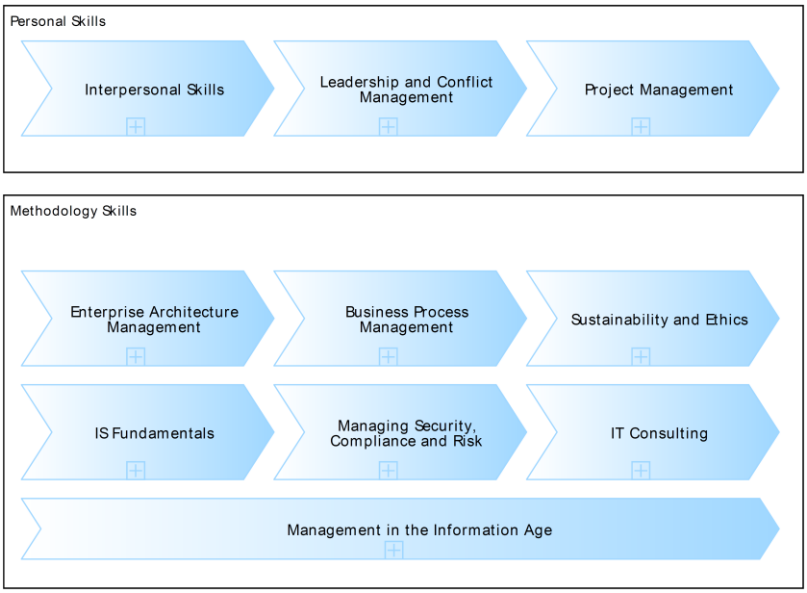

Figure 1. Framework for Teaching IS professionals (Boehm et al. 2011b)

Developing IS Leaders

CIOs, IS project and line staff, or IT consultants are IS professionals who work at the IT function within enterprises and ensure ongoing business processes (Luftman 2004). The head of this organizational unit responsible for IT is the CIO (Joia 2010). Her/his role of often defined in various ways and her/his power varies from company to company (Peppard 2010; Gerow et al. 2012). This is not optimal because CIOs should be able to get a deep understanding of their organizations in order to unfold their complete impact and work successfully (Carter et al. 2011). Many companies also often think that the role of the CIO is all about technology and therefore the focus is set on technical skills when hiring a new CIO (Peppard 2010). In fact, studies have shown that CIOs with strong political skills significantly can improve their influence on IT initiatives, for example (Gerow et al. 2012). One can say that a mixture of different skills is required in order to successfully work as a CIO (Boehm et al. 2013). A similar argumentation can be done for other IS professionals.

IS leadership development requires to cope with new trends and technologies. Every year, several institutions try to identify current technological trends that are covered in research or 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 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 most valuable technologies (Hopkins 2011). A survey by Luftman and Derksen (2012) among 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 perspective and applied method, even in this small sample different trends are identified. Only for a small number of trends there is a match between the studies. This makes it even more difficult for IS professionals to get an overview on relevant trends and choose goal-oriented teaching offerings.

Method

Design Science Research (DSR) can be defined in short as “the construction of an information technology artifact and its evaluation” (Kuechler and Vaishnavi 2011). Artifacts are constructs, models, methods, and instantiations (March and Smith 1995). The main objective DSR is improvement of the environment by developing technology-based solutions to important and relevant business problems (Hevner et al. 2004; Gregor and Hevner 2013). The identification of these problems is the beginning of the research process (Hevner 2007). Based on this, the two key research activities of design theory refinement as well as its testing are conducted. The process is repeated if requirements and restrictions are not fulfilled (Peffers et al. 2007).

Although guidelines for conducting DSR have been proposed (Hevner et al. 2004), process models which aim at giving the research process a better structure have been developed (Peffers et al. 2007). The concept of nested problem solving also has been applied to DSR (Wieringa 2010). Nevertheless, most recommendations are only discussed on a conceptional level and often not detailed enough for immediate application. Furthermore, the specific

aspects of (teaching) services and products are not considered. Within the field of service engineering the three steps of design, analysis, and synthesis have been early discussed (Shostack and Kingman-Brundage 1991, p. 249). Similar to DSR, the service is designed, evaluated, and then adapted. This principle has been extended by researchers from the field of Product-Service Systems Engineering (PSSE). A Product-Service System (PSS) in general is "a marketable set of products and services capable of jointly fulfilling a user's need" (Goedkoop et al. 1999). The advantage of this concept is the combined consideration of services and products in the development process. Also the supporting role of IT is acknowledged. Therefore, the application of PSSE is very suitable in our case because the approach shall be developed in parallel with a supporting software system.

In the following, DSR is used as foundation for applying the PSSE development method by Weber et al. (2004). This method has been adopted in a way that a process-oriented view on PSSE is applied. Figure 2 depicts the PSSE process using Business Process Model and Notation (BPMN) 2.0. This development process changes the order of the original service engineering steps. Development does not start with design but with an identification of customer requirements which provide the foundation for the definition of the to-be properties (cf. Figure 2). These properties are expressed in customer terminology. At this stage of the process no concrete products or services are specified. The properties are the customer-defined and non-changeable features of the PSS. The customer requirements are now grouped into functional aspects and transferred to the level of properties of the product model. This model is a central cornerstone as it summarizes the complete PSS. Within the following synthesis phase, requirements from customer perspective are transformed into constructor terminology and finally converted into characteristics. In this way, the developer-defined and modifiable characteristics can be derived. By following this procedure both the customer and the designer can each use their own terminology. Because there are discrepancies between the to-be properties and the characteristics, a further analysis is necessary in order to derive the as-is properties. Finally, the as-is properties are compared to and aligned with the to-be properties. The process is continued until the properties match or their difference is acceptably small. A continuously improvement and adaption to new customer requirements is crucial because they tend to change over time (Weber et al. 2004). Although the cycles of synthesis and analysis can be interpreted as the evaluation and

refinement step within the design cycle (2004), the application of PSSE allows a much more structured and straightforward development.

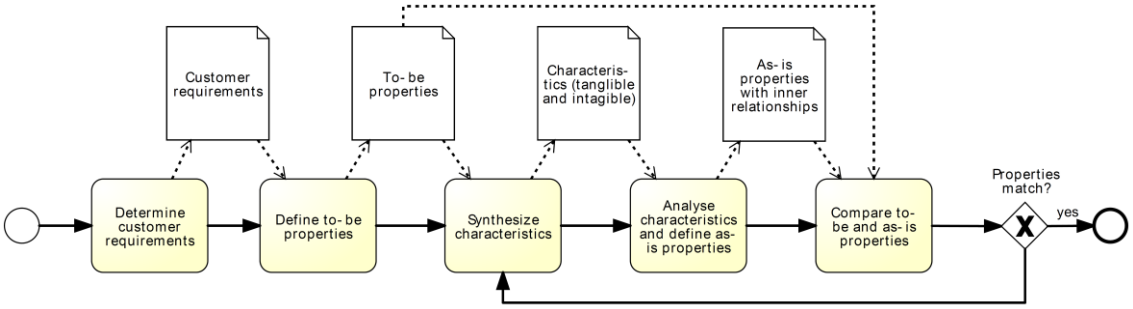

Figure 2. Process-oriented PSSE (based on Weber et al. 2004)

Developing the product model is only the first step in designing teaching processes. The product model can be seen as a blueprint for the developent of the further artifacts.

