Transferring Well-Performing Collaborative Work Practices with Parameterized Templates and Guidebooks: Empowering Subject Matter Experts for an Adaptation to Slightly Different Contexts

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Abstract

Collaborative work practices (CWPs) package facilitation expertise and have the potential to increase team productivity up to 90%. Collaboration engineers develop CWPs and deploy them to practitioners that execute them. These CWPs, however, are typically customized to conditions of a specific use case. This creates the challenge that changing use case conditions or even small variations across contexts, hinder well-performing CWPs of being applied more often to create a long-term value. Practitioners fail to adapt existing CWPs due to missing collaboration expertise and adaptation guidelines. To address this challenge in collaboration engineering literature, we introduce a) the Subject Matter Expert role; b) the 'CWP Adaptation Approach' that formalizes the transfer of CWPs to different contexts with parameterized Templates and Guidebooks. To show a first proof-of-concept, we further inductively generalize from an exemplarily use case with a well-performing CWP in the educational domain.

Keywords: Collaboration Engineering, Collaborative Work Practices, Collaboration Engineer, Subject Matter Expert, Practitioners

1. Introduction

Research shows that practitioners can gain up to 90% in team productivity by executing well-performing collaborative work practices (CWPs). The so-called Collaboration Engineering (CE) "is an approach to designing collaborative work practices for high-value recurring tasks, and deploying those designs to practitioners to execute for themselves without ongoing support from professional facilitators" (Briggs et al., 2006). A CWP is a series of reusable collaborative activities performed by multiple teammates to achieve a group goal (Winkler et al., 2020). High-value tasks are those that create substantial value or reduce risk of loss of substantial value (G.-J. de Vreede & Briggs, 2005; Gert-Jan de Vreede & Briggs, 2019). To develop well-performing CWPs, collaboration engineers with sophisticated collaboration skills consider dozens of design concerns. They engineer a CWP, build a Process Support Application (PSA) to instantiate and test it in the field and finally deploy it to practitioners. This expensive engineering procedure, however, is customized to conditions of a specific use case and requires collaboration expertise from a collaboration engineer. Thus, a well-performing CWP is customized for just one specific collaboration task in the specific context of a use case (Gert-Jan de Vreede & Briggs, 2019). CE research also demonstrates that, for all but the simplest circumstances, CWP design is a complex, multi-layered undertaking involving dozens of design concerns, techniques, and indicators of success (Randrup & Briggs, 2017).

However, conditions of a use case may change over time, or a slight variation of a use case can be relevant in different related contexts. For example, practitioners, that are thrilled from the success story of well-performing CWPs and discover related usage scenarios (e.g., collaboration task with different domain knowledge; different group size; different tool infrastructure) fail to make slightly variations on the CWP. Consequently, well-performing CWPs that unfold substantial value and attention in their organizations (e.g., skilled workers' tacit knowledge documentation in a German automotive company (Bittner & Leimeister, 2014); peer-creation of storyboards for explainer videos (Oeste-Reiß et al., 2016); software requirements negotiation (Grünbacher et al., 2007)) cannot leverage long-term value. Adhering to the current state-of-the-art of CE research, for small adaptations, organizations are typically dependent of the expertise of a collaboration engineer and must again complete the whole CWP engineering procedure. Summing up, CE research has two core

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foci: *First*, provide guidance on how to design reusable IT-based CWPs; *Second*, provide guidance on how to transfer a CWP tailored for a specific task to practitioners (non-collaboration experts) to execute with little or no training in the tools and techniques (Gert-Jan de Vreede & Briggs, 2019). For these two core foci, CE literature supports collaboration engineers with a design approach, guidelines, and tools (see section 2). However, a major shortcoming of CE remains when practitioners with advanced domain knowledge and basic moderation skills, so-called subject matter experts (SMEs) aim to transfer and adapt a well-performing CWP to slightly different context and build their own CWP.

To address this research gap in CE literature, a promising solution is twofold: A first solution aspect is to extent the current CE role concept that focuses on the engineering of CWPs by collaboration engineers and the execution of well-performing CWPs by practitioners. Therefore, we create the 'subject matter expert' (SME) role. This new role will be equipped with skills and guidelines to make the before required adaptations on a CWP. The second solution aspect is to create the so-called 'CWP Adaptation Approach' that formalizes the transfer of CWPs to different contexts (i.e., slight variation of a use case) with parameterized Templates and Guidebooks. The new approach with the Templates and Guidebooks promises to empower SMEs with the necessary guidelines. In this light, we address the following research question: *How can the principles of CE be used to support SMEs to adapt well-performing CWPs to the specifics of diverse conditions without assistance from a collaboration engineer?* To answer the research question and derive a first proof-of-concept solution, we inductively generalize from an exemplarily use case with a well-performing CWP in the educational domain. In section 2, we refer to the background of CE. In section 3, we refer to the foundations of proof-of-concept research that characterize our research procedure. In section 4, we refer to the foundations to transfer CWPs to different contexts. We introduce an exemplarily use case with a well-performing CWP and personas that serves as illustrative basis for the inductive development of our solution (sec. 4.1.). We model the state-of-the-art procedure of the CE design methodology to illustrate pitfalls of CE research (sec. 4.2). Based on, we derive generalizable requirements to transfer CWPs to slightly different contexts (sec. 4.3). In section 5, we rely on the requirements and develop a new paradigm to transfer CWPs. We introduce a revised CE 'role concept' (sec. 5.1), the 'CWP Adaptation Approach' (sec. 5.2) and CWP 'Template' and 'Guidebook' (sec. 5.3). In section 6, our paper closes with a discussion of the contributions and conclusion of our research.

