Enhancing transfer-of-training for corporate training services: Conceptualizing transfer-supporting IT components with theory-driven design

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Abstract. Corporate training services have grown into a key approach for improving performance and a substantial industry in recent years due to increased job requirements, workforce flexibility and lifelong learning. Transfer-of-training is a key output of these services, defined as the application and generalization of new competences at work acquired in training. Corporate trainings are exemplars of highly co-created services. Improving the output productivity through better transfer-of-training requires collaboration between providers and customers.

IT could be an enabler to embed transfer-related activities for transferring training contents to the work. However, IT support is missing for improving transfer-of-training in corporate trainings.

Inspired by service logic and based on training research, this paper employs a theory-driven and iterative design approach to develop transfer-supporting IT components for corporate trainings. Furthermore, we present the implemented prototype, findings from several design interactions and report on the on-going summative evaluation in an international service management training.

Keywords: Transfer of Training, Corporate Training Service, Theory-Driven Design, Blended Learning, Value Co-Creation

1 Introduction

The growing prevalence of knowledge-based work leads to increasing participation in lifelong learning [1]. Changing job profiles and competencies are key drivers of this development. Corporate training services address this need through customized training programs [2, 3], creating significant growth for these services [1, 4]. In scarce markets for talents, firms need to invest into the training of their workforce. In Germany alone, companies spent 28.6 bn euros for corporate trainings in 2010 [5]. Given this substantial investment, companies seek to ensure that the investment into corporate trainings leads to an improved business performance [6]. This makes transfer-of-training to the work a key output of corporate training services. Transfer-of-training is generally accepted as "…the degree to which trainees effectively apply the knowledge, skills, and attitudes gained in a training context to the job…" [7]. Howev-

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er, corporate training services seem to suffer from low productivity, as studies show that only between 10% and 50% of the corporate training contents are applied at work [8-11].

Service logic posits that value is created by customers [12] or phenomenological co-created [13]. If transfer-of-training is considered as the key output of corporate training services, neither customers nor providers of such services can be satisfied by the current extent of transfer-of-training output.

Scholars emphasize that neither providers nor customers can achieve improvements of service productivity individually [14]. Improvement in the transfer-of-training output of corporate training services thus requires addressing the transfer-related collaboration between all involved actors of value co-creation. This need for collaboration is also emphasized by research on transfer-of-training [15]. Apart from factors related to the design of the training as such, researchers have identified the characteristics of individual learners as well as the work environment as determinants of successful transfer-of-training [6].

This research thus seeks to facilitate improvements in the output productivity of corporate training services by strengthening the transfer output of these services. We seek to do this with the design of transfer-supporting IT components. Despite the growing prevalence of blended learning in corporate training, IT support of transfer-of-training has not yet been sufficiently addressed in research [16, 17]. Similarly, state-of-the-art learning management systems provide only little support for transfer-of-training [18]. Thus, the research question addressed in this paper is as follows: *How do transfer-supporting IT components have to be designed to improve the transfer output of corporate training services?*

The remainder of the paper is structured as follows: The next section introduces the conceptual foundations. Then we discuss design science research and theory-driven design as the methodologies used for this research. Afterwards the theory-informed design of transfer supporting IT components and of a prototype implementation of those components will be explicated. In the following chapter we discuss results of the formative evaluation and the ongoing summative evaluation of the prototype. The paper ends with a conclusion and an outlook on further research.

2 Conceptual Foundations

2.1 Service logic, service productivity, and corporate training services

Service logic posits that value is created by customers rather than providers, while providers facilitate this process of value creation [12]. Therefore, service is characterized by collaboration between customers and providers as well as by contextualization of value creation to the specific setting of a customer [19].

Researchers have thus long concluded that traditional thinking about productivity has limited value when applied to service [14]. A service provider cannot manage service productivity unrelated to customers as customers provide critical inputs, collaborate with providers in creating value, and accrue benefits from the service [14]. Improvements in service productivity thus need to address the involvement of cus-

tomers in the process of co-creation of value as well as the ability of customers to appropriate the value of the service in the customers' own contexts [20].