We continued our research and followed well established process management models – like for example the project management procedure models by Becker et al. (2003) and Thomas (2006) – when developing the teaching processes. In doing so, we recongized the importance of supporting management systems. This system – which has been implemented as a prototype – is the operationalization of the previousely defined processes. Before starting the development of the platform a comprehensive comparison of existing solutions took place. Results showed that no solution fulfills the to-be properties of the integrated approach. Existing solutions either are highly suited towards teaching university students or overstrain users in practice by an impenetrable diversity of features. Therefore, often tools like Microsoft Excel and Word are used to solve the project tasks.

DSR demands an evaluation of the artifact which has been built. However, a solely analysis of the developed prototype does not make sense, because it is only a small building block of the whole concept. Therefore, we decided to conduct the evaluation on another level of analysis. We used our approach to design, offer, and run through two courses – one in 2011 and one in 2012. For each course, three authors worked as administrative staff. Together with eight teachers/coaches, twenty-two participants in 2011 and fifteen participants in 2012 attended the offering. These courses have been evaluated by means of questionnaires and interviews. In doing so, we are able to evaluate the success of the complete package of developed artifacts.

Design of the Teaching Processes

Product Model

In order to be able to develop the product model, we first had to identify the requirements of IS professionals concerning teaching approaches (and software to support them). Based on a comprehensive literature review, 14 expert interviews have been conducted (cf. Table 1). These experts have been carefully selected in order to capture as much as different points of view as possible. All interviewed persons have proven experience with different forms of further education and especially teaching approaches offered by universities. The results of the interviews have been used to derive the customer requirements (cf. Figure 3). Often, broadening of knowledge base, communication and networking as well as motivation for learning have been named as central requirements.

Table 1. Characterization of the interviewed Experts

No.	*Role*	*Size of Company*	*Industry*
1	CIO	550.000	Insurance
2	IT consultant	180.000	Consulting
3	Solution architect	10.000	Logistics
4	IT consultant	1	IT services
5	CIO	480	Automobile industry
6	IT consultant	850	Automobile industry
7	CIO	3.500	Food industry
8	IT project manager	1.500	IT services
9	IT project manager	150	Media industry
10	Training provider	16	University
11	Training provider	16	University
12	IT support	18	Legal
13	CIO	4	Legal
14	Senior developer	19.000	Publishing industry

IS professionals' requirements for teaching approaches

- Knowledge acquisition of new and trendy topics and broadening of knowledge base (wider knowledge),
- Communication among participants and between participants and instructor (networking),
- Becoming more familiar with different point of views,
- Motivation for learning,
- Demand meeting education offering,
- Appropriate price-performance ratio,
- Good reputation of provider,
- Practical experience of instructors,
- Issuing of certificates (especially crucial for technical training),
- Minimization of time consumption (in terms of rhythm of the courses and organizational effort),
- Limited group size (maximum of 25 participants) and heterogeneous group structure,
- Appropriate catering,
- Electronic distribution of documents, and
- Keeping in touch with participants beyond the end of the course.

Figure 3. Customer Requirements

The customer requirements depicted in Figure 3 now can be used to define the to-be properties as well as the synthesis of the characteristics in the product model (cf. Figure 2). For doing so, the list of requirements has been structured and rearranged by the authors.

Figure 4 shows the final product model, which is the result of several iterations and a minimization of ΔP. The logical relations and interdependencies between product and service components are illustrated by the inner relationships. The model shows the complexity of the teaching approach and made the necessity of the structured process documentation obvious.

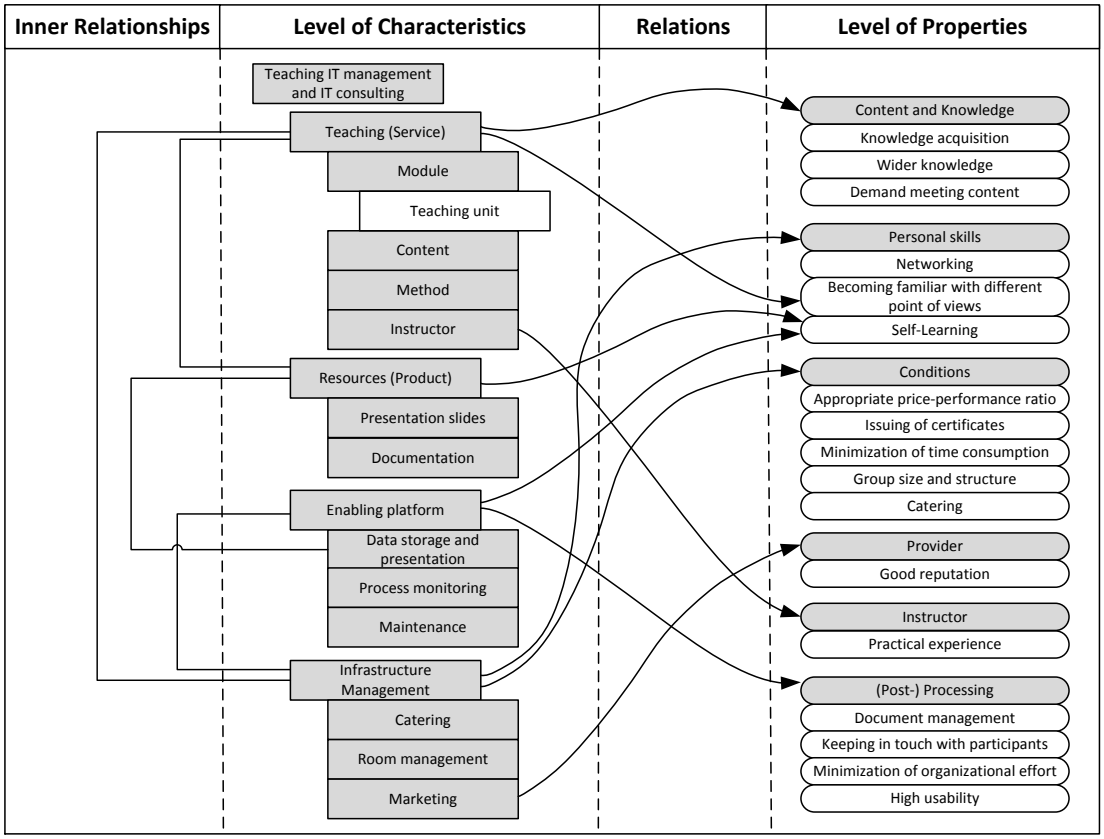

Figure 4. PSS Product Model

Procedure and Prototype

The procedure model was modeled using well established process management models from literature and the results of the previous research (cf. Figure 5). BPMN 2.0 was used as modeling language. We used the web-based modeling tool Signavio Process Editor (www.signavio.com). The Process Editor allows us to create process models for each (sub-) task. By clicking on the “+” one can navigate to the respective sub-models.