2. Background: Collaboration Engineering

The current section refers to CE landmark papers to develop, evaluate and deploy CWPs. Therefore, we briefly mention CE foundations and refer to the papers that describe them in more detail: (1) *CE* is an "*approach to designing collaborative work practices for high-value tasks and transferring them to practitioners to execute for themselves without ongoing support from a collaboration expert*" (Briggs et al., 2006). The existing CE methodology is tailored to two unique roles: The first role is the *collaboration engineer.* This is a collaboration expert that designs CWPs in such a way that non-collaboration experts can execute them with little or no training on tools or techniques. The second role are *practitioners.* They are skilled in their domain but have no collaboration expertise. They can facilitate or participate a repeated execution of a CWP (Gert-Jan de Vreede & Briggs, 2019). Collaboration engineers use the CE approach as a structured design methodology to design reusable CWPs and deploy them to practitioners (G.-J. de Vreede & Briggs, 2005)(Gert-Jan de Vreede & Briggs, 2019). For the design activities, the existing CE methodology supports collaboration engineers with two approaches to produce CWPs tailored to a specific task in a specific context: The so-called *Six-Layer Model of Collaboration (SLMC)* describes key areas of concern for designers of CWPs in the form of six layers. A collaboration engineer 1) defines the 'collaboration goal'; 2) defines the 'group product' and sub-products; 3) creates 'group activities' that are functional to achieve the group product; 4) identifies 'group procedures' to structure the collaboration; 5) selects and configures 'collaboration tools' that are suitable to execute the collaboration and; 6) summarizes 'collaborative behaviors' by documenting the things practitioners say and do with their tools to execute the CWP (Briggs et al., 2014). The *Collaboration Process Design Approach (CoPDA)* incorporates the SLMC and provides a process model on how a collaboration engineer should execute five design activities: 1) task diagnosis; 2) activity decomposition; 3) thinkLet choice; 4) agenda building; and 5) design validation (Kolfschoten & Vreede, 2009). When it comes to transferring a well-performing CWP to practitioners, collaboration engineers create three artifacts. These are: 1) a *'Facilitation Process Model' (FPM)*, that serves as process flow overview; 2) an '*internal agenda*', that serves as a facilitation guide; 3) a *'Process Support*

Application' (PSA), that serves as an instantiation of the CWP in the field. The PSA is the prototype or collaboration system that is used to execute the CWP (Briggs et al., 2013)(Winkler et al., 2020).

3. Proof-of-Concept Research and Research Procedure

The aim of research in this paper is to create a first proof-of-concept solution toward a class of unsolved problems inherent in the CE research gap discovered in section 1. Proof-of-concept research aims to demonstrate the functional feasibility (i.e., degree to which a potential solution is technically possible, and the degree to which it is within the mental and physical abilities of its intended participants) for a potential solution to an important class of unsolved problems; to develop deeper understandings of the class of problems addressed by a solution; to discover first nuggets of scholarly knowledge that may lead to future operational feasibility for a solution (Nunamaker Jr et al., 2015). Typical research products are detailed problem descriptions, generalizable requirements, potential solutions. Typical research methods used are exploratory case studies and engineering research (Nunamaker Jr et al., 2015). Therefore, we inductively reason from an exemplarily use case with a well-performing CWP in the educational domain. This serves as example to illustrate the class of unsolved problems and achieve a deeper understanding. Next to this, we model the state-of-the art of the CE design methodology to illustrate limitations of CE research. This forms the basis for our further inductive reasoning (i.e., derive generalizable requirements; a new CE paradigm inherent in a revised CE 'role concept' and the 'CWP Adaptation Approach').

4. Foundations to Transfer Well-Performing CWPs to Different Contexts

4.1. Exemplarily Use Case and Personas

To gain a deeper understanding of the class of unsolved problems and illustrate the challenges that practitioners face, we refer to an exemplarily use case with a well-performing CWP. We choose a CWP in the educational domain. The domain is illustrative as collaboration takes a crucial role when it comes to teaching higher order thinking skills and providing inclusive and equitable education (OECD, 2021). The OECD, identifies skills like problem-solving, communication and cooperation as crucial job-related skills (OECD, 2016)(Elliot, 2017). Even though, instructional designs for that purposes are existent, they don't unfold long-term value as they are typically neither reusable nor transferable. The COVID-19 pandemic disclosed that industry nations and developing nations are equally affected by these demands. Instructional designs for collaborative learning promise to increase learners' higher-order thinking skills. Such instructional designs, however, are not suitable for distance teaching as they base on ad hoc collaboration. Therefore, the educational domain and more precisely lecturers that aim to use collaborative learning for distance teaching face a 'collaboration problem'.