Corporate training services are specific instances of highly co-created services. Training is often provided as an internal or outsourced service [21]. Training is an organized, systematic series of activities designed to enhance an individual's work related knowledge, skills and understanding or motivation [22], which is provided to improve performance on the job [23]. Achieving this output requires collaboration between customers and training providers as well as contextualization to meet the specific training needs of individuals and organizations [20]. Customers need to share need-related knowledge for the design and/or customization of corporate training services, to enable participation in the training and/or participate, as well as to provide a conducive environment for applying new skills and knowledge acquired through training on the job.

The service logic lens led us to conceptualize the critical outputs of corporate training services based on training literature [24]. Therefore, we focus on the collaboration and contextualization of corporate training services in order to improve the ability of customers to appropriate the value of training in the form of performance improvements. This appropriation requires learners to generalize learnings and to apply them to the learners work. The output of this process is called transfer-of-training [7].

2.2 Transfer-of-Training

According to interdisciplinary research, three determinants affecting the transfer-of-training output are identified. These are learner characteristics [7, 25, 26], intervention design [26-30], and work environment [7, 25, 26, 31].

Learner characteristics subsume individual characteristics of the learner like motivation, cognitive ability, and self-efficacy [7, 26, 32]. An influence on these factors is only partially possible during the training and therefore, the effectiveness of transfer-supporting IT components is limited.

Intervention design summarizes factors of the design and delivery of the corporate training service. Relevant factors are a clear definition of training goals, the relevance of training content, behavioral modeling and the utilization of error-based examples [26, 28, 30, 33, 34]. These factors can be addressed and are addressed by learning management systems and therefore, are not focused in this paper [35].

Work environment subsumes factors that are related with the job of the learners of the training program [25]. Relevant factors are transfer climate, peer and supervisor support, and opportunity to perform [36-40]. Transfer climate describes the circumstances at the workplace, where the learner has to utilize the content of the corporate training service [36-40]. This includes the intra-organizational willingness for accepting changed post-training behavior. A positive transfer climate significantly enhances transfer-of-training and the effectiveness of post-training interventions [40, 41]. Supervisor support describes the involvement of supervisors in the process of adapting new knowledge on the job. For example, supervisors can tolerate longer times per task of a learner during the first application or encourage a learner to utilize the training content. Empirical studies show that participation of supervisors in the training

service positively affects transfer-of-training output [40, 42-44]. Peer support subsumes support of colleagues and support of other learners of the corporate training service [45-47]. Peers can discuss among each other different ways of applying training contents on the job. Opportunity to perform describes the possibility to utilize the learnings in daily business [37, 42, 43]. To enable this opportunity it could be necessary to reduce workload after the training to enable the application of learnings.

Out of these three determinants work environment is barely addressed in recent literature and lacks of concepts to improve transfer-of-training with IT-support, although research has clearly demonstrated the critical role of it [18, 26]. Moreover, the corporate training service can be easily embedded in the work setting by IT. On this account we focus on the work environment determinant as a novel approach to improve transfer-of-training output in a target-oriented way.

3 Research Design and Methodology

The research described in this paper generally follows the design science paradigm. Hevner et al. [48] require researchers to build on prior research for advancing design knowledge. To fulfil this requirement, we adopt theory-driven design that has been proposed by Briggs [49]. Briggs advises design researchers to determine an output variable they seek to change and to search for a guiding theory that helps to understand causal relationships related to the chosen output variable. The design should build on these causal relationships by designing artifacts that influence the theoretically identified determinants of the chosen output variable. We follow this reasoning in this paper by choosing transfer-of-training as our intended output variable and search for theoretical guidance how transfer-of-training is determined. As explained earlier, the work environment yields key determinants of transfer-of-training. Figure 1 illustrates that we design (1) transfer-supporting IT components to improve the (2) determinants of transfer-of-training related to the work environment.