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 as well as the course is conceptualized and finally set up. This last activity is the bridge to the formal training and learning phase, which consist of the *4E activities*. Enrollment, execution, evaluation and evolution are now run through in cycles. Marketing activities, registration of participants as well as other organizational activities have to be done within the enrollment. The execution contains the actions teaching and coaching. 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 training phase is over, a lifelong learning 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.

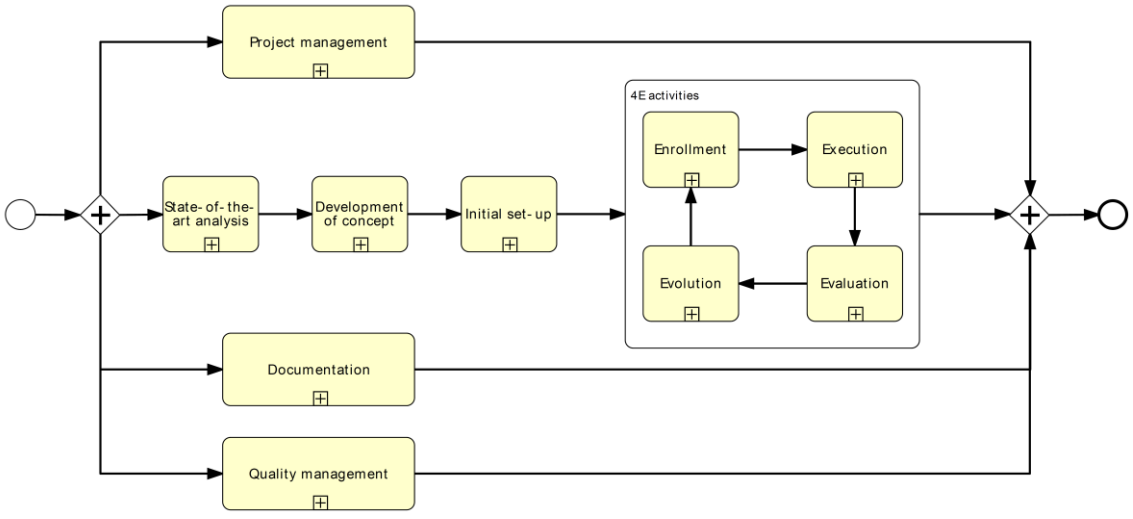

Figure 5. Procedure Model

To illustrate our process-oriented design, we present the enrollment process in detail (cp. Figure 6). Several sequential and some parallel tasks have to be done here. The process starts with the set-up of the time schedule. This is a rather creative task and depends a lot on the circumstances. Therefore, this task is not modeled in more detail. Next, for room management there is a sub-process-model which covers aspects like collecting of offerings for rooms,

selecting the appropriate ones and making a reservation. The task of selecting instructors is more complex. Here, several iterations of selection and addressing of potential instructors are followed up by iterations of content and method discussions as well as checking of time schedule. When all instructors have been found, the caterer has to be informed. One and a half months before the first course, usually the acquisition of participants starts. Here, different media channels should be utilized. Now, a parallel procession of different tasks takes place: Registrations are processed, catering is planned in detail, social media groups and e-Learning system are set up as well as official letters of thanks for the instructors should be prepared and send out. The process ends with a final instruction of the assistants.

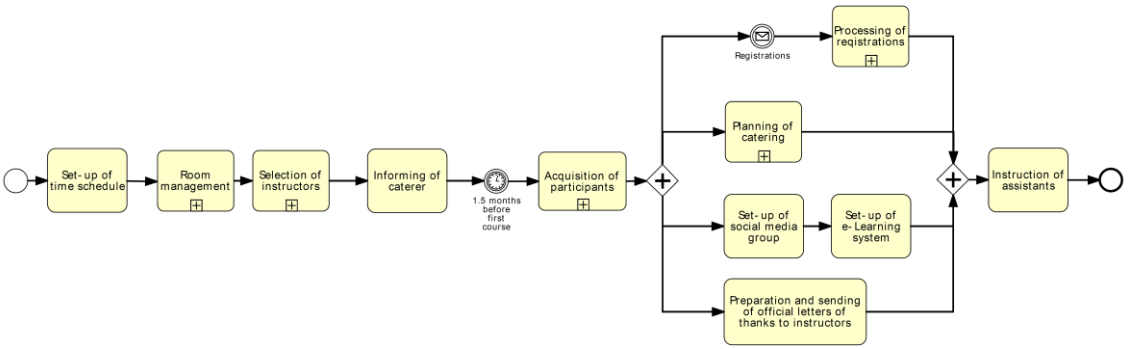

Figure 6. Enrollment Process

By developing the product model (cf. Figure 4) the importance of the enabling platform became visible. Based on the complete procedure model, the prototype can be developed.

The so-called cl2 (coaching and learning) platform was designed to be completely flexible in supporting the participants as well as the university in offering the course – as this is a requirement from the product model (cf. Figure 4). This web-based system is different to traditional project management software especially through the high degree of flexibility and usability. The foundational generic data model allows the flexible adaption of the system to individual needs. By using modern web technologies all tasks can be solved intuitively and comfortably. The core of the system is a slim skeletal structure. On this the user himself can create an individual and needs-oriented system with high flexibility. Instead of providing static structures, the platform itself only offers the basic features which are necessary for configuration. The generic data model (cf. Figure 7), which is necessary for implementation, discerns between object classes with its attributes on the one side

(object type, attribute type, and relation type) and instantiations of objects from an object class with its concrete attribute values on the other side (object, attribute, and relation). These six tables are sufficient to save all data of the web forms, documents and so on. Only additional tables for users, user settings, and templates are necessary.