SUSAN –
Lecturer and collaboration expert

Susan is an experienced lecturer and expert facilitator. She is familiar with the CE methodology. In a large-scale lecture with undergraduate business students, Susan teaches the foundations of 'information systems'. To enable collaborative learning in the classroom she designed a well-performing CWP for an instructional design. To deploy the CWP to her students, she created a PSA that their students execute without her guidance.

Name of the instructional design: "*Learning Case - Coping with the Digital Transformation of a Small Retail Company*"

Overview: Undergraduate business students of a large-scale 'information systems' lecture will gain expertise on key concerns for transforming a small brick-and-mortar retail company into an ecommerce vendor. Students will develop and use reference models to cope with problems that can arise when implementing a first online payment system, and analyze the benefits of potential solutions, i.e., CRM and ERP. Students will brainstorm possible solutions in subgroups, then break into breakout groups to discuss and converge the gained solution ideas and finally discuss and summarize a solution.

Collaboration goal, group deliverables and learning tasks: The collaboration goal for this learning case is to increase sales, profits, strategic advantage, and market share for a small retail organization by digitizing core business processes. Students will generate as group deliverable a jointly-authored slide show containing five slides using both text and graphics to propose a solution to one of four learning tasks: *Learning task 1* - Use a model-based problem-solving approach to plan how a small retail company moves from its current practices to its first online payment system; *Learning task 2* - Develop a reference model for online payment procedures in a small retail company; *Learning task 3* - Evaluate the potential value of implementing a CRM in a small retail company; *Learning task 4* - Analyze the potential benefits to first-line, middle, and top managers from implementing an ERP in small retail company, considering the question from a user-centric orientation, a usability orientation, and a utility orientation.

ROBBY –
Lecturer and subject matter expert

Robby is an experienced lecturer in his domain. He is skilled in designing ad-hoc collaboration instructional designs. He is not familiar with CE. In a large-scale lecture with undergraduate business students Robby teaches the foundations of 'human-resource management'. Robby heard from Susan's CWP and wants to use such a CWP for his own lecture. He compared the conditions of Susan's lecture (e.g., number of participants, learning objectives, learning task) with his own lecture and discovered similarities. However, he has no idea how he could transfer Susan's CWP to his own lecture.

Figure 1. exemplarily use case - personas

On the one hand, designing CWPs that allow collaborative learning in distance teaching is still a high-relevant challenge in education. Such CWPs are still rare. Nevertheless, there are scholars that used CE to design CWPs to enable collaborative learning in distance teaching scenarios. Their work proves that a) packaging facilitation expertise in a CWP allows reusability; b) groups of learners that execute a CWP achieve better performance scores compared those that execute ad-hoc collaborative learning experiences; c.) collaborative learning is applicable to large-scale lectures and distance teaching (Oeste-Reiß et al., 2023). On the other hand, lecturers have a frequent need to adapt and integrate well-performing CWPs to the conditions of their own lectures. The example shown in figure 1 illustrates this. Susan's well-performing CWP refers to a former Design Science Research study (Hevner, 2007). A collaboration engineer designed, instantiated, and tested the mentioned CWP.

The example illustrates that a collaboration engineer, like Susan can easily achieve both CE purposes - i.e., design a CWP, package all facilitation expertise in a PSA and transfer it to students who execute the PSA without training in tools or techniques. In the educational domain it is a big achievement to use CE to create substantial value in management education (i.e., create a well-performing CWP that enables reusable collaborative learning experiences in a large-scale lecture). However, the example also illustrates that small variations across contexts, such as adaptation endeavors by SMEs like Robby, hinder well-performing CWPs of being applied more often. They do not know which parts of the design are essential to the success of the CWP, and which parts could be changed without interfering with its value. Thus, a transfer from Susan's lecture to Robby's lecture doesn't take place and well-performing CWPs often remain one-time success stories. However, a transfer of Susan's well-performing CWP to other large-scale lectures could entail a disruptive value creation in management education. It could foster inclusive and equitable education in a pandemic prone society with increasing distance education.

The example reveals various pitfalls: *First*, difficulties occur when SMEs (e.g., lecturers like Robby) try to adapt well-performing CWPs (e.g., engineered by collaboration engineers like Susan) and transfer them to their slightly different contexts. *Second*, the CE design methodology supports collaboration engineers with pretty-well guidance on how to design a CWP and transfer it to practitioners that execute the CWP. *Third*, the CE design methodology does not support SMEs that just want to make little adaptations on a well-performing CWP and aim to develop a CWP tailored for their own slightly different context. *Summing up*, exactly such supposedly small and easy looking adaptation endeavors from SMEs and missing CE guidelines for SMEs constitute the reason for the one-time success stories of well-performing CWPs. Considering CE's state-of-the-art, even small adaptations on a CWP typically require again the work of expensive and rare collaboration engineers. This, however, makes a CWP transfer and adaptation laborious, expensive and time consuming. For organizations this is not attractive and economically.

4.2. State-of-the-Art of the Collaboration Engineering Design Methodology

This section models the state-of-the-art procedure of the CE design methodology (see figure 2).