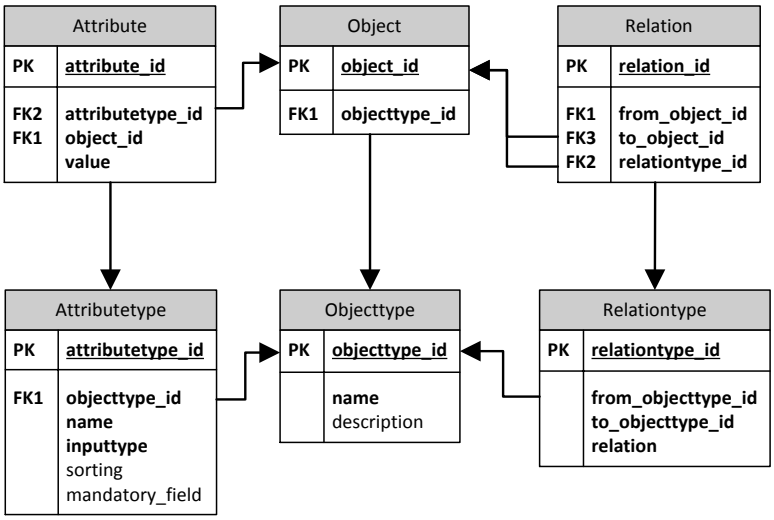

Figure 7. Generic Data Model of the cl2 Prototype

Usually, all coaching and learning processes can be subdivided into several phases which again contain different activities. Additionally, a number of stakeholders like instructors, participants, and organizers are involved. Therefore, the basic feature of the system is the simple and dynamic management of phases, activities, instructors, and any arbitrary further object classes. The classes and their attributes are not given and, hence, can be configured on demand. However, general tasks like creation of participant lists or writing of letters are built into the system. A wide range of export functionality is also available. The characteristic of the platform can be finally summarized in functional and non-functional characteristics (cf. Figure 8).

Functional characteristics

- Flexibility (multitude of possible fields of applications, generic data model, flexible definition of attributes and objects)
- Document management (management of learning data, automatic generation of documents)
- Correspondence management (e-mails, telephone calls, letters)
- User and policy management (e.g. role-specific user rights)

Non-functional characteristics

- User-friendliness (drag & drop, no unnecessary reloads, inline editing)
- Maintainability and expandability (well-documented source code, usage of widely used frameworks and programming standards)

Figure 8. Characteristics of the cl2 Prototype

The web-based system has been implemented using modern web technology. Based on the PHP programming language, which is the mostly used language in the Internet, the Zend framework version 1.1.11 has been chosen. It offers highest flexibility and directly supports techniques like AJAX (Asynchronous JavaScript and XML). For data storage a MySQL database is utilized. For layout and design, markup languages like HTML5 and CSS3 have been used. YAML, jQuery, and jQuery UI also have been deployed in order to ensure a high degree of usability.

Figure 9 shows a screenshot of the cl2 prototype. At the top the navigation bar can be found. Here the user can add, edit or delete new objects (Object Manager), manage templates e.g. for correspondence management, and administer the tool in terms of general settings, user rights and so on. On the right side, a menu bar of the created objects is placed. This bar is dynamically updated when changing the objects. By clicking on the "+"-icon a new instantiation of the respective object is created. The main space of the window is reserved for the actual content. In Figure 9 an exemplary event is shown. All depicted attributes can be easily changed and the order of appearance can be altered by drag and drop. Comfortable searching and the export of selectable information are also possible.

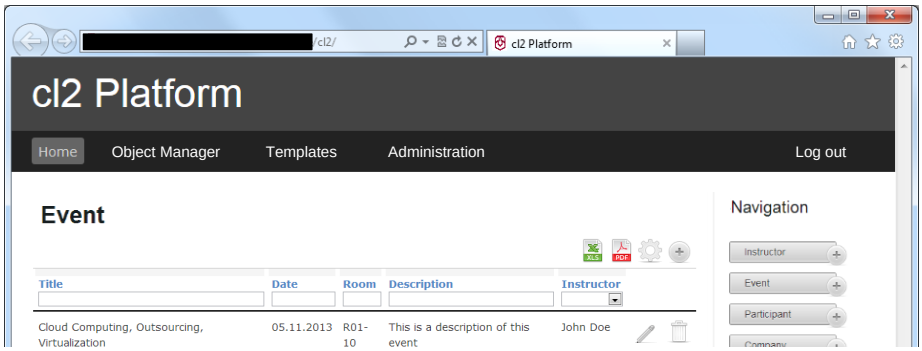

Figure 9. Screenshot of the cl2 Prototype

Integrated Modules

Next to product model, procedure, and prototype the concept of integrated models is crucial for our approach. The core idea is to mix topics as well as hard and soft skills on one module to create an integrated and holistic learning experience. It is crucial to note that this mixture should not take place arbitrarily. The respective teaching units have to be developed in close collaboration with instructor and organizer. Our procedure model documents

this dialogue within the task selection of instructors. In general, a well-balanced combination of practically relevant content is required.

When developing the integrated modules using our approach, one should also relay on results in literature. For example the framework by Boehm et al. (2011a) can be suitable. This allows the developer to cover all relevant aspects for IS professionals.

Evaluation

The described approach has been evaluated twice. In autumn 2011 a first course has been offered containing an initial list of integrated modules (cf. Table 2). The 8 courses can be classified according to their focal content: innovative topics, classical topics and soft skill content. It is important to mention that this is only a brief characterization of each module. Twenty-two IS professionals participated.

Table 2. Integrated Modules in 2011

No.	*Module*	*Classification*
1	Holistic approach of IT management through IT-governance-mapping	Innovative
2	Company development with the help of cloud computing, outsourcing and virtualization	Innovative
3	Reorganization of the IT application architecture	Innovative
4	Implementation of process management in change projects	Classical
5	Management of customer and employee satisfaction as a core task of the CIO	Soft skills
6	Coaching methods for IT professionals	Soft skills
7	ERP consolidation and harmonization	Classical
8	IT further education strategies for the future	Soft skills

In autumn 2012, a second round has been offered. New instructors have been asked to discuss their current issues and therefore the list of integrated modules changed (cf. Table 3). Fifteen participants attended this course.

Table 3. Integrated Modules in 2012

No.	*Module*	*Classification*
1	Legal aspects of cloud computing	Innovative
2	Social business strategies	Innovative
3	Coaching methods for IT professionals	Soft skills
4	Information management and collaboration platforms	Innovative
5	Global efficiency and local needs as tasks of the CIO	Soft skills
6	IT reorganization and continuous development of the organization	Classical
7	IT strategies for medium-sized businesses	Classical
8	The role of IT in business process management and enterprise architecture management	Classical

Each integrated module has been evaluated using a questionnaire. The scale is -2 (not satisfied) to +2 (very satisfied). The compressed result of this evalua-

tion is depicted in Figure 10. One can recognize that the level of satisfaction rose in nearly all variables. For example time and content have been particularly better assed in 2012 than it was the case in 2011. Also the general satisfaction is better in 2012. One has to note that all ratings are above 0 meaning that no variable has been rated worse than “ok”. The reason why results are better in 2012 than in 2011 is the fact that in the second year, the cl2 platform has been comprehensively used to support processes. Therefore, only the complete package of products and services enables the delivery of integrated teaching processes.