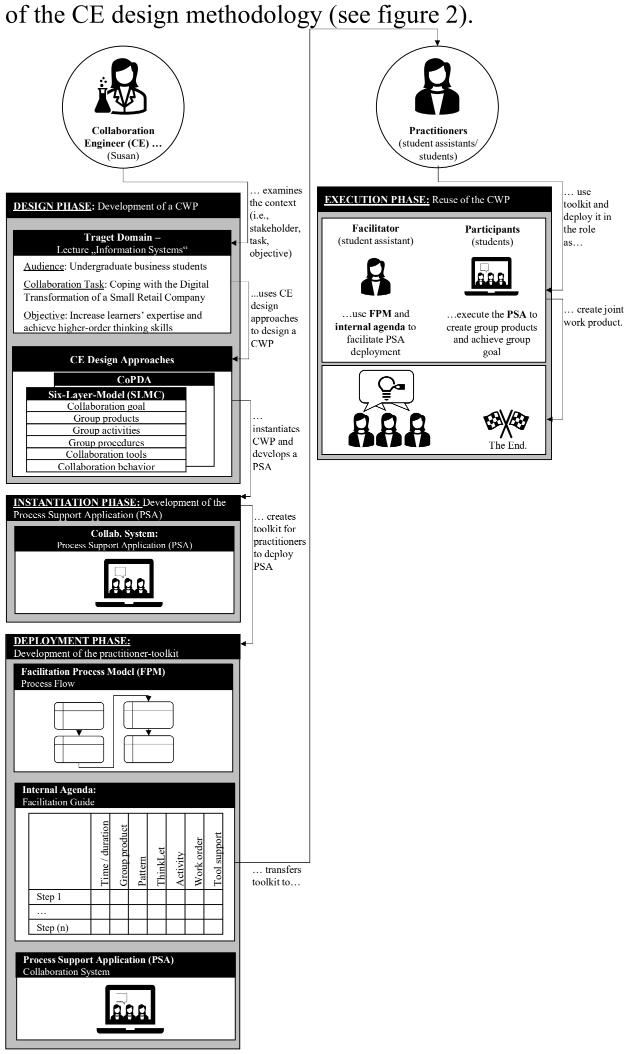

Figure 2. State-of-the-art procedure of the CE design methodology

We distinguish between two core sub-processes by which a different CE role is in the lead.

Sub-Process 1 - *design, instantiation, and deployment of a CWP (lead: collaboration engineer):* When a collaboration engineer develops a CWP, he starts a '*Design Phase*' by which he examines the target domain (i.e., audience, collaboration task, objective). Next, he uses the CE design approaches (i.e., Six-Layer-Model of Collaboration (SMLC); Collaboration Process Design Approach (CoPDA)) to consider dozens of design concerns. The result is a CWP design. Then, the collaboration engineer moves to the *'Instantiation Phase'* to set up the collaboration system. For that purpose, he creates a PSA. This is a fully configured and running collaboration system. Afterwards, he is equipped to move to the *'Deployment Phase'*, in which he creates a toolkit to transfer the CWP to practitioners. This toolkit is highly crucial as it serves as the key to execute the CWP without facilitation guidance from a collaboration engineer. For that purpose, he additionally creates a FPM with the whole process flow of the CWP and an internal agenda with facilitation advice. Practitioners that take the facilitator role will later take these two artifacts to execute the CWP in the field. Now, the collaboration engineer can transfer the CWP to practitioners that execute the CWP. Sub-Process 2 - *execution of a CWP (lead: practitioner):* There are practitioners that take the role as facilitators (i.e., student assistants) and those that take the role as participants. The facilitators use the FPM and internal agenda to observe the execution of the CWP and, if necessary, intervene. The participants (i.e., students) use the PSA and execute create joint work products.

When considering our illustrative use case example (sec. 4.1) in the light of the state-of-the-art procedure (sec. 4.2), the various derived pitfalls become even more clear: The lecturer Robby does not represent the typical target group of a practitioner. Robby has different skills than practitioners and thus, is more a SME that asked Susan how he could adapt the CWP for the purposes of his large-scale lecture. Nevertheless, Susan tried to transfer the practitioner-toolkit (i.e., PSA, FPM, internal agenda) to Robby. But very quickly, the enthusiastic discussion between Susan and Robby stocked, and problems occurred. Robby asked questions for which Susan's toolkit did not provide guidance. The questions were broad and ranged from an announcement in the lecture hall, expectation management over the learning-task anatomy to PSA configurations - e.g., *Did you make an announcement to make expectation management among the students? If yes, how did it look like and what should be considered? Are there any requirements to define learning-task as collaboration task? Is it one learning task or are there sub-tasks? Should sub-tasks build on each other or not? Are there any connections between the learning task, group modes and group size? How did you manage the group composition? The PSA uses as tool support the learning management system 'moodle'. However, I use 'mahara'. ...and many more questions followed!* This real-world scenario nicely illustrates the limitations of the CE design methodology and the toolkit that collaboration engineers use to transfer a well-performing PSA to practitioners.

4.3. Generalizable Requirements

This section describes generalizable requirements (GR) to make well-performing CWPs transferable to slightly different contexts and thus, to enable their long-term value. CWPs like ones in our illustrative use case are to a large extent similar – i.e., lecturers seek to cope with the 'collaboration problem' that collaborative learning instructional designs face; foster similar collaboration behavior among students to increase their expertise and foster higher-order thinking skills. Nevertheless, CWPs slightly differ – e.g., varying class sizes, learning task, setups, domain knowledge. Thus, instead of using a well-performing CWP from a collaboration engineer, lecturers need to adapt a CWP. For such purposes one may argue that the toolkit (i.e., FPM, agenda, PSA) that collaboration engineers create to transfer CWPs to practitioners packages valuable rich facilitation expertise. Lecturers like Robby, who are experts in their subject matter, however, are neither practitioners nor collaboration engineers. Thus, they require different guidance. Summing up, the current CE role concept is not tailored to the needs of this audience (i.e., SMEs like lecturers). Therefore, *GR 1. Tailor CE role concept to SMEs: To create the basis to transfer well-performing CWPs to slightly different context, the two foci of CE and its two roles (i.e., collaboration engineer, practitioners) are too tight and should be extended to support SMEs with necessary capabilities and guidance.* One may argue that SMEs (e.g., lecturers) can use the toolkit (i.e., FPM, agenda, PSA) that collaboration engineers create to transfer a CWP to practitioners as foundation for their adaptation endeavors and to develop an own CWP on an analogy-based way. The toolkit incorporates an impressive amount of the tacit knowledge of the collaboration engineer. To transfer and deploy a CWP to practitioners, it is not necessary to explicate all this tacit knowledge in the toolkit. This tacit knowledge, however, has a highly crucial relevance for the transfer of a CWP to slightly different contexts. For example, the PSA contains tacit knowledge about the collaboration and set-up design for the collaboration system. SMEs typically just have expertise in their subject matter. They have neither sophisticated expertise to develop reusable collaboration processes nor expertise to select and configure suitable collaboration systems. In the case that a SME uses the toolkit various pitfalls occur (e.g., accidently lecturers may delete parts of the design that are essential to the success of the process). Summing up, SMEs typically lack capabilities to recognize which parts of the CWP design are essential to the success of the CWP, and which parts could be changed. Therefore, <u>GR2. Support SMEs with guidance</u>: *To support SMEs with guidance to adapt a well-performing PSA, collaboration engineers should create a new toolkit that is tailored to the needs of a SME and supports the transfer of a well-performing CWP to slightly different contexts.* Taking these requirements into account, they extend the tasks of the collaboration engineer. Thus, the state-of-the-art procedure of the CE design method reaches its limits. Therefore, <u>*GR3. Revise procedure to design and transfer CWPs:*</u> *To create a well-performing CWP that is transferable to practitioners and to slightly different contexts, a revised procedure of the CE design method should differentiate between sub-processes and explicate tasks for which the collaboration engineer, a SME or practitioners have the lead.*

5. A New Paradigm to Transfer Well-Performing CWPs to Different Contexts

5.1. Collaboration Engineering 'Role Concept'

This section picks up generalizable requirements and in particular GR 1 (sec. 4.3) and introduces a revised CE 'role concept'. This distinguishes between three CE roles – i.e., *collaboration engineer, SME,* and *practitioners* (see table 1 / right column). These three roles are necessary to formalize the transfer of a well-performing CWP to a) practitioners, and to b) slightly different contexts. This way, the revised role concept also extends the two foci of current CE research by a third one. This revision extends 1) the role of the collaboration engineer with new tasks and 2) introduces the new role of a SME. These two extensions create the key to formalize the transfer of well-performing CWPs. To characterize the roles, table 1 distinguishes in the columns between collaboration process formalization types (i.e., ad hoc, recurring, recurring with slightly different task); in the lines between process design development, process execution as well as toolkits.

Table 1. Roles in collaboration engineering

<table>
<tr><th rowspan="2"></th><th colspan="3">Collaboration Process is…</th></tr>
<tr><th>ad hoc and one-off</th><th>recurring and of high value</th><th>recurring with slightly different high-stakes task</th></tr>
<tr><td>Toolkit Development</td><td></td><td rowspan="2">Collaboration Engineer
(external)
develops CWP, PSA and practitioner-toolkit</td><td>Collaboration Engineer
(external)
develops CWP, PSA and SME-toolkit</td></tr>
<tr><td>Process Design Development</td><td rowspan="2">Facilitator
(external or internal)</td><td>Subject Matter Expert (SME)
(internal)
uses SME-toolkit to develop own CWP, PSA and practitioner-toolkit</td></tr>
<tr><td>Process Execution</td><td>Practitioner
(internal)
use practitioner-toolkit to execute LPSA</td><td>Practitioner
(internal)
use practitioner-toolkit to execute PSA</td></tr>
</table>