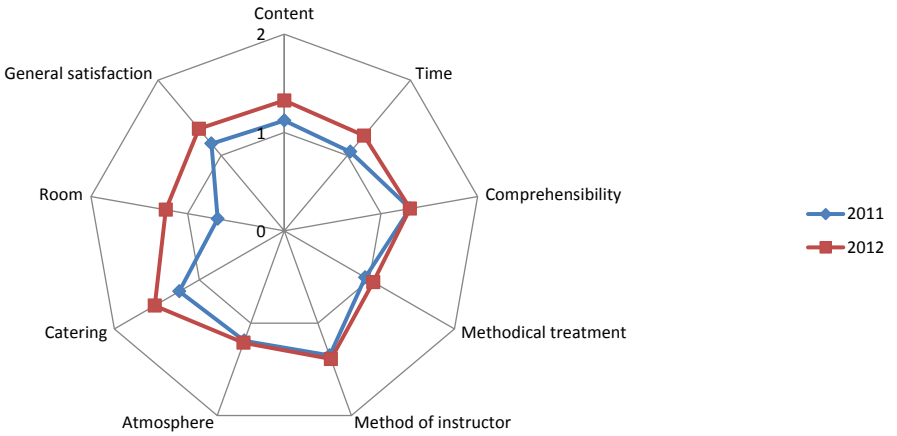

Figure 10. Evaluation of Modules

The success of the teaching also has been measured by conducting interviews with participants and handing out of questionnaires. Learning success was measured based on self-assessment method (Vygotsky 1962). After the last module in autumn 2012, skills before and after participation have been recorded on a scale from -2 (deficient) to +2 (very good). These values have been analyzed in a t-test for measuring the equality of means. Figure 11 depicts the means from before and after participation for those topics which differences are significant on a 0.15 level or better. Highest learning success can be therefore recorded for subjects like social business, internationalization, business intelligence, or IT- and business-alignment. But also for the other topics significant success has been reported. The results of this evaluation as well as the informal discussions with participants lead to the conclusion that our proposed service approach is suitable to ensure IS leadership development.

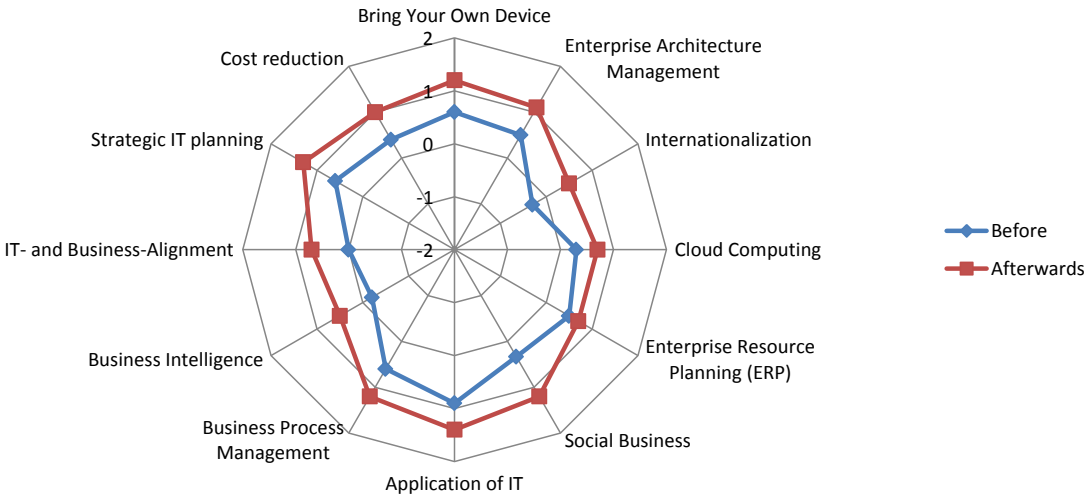

Figure 11. Evaluation of Learning Success

Conclusion and Outlook

We designed and evaluated teaching processes in form of product and procedure models as well as a prototype for developing IS leaders. The artifacts show their integration capability on three levels: (1) integration of stakeholders, (2) integration of IS professional training, and (3) integration of content and modules. Results show the success and viability of our method as well as illustrate the application of process thinking to the new area of teaching processes.

The concept of integration will be useful for other scientists. Our methodology of combining DSR and PSSE shows its viability and can be adopted in other research projects. We describe a new teaching and coaching concept which allows continuing education for self-education. From the practical point of view, our procedure model and module structure help practitioners in designing their own on-the-job training approaches. The models can be used as guidance for their work. Novel ideas are given and people are helped to help themselves. Participants are supported in looking beyond one's own cultural horizon.

Future research can adopt our approach and apply it to other fields within the IS discipline. Additionally, the prototype has to be continuously developed in order to extend functionality and transform it into a marketable product.

Acknowledgments

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Beitrag 9: The Further Education Maturity Model: Development and Implementation of a Maturity Model for the Selection of Further Education Offerings in the Field of IT Management and IT Consulting

Titel	The Further Education Maturity Model: Development and Implementation of a Maturity Model for the Selection of Further Education Offerings in the Field of IT Management and IT Consulting
Autoren	Matthias Boehm Michael Jasper Oliver Thomas
Publikationsorgan	Proceedings of the 19th Americas Conference on Information Systems
Ranking	VHB: D WKWI: B
Status	Veröffentlicht
Bibliographische Information	Boehm, M.; Jasper, M.; Thomas, O. (2013): The Further Education Maturity Model: Development and Implementation of a Maturity Model for the Selection of Further Education Offerings in the Field of IT Management and IT Consulting. In: Proceedings of the 19th Americas Conference on Information Systems : Chicago, Michigan, August 15-17, 2013. Atlanta, Georgia, USA : AIS, Human Capital in Information Systems, Paper 4.
URL	http://aisel.aisnet.org/amcis2013/HumanCapital/GeneralPresentations/4/
Abstract	The permanently changing information and communication technology (IT) makes it inevitable for IT professionals to keep up-to-date. However, the market for further education presents itself as being diversified and opaque at the same time. Especially for young professionals, the selection of the “right” training offering is difficult. This entails the necessity to develop methods and models to create the further education market in a more comprehensible and transparent way. This article describes the development of the Further Education Maturity Model (FEMM). It enables users to assign IT training offerings to certain maturity levels and consequently to make decisions about the quality of the further education offering. A proven procedure is used to develop the FEMM, implement it into an online tool, and evaluate it. Results show the appropriateness of the proposed model.