Since our research aim is to make well-performing CWPs transferable to slightly different contexts, we describe in the following the three roles of the right column in more detail: *The collaboration engineer* is a collaboration expert with professional skills to design CWPs for collaboration processes that are 'recurring'. His CWPs evoke among practitioners predictable outcomes that they collaboratively create. He has skills to package facilitation expertise in a practitioner toolkit (i.e., FPM, agenda, PSA) to transfer the CWP to practitioners that can execute the CWP without its ongoing facilitation support. In terms that an engineered CWP should be transferable to slightly different high stakes tasks, he is equipped with capabilities to explicate his tacit knowledge and parametrize a created PSA. For that purpose, he develops a SME toolkit that he deploys to SMEs. This SME toolkit consists of two designed objects (i.e., CWP Template and a CWP Guidebook (sec. 5.2/ 5.3)). It empowers SMEs to particularize a PSA and design an own slightly different CWP. *Subject matter experts (SME)* are domain experts (e.g., lecturer) that have a sophisticated understanding of conditions, constraints, and knowledge of their domain. SMEs have basic skills in designing and executing ad hoc collaboration. Their domain knowledge equips them with skills to examine a collaboration task of a well-performing CWP and recognize similarities in their slightly different domain contexts. Collaboration engineers can equip SMEs with a SME toolkit that empowers them to particularize a well-performing PSA and create own CWPs and practitioner toolkits. This way, SMEs can also deploy own engineered CWPs to practitioners that execute the CWP without their ongoing support. *Practitioners* are domain experts. They become equipped with skills to execute a PSA.

5.2. The 'CWP Adaptation Approach'

This section picks up GR 3 (sec. 4.3) and introduces the *'CWP Adaptation Approach'* as an extension of the state-of-the-art procedure of the CE design method shown in figure 2. The new approach formalizes the design of CWPs and its transfer to SMEs and practitioners. The new approach empowers SMEs to easily particularize PSAs to develop own related CWPs. This way, the solution supports the transfer of well-performing CWPs to slightly different contexts. The approach distinguishes between three sub-processes by which a different CE role is in the lead (see Figure 3).

Sub-Process 1 - design, instantiation, and deployment of a CWP (lead: collaboration engineer): When a collaboration engineer develops a CWP, he starts a '*Design Phase*' by which he examines the target domain (i.e., audience, collaboration task, objective). Next, he uses the CE design approaches (i.e., Six-Layer-Model of Collaboration (SMLC); Collaboration Process Design Approach (CoPDA)) to consider dozens of design concerns. The result is a CWP design. Then, the collaboration engineer moves to the *'Instantiation Phase'* to set up the collaboration system. For that purpose, he creates a PSA. This is a fully configured and running collaboration system. At this point, the PSA packages rich tacit knowledge of the collaboration engineer. To deploy this PSA to SMEs and to empower them to build own related PSAs for slightly different tasks, the Collaboration Engineer moves to the *'Deployment Phase'*. In this phase he creates a SME toolkit to deploy the CWP to SMEs. For that purpose, he *parameterizes* the PSA. Thereto, he creates two new designed CE objects – the CWP Template (i.e., a skeleton of the CWP), and a CWP Guidebook (i.e., a completion aid for the Template). Both designed objects describe a CWP in an abstract way without the domain specifics. Now, the Collaboration Engineer deploys the SME-toolkit to a SME. *Sub-process 2: adaptation of a well-performing CWP (lead: SME):* To develop an own related CWP, a SME starts a *'Design & Instantiation Phase'*. For that purpose, he examines its the target domain (i.e., audience, collaboration task, objective) of the well-