Beitrag 10: Enabling IT-Professionals to Cope with Technological Change through Skill-based Coaching

Titel	Enabling IT-Professionals to Cope with Technological Change through Skill-based Coaching
Autoren	Matthias Boehm Carl Stolze Alexander Fuchs Oliver Thomas
Publikationsorgan	Living Lab Business Process Management Research Report
Ranking	-
Status	Veröffentlicht
Bibliographische Information	Boehm, M.; Stolze, C.; Fuchs, A.; Thomas, O. (2013): Enabling IT-Professionals to Cope with Technological Change through Skill-based Coaching. In Living Lab Business Process Management Research Report, Nr. 8, Osnabrück, Living Lab BPM e.V.
URL	http://repositorium.uni-osnabrueck.de/handle/urn:nbn:de:gbv:700-2013121212190
Abstract	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 better 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)).

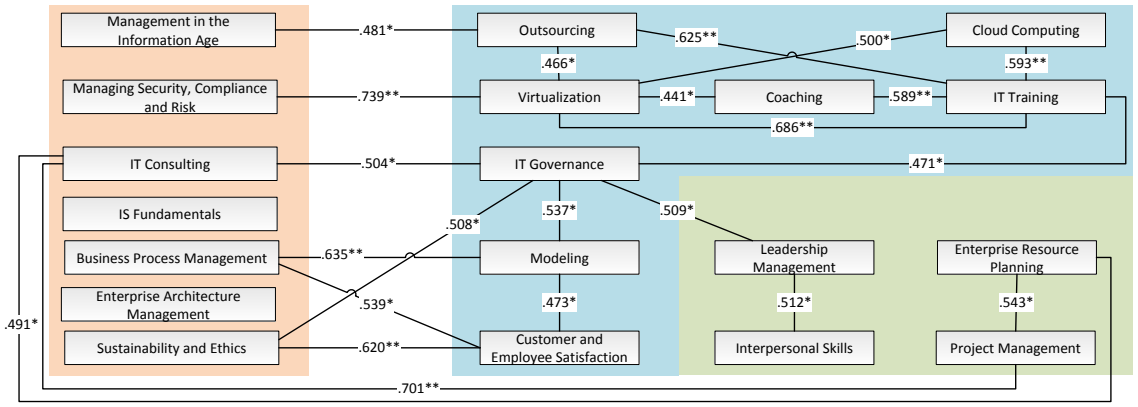

Figure 1. Skill Correlation Network for CIOs (Boehm et al. 2013b)

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.

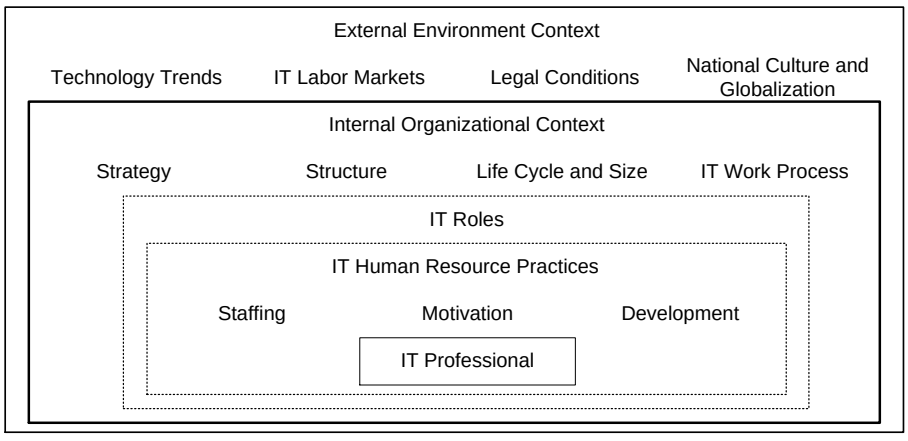

Figure 2. Contextual Perspective of IT Professionals (Ang and Slaughter 2000)

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 manage-

ment 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 engagement 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 another 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.

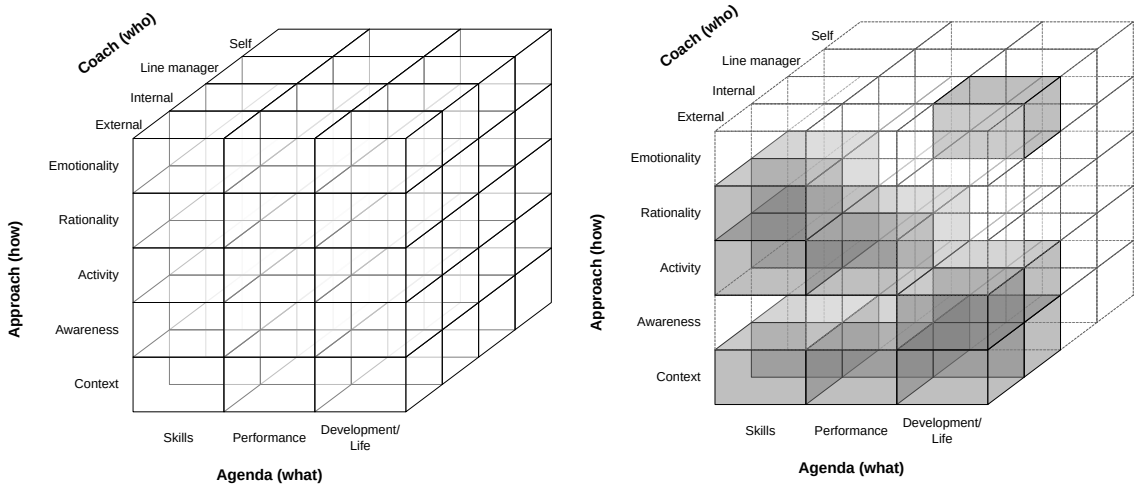

Figure 3. Coaching Cube (left: complete; right: most likely combinations) (Segers et al. 2011)

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.