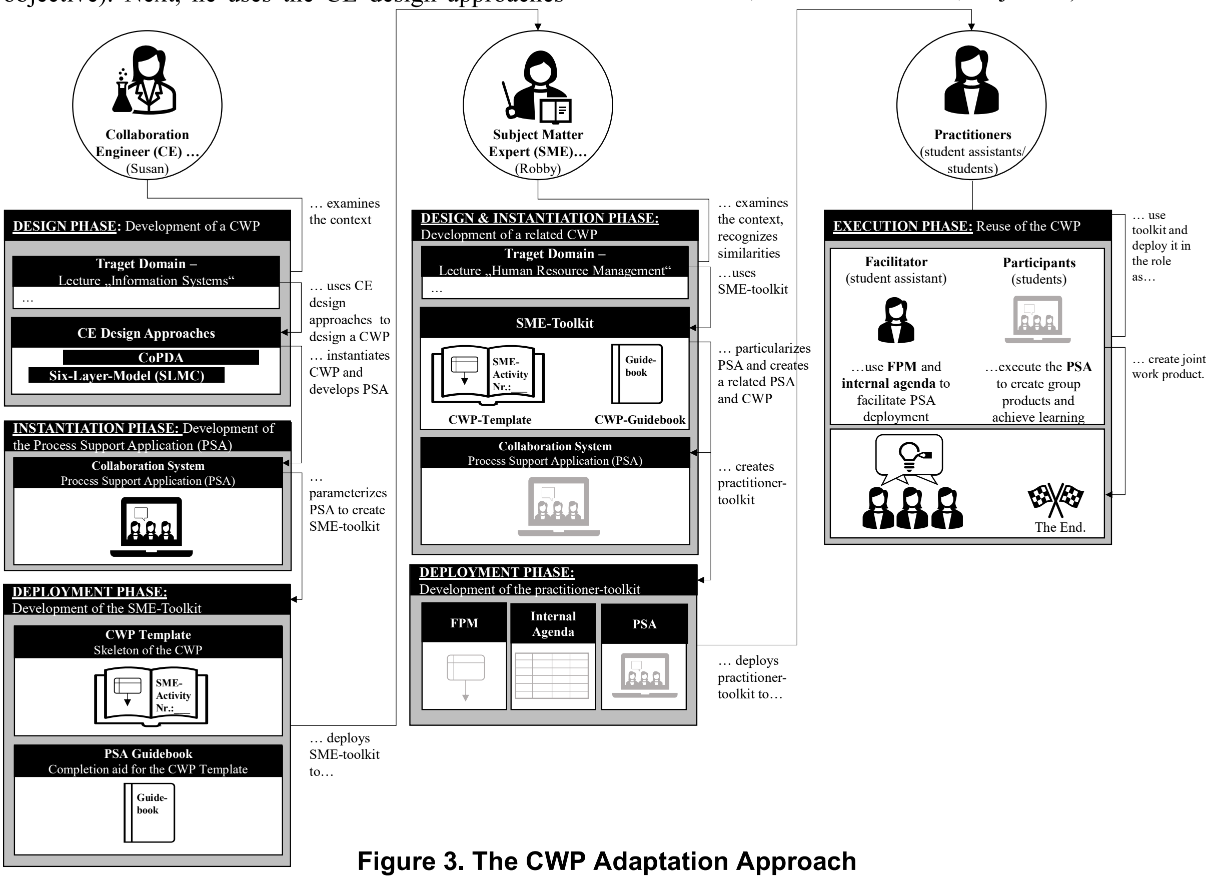

Figure 3. The CWP Adaptation Approach

performing CWP, compares it with his own target domain and identifies similarities. This is the starting point for his further adaptation endeavors. He uses the SME-toolkit to create an own related CWP for his slightly different context. The key to a well-performing related CWP is to *particularize* the well-performing PSA from the collaboration engineer. Thereto the SME completes the CWP Template and Guidebook. To deploy the new engineered CWP to practitioners, the SME moves to the *'Deployment Phase'*. Now, the SME creates a Practitioner-Toolkit (i.e., FPM, internal agenda, PSA) and deploys it to the practitioners. *Sub-process 3: Execution of a CWP (lead: practitioners)*: There are practitioners that take the role as facilitators (i.e., student assistants) and those that take the role as participants. The facilitators use the FPM and internal agenda to observe the execution of the CWP and, if necessary, intervene. The participants (i.e., students) use the PSA and create joint work products.

5.3. CWP Template and CWP Guidebook

This section picks up GR 2 (sec. 4.3) and introduces the SME toolkit with the two new designed objects – i.e., *CWP Template* and *CWP Guidebook*. These two new CE objects are key elements to transfer a well-performing CWP to slightly different contexts. They empower SMEs to build a new related CWP for own contexts (e.g., referring to our exemplarily use case (sec. 4.1): The lecturer Robby particularizes Susan's PSA by using the CWP template and CWP guidebook to create a new related CWP for his 'human resource management' large-scale lecture).

The *CWP Template* is the skeleton of a well-performing CWP. Its structure is abstracted from a PSA expressed with design decisions. It describes the activities that a SME needs to take in a chronological order. For each SME-activity the CWP Template defines a deliverable that a SME must create as well as corresponding design decisions he must take. To achieve this structure, the collaboration engineer explicates his tacit knowledge inherent in the PSA. The collaboration engineer parameterizes the specifics of the PSA with requirements, that he expresses as design decisions. This way, the CWP Template primarily describes *which* design decisions a SME must take. These exceed the collaboration activities documented in a FPM. They range from the definition a title for the CWP over the creation of a process flow; requirements for the creation of a collaboration task; the creation of an announcement for expectation management purposes; the creation of suitable group decomposition mechanisms; the creation of the collaboration system to the definition of instructions for each collaborative activity. One might argue that there are deliverables that are self-evident and thus, not worth mentioning. However, all SME deliverables explicate interwoven interconnections of the collaboration design and the setup design. Therefore, each SME-activity is mandatory to execute a CWP.

SME Activity 1: Create a Title and Topic for the New Collaborative Learning Experience
(1) Decide on the topic in which the students should gain expertise.
(2) Decide on a title for the New Collaborative Learning Experience that describes the knowledge domain in which students are to gain expertise.

Figure 4. CWP Template: SME-activity example

The *CWP Guidebook* is an aid for SMEs to complete the CWP Template. It supports SMEs with prescriptions to create a deliverable and take design decisions. For each SME activity the CWP makes prescriptions. The prescriptions are described in the form of goals, deliverables expressed as capabilities, design concerns and key performance indicators (KPIs) (see figure 5).

SME Activity 1: Create a Title for the New Collaborative Learning Experience

Goal: Create a title that identifies the body of knowledge in which students will gain expertise so an instructor can decide whether the experience might be useful for a class.

Deliverable: A title that:
1. Identifies a knowledge domain that requires higher-level learning
2. References the learning objectives.