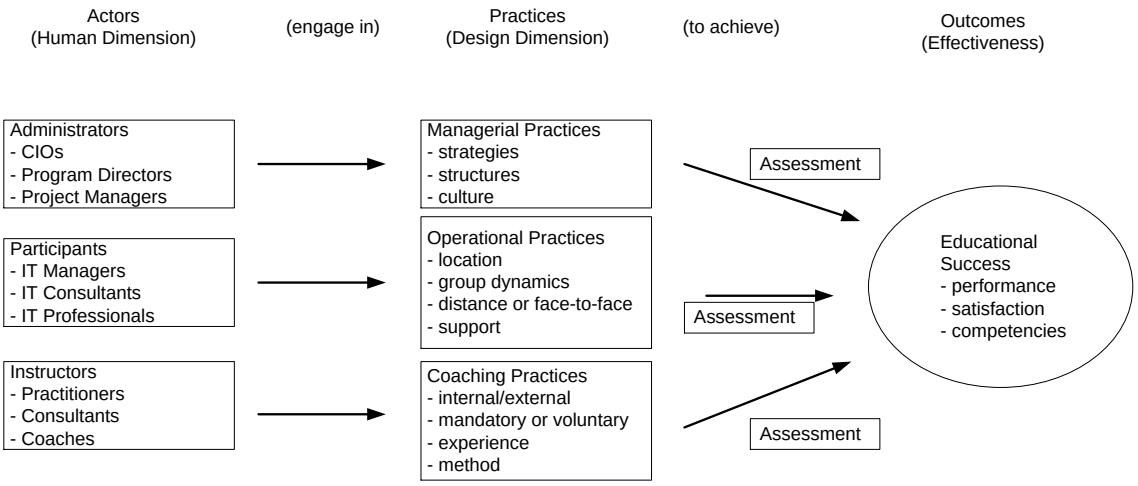

Figure 4. Research Model

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 re-

searcher. 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 multiple 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). Neverthe-

less, 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.

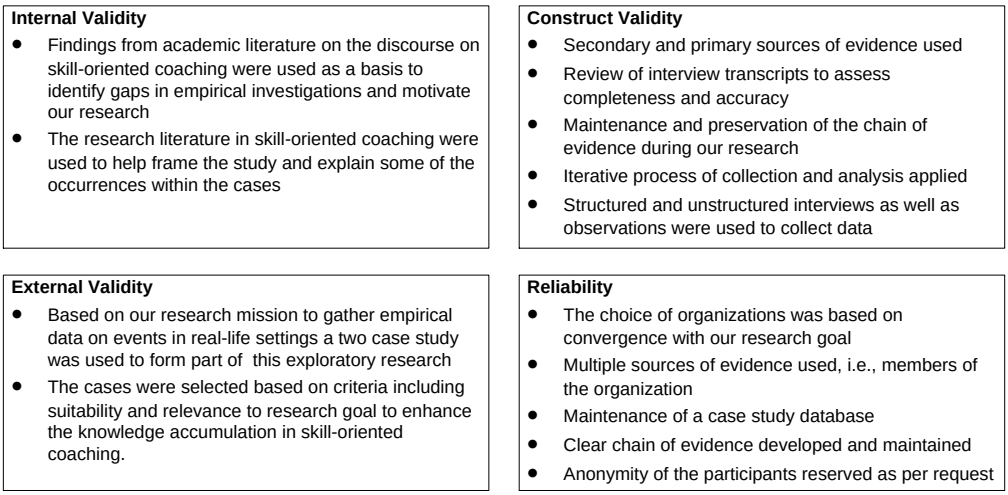

Figure 5. Applied Case Study Principles

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

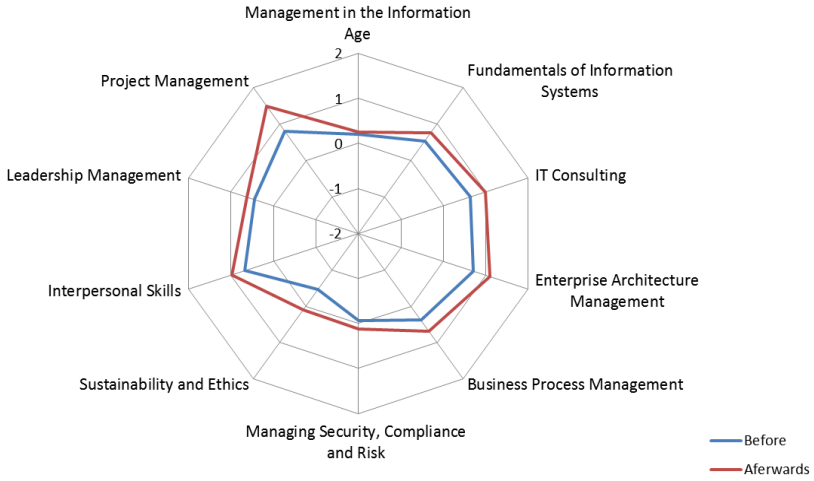

Figure 6. Observed Skill Levels Before and After Coaching

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.

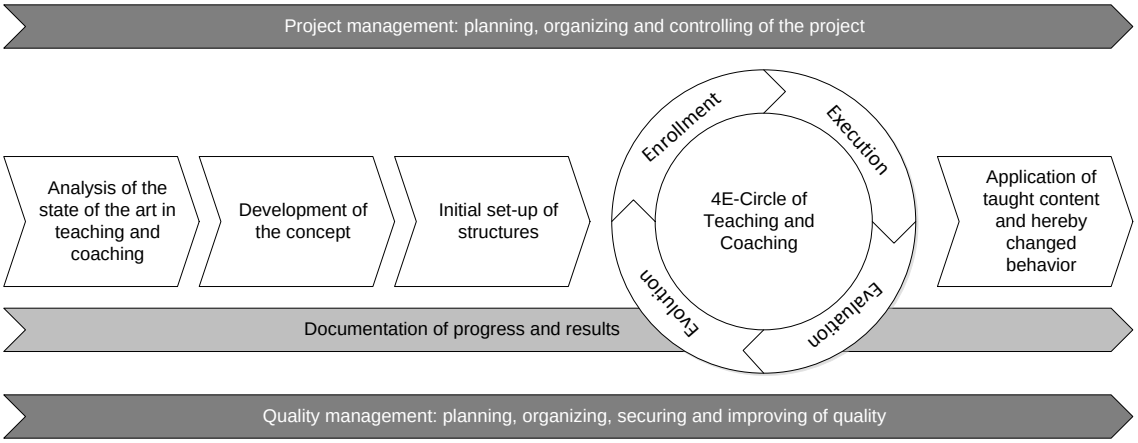

Figure 7. Procedure Model of the Teaching and Coaching Program

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.

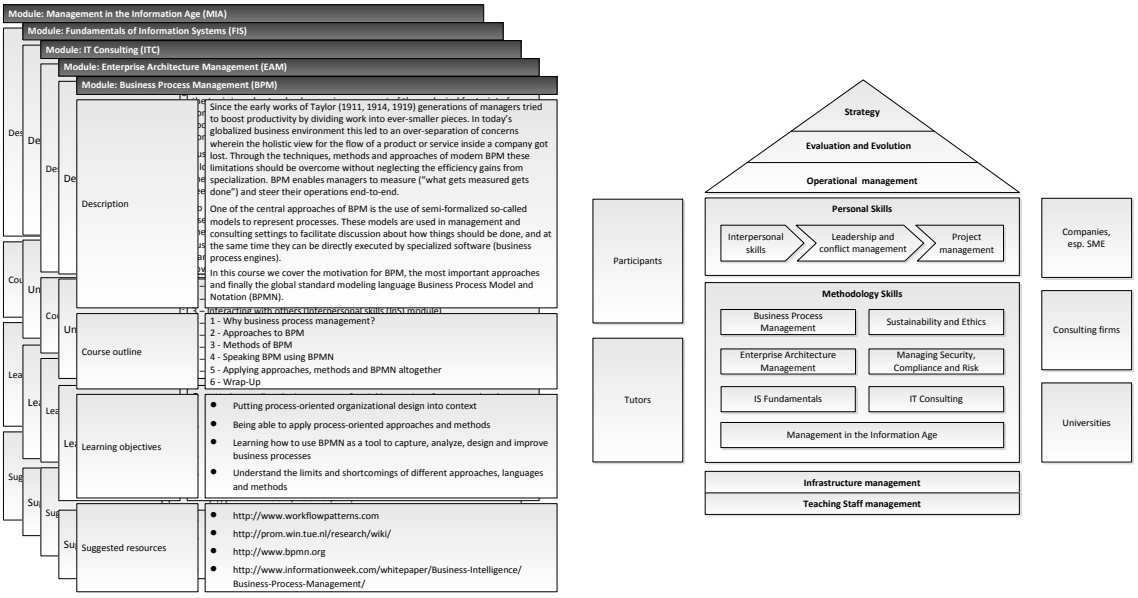

Figure 8. Exemplary Documents (left: module descriptions, right: framework)

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.

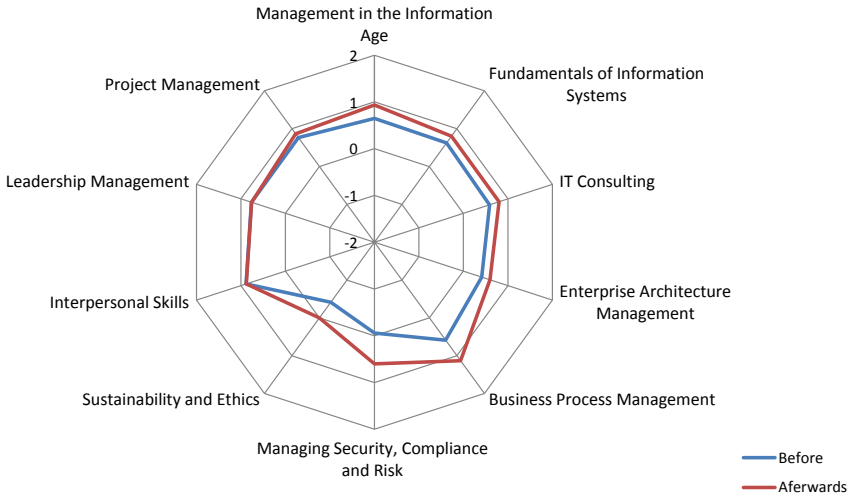

Figure 9. Skills of the Participants Before and After Participation

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.

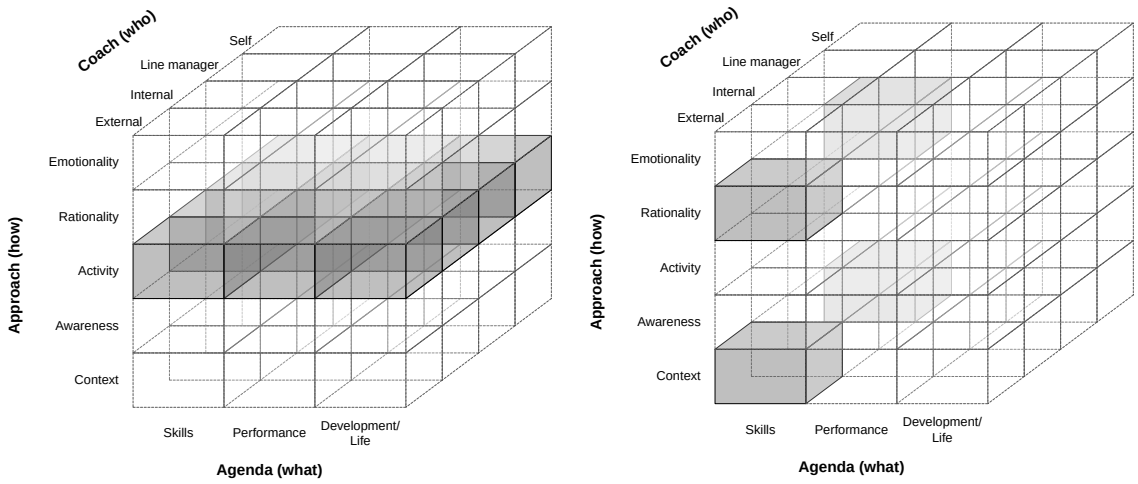

Figure 10. Applied Coaching Cube (case SISDEV left, case IC right)

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.

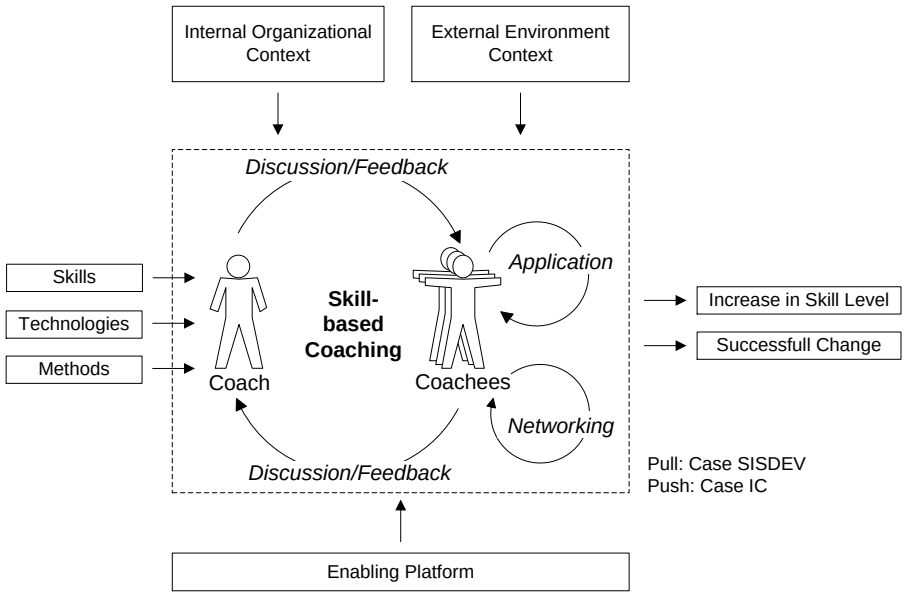

Figure 11. Skill-based Coaching

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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