Design Concerns:
1. *What should be the content of the title?*

It is a common pitfall to make a title broader than the knowledge domain of the learning experience (e.g., Susan's first title in the real-world example was "Principles of Information Systems"). This title, though, encompassed all the knowledge that exists about information systems. It was too broad to help others decide whether to adapt the LPSA for their classes. Susan renamed it to a well-bounded description of the knowledge domain.

2. *What kinds of knowledge are best conveyed with the instructional design for collaborative learning?*

The body of knowledge should require higher-level learning.

Example of a title: Coping with Digital Transformation of a Small Retail Company.

KPIs:
1. Title identifies the specific body of knowledge that students can address in a single learning experience? (y/n?)
2. Title relates to the learning objectives? (y/n?)
3. Learning objectives require higher-level learning? (y/n?)

Figure 5. CWP guidebook: SME-activity example

This supports SMEs on *how* to take design decisions and on how to particularize the CWP

Template to create a new related CWP. Particularizing means to complete the CWP Template with the specifics of the new context to build a new related PSA. Moreover, the guidebook summarizes valuable additional collaboration knowledge and explanations (e.g., best practices) that support SMEs to take design decisions. It substitutes the collaboration engineer's expertise as it explicates its tacit knowledge.

6. Discussion, Contribution and Conclusion

Despite the substantial value that well-performing CWPs can unfold in organizations and the attention that they achieve, they often remain once-a-time-success stories and don't unfold a long-term value. The core challenge that impedes a long-term value creation in organizations is a missing transferability and adaptability of well-performing CWPs to slightly different contexts. The current CE research does not provide guidelines for such design endeavors. There is an impressive amount of CE research that provides evidence that practitioners can achieve gains in team productivity by executing well-performing CWPs designed by collaboration engineers (Gert-Jan de Vreede & Briggs, 2019). For example, scholars used CE to design well-performing CWPs in various domains (e.g., collaborative writing (Lowry & Nunamaker, 2002), knowledge transfer (Bittner & Leimeister, 2014), software code inspection (Gert-Jan de Vreede et al., 2006), business model development (Simmert, B., Ebel, P., Bittner, E. A. C., Peters, C., 2017)). In the examples, the CWPs solved a collaboration problem and created an impressive value in the various application domains - on a short-term. Even though, a transfer of well-performing CWPs to slightly different contexts (e.g., due to changing use case conditions) promises to unfold a long-term value creation in organizations, research on this is surprisingly rare. Such a perspective has the potential to bring new attention to well-performing CWPs and make them more economically attractive.

Considering the example of our exemplarily use case (sec. 4.1): The transfer of Susan's well-performing CWP to other large-scale lectures promises to entail a disruptive value creation in management education. Such a CWP transfer contributes toward OECD's sustainable development goal of 'inclusive and equitable education' in a pandemic prone society with increasing distance education. Like in our chosen illustrative use case example, one will find similar success stories of CWPs with potentials for long-term value creation in all domains where organizations face 'collaboration problems'. In each domain there are SMEs that recognize the value of a CWP. Deploying the SME toolkit to them promises to empower them to develop own related CWPs.

In this paper, we report proof-of-concept research (Nunamaker Jr et al., 2015). Our aim was to create a first proof-of-concept solution toward a class of unsolved problems (i.e., transferring well-performing CWPs to slightly different contexts). For that purpose, we make contributions toward a deeper understanding of this problem class. We relied on an exemplarily well-performing CWP in the educational domain and modeled the state-of-the-art procedure of the CE design methodology. We used this illustrative problem description, to illustrate pitfalls of CE research that impede the transferability of well-performing CWPs to slightly different contexts research. Based on, we inductively derived three generalizable requirements to further create a solution to this problem class. We developed first nuggets of scholarly knowledge. These are inherent in our new paradigm to transfer well-performing CWPs to slightly different contexts. In this light, we introduced a revised CE role concept, CWP Templates and CWP Guidebooks as well as the CWP Adaptation Approach to formalize the transfer of well-performing CWPs to slightly different context.

Table 2. Overview of contributions

Generalizable Requirement (GR)	Proof-of-Concept Solution Nuggets:
GR 1 *Tailor CE role concept to SMEs*	Extended 'role concept': Collaboration Engineer, SME, Practitioner
GR 2. *Support SMEs with guidance*	SME-toolkit (i.e., CWP Template, CWP Guidebook)
GR 3. *Revise procedure to design and transfer CWPs*	CWP Adaptation Approach

Future research should focus on the evaluation of the *CWP Adaptation Approach* and exploratory collect insights when a) collaboration engineers develop a CWP, create the SME toolkit and deploy this to SMEs; b) SMEs develop a related CWP and particularize the CWP Template and CWP Guidebook to develop the practitioner toolkit. Collaboration engineers should evaluate the quality of the practitioner toolkit developed by SMEs. This will reveal whether the 'practitioner toolkit' (developed by a SME) and 'SME toolkit' (developed by a collaboration engineer) are of comparable quality. A comparable quality would be an indicator that the CWP Adaptation Approach is useful to transfer CWPs to slightly different contexts and empower SMEs to develop related CWPs.

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