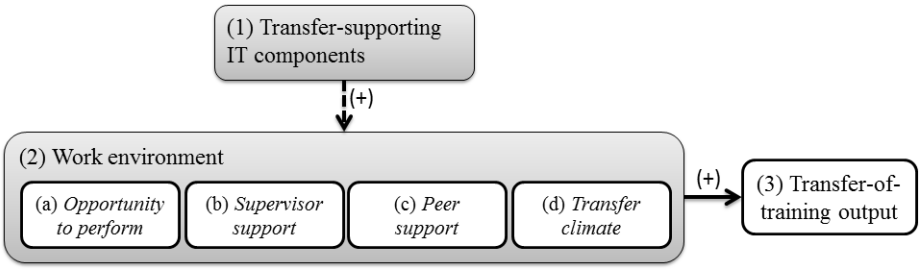

Fig. 1. Theory-driven design approach for transfer-supporting IT components

To evaluate the transfer-supporting IT components, a fully functional prototype has been developed and embedded into transfer-focused management training programs.

Guided by the underlying theory on transfer-of-training, the research process follows an iterative search for the detailed design of the transfer-supporting IT components. In particular, we adapted Arnold et al.'s "Community Platform Engineering

Process" (CoPEP) for our design efforts [50]. This approach institutionalizes discussions with the target audience, thus improving the applicability and utility of the components for participants, managers and trainers in corporate training services. According to CoPEP four iterations with four phases are appropriate. As illustrated in figure 2 each iteration results in a more accurate artifact (iteration 1-3) or in an instantiation (iteration 4). A single iteration consists of phases for planning, analysis, development, and evaluation.

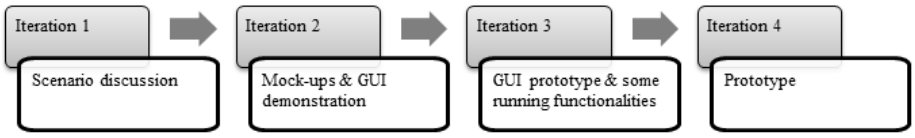

Fig. 2. Adapted iterations of Arnold et al.'s "Community Platform Engineering Process" [50]

We started with the planning phase and scheduled the activities for the corresponding iterations. Subsequently we analyzed prior field studies in addition to corporate training service phases of the field partner and searched for a suitable theory in iteration 1. As mentioned above we adapted the theory of the transfer-of-training output and utilized it in a theory-driven design approach. After the development phase of iteration 1 we evaluated the requirements of the transfer-supporting IT components with experts. Based on the extended requirements and the analysis of these with experts in iteration 2 we developed a demonstration prototype. Afterwards an evaluation of the demonstration prototype with experts was conducted. The translation of the socio-technical requirements into the system design was done iteration by iteration with the assistance of experts as well as end users in iteration 3 and is currently conducted with end users in iteration 4. Finally the instantiation of the transfer-supporting IT components will be introduced to the broader public after the end of iteration 4 and a summative evaluation with end users and experts.

4 Derivation of Transfer-Supporting IT Components

4.1 Context of use of transfer-supporting IT components

In this section, we derive transfer-supporting IT components that are based on the factors of transfer-of-training related to the work environment determinant.

For the application and generalization of new competences acquired in a corporate training service, it is necessary that a training program is closely linked to the learners' work. One effective post-training intervention for linking training and work is the use of field projects that guide learners to apply new competences acquired in a training context to achieve improvements in their work [51-57]. The transfer-supporting IT components leverage such a project-based approach for improving the effect of training on the job. In this project-based approach, learners are encouraged to develop an improvement project for their specific work setting that leverages the competences acquired in the training program. Already during the formal training, learners are

guided in a structured process to capture relevant content, develop project proposals, and receive authorization by management stakeholders to pursue the project. The design and implementation of the project can be supported by IT to give a seamless experience as well as integrate the project into the actual training and work.

Figure 3 illustrates the context of use of the derived transfer-supporting IT components within our project-based approach. To transfer the knowledge from the training environment to the work the trainer instructs learners during the training to capture new knowledge relevant to the work setting in a transfer journal (C1). Based on this transfer journal, learners develop initial ideas for an improvement project. Based on the project idea and initial feedback of trainers and supervisors, learners develop a project charter (C2) in which the learner describes key aspects of the project. Moreover, the project charter is used as a basis for feedback and, eventually, as an agreement with key stakeholders (learner, supervisor, mentor and trainer; C3) about the improvement project [58]. Subsequently, learners develop a detailed project concept based on the project charter in order to be able to implement the project within their work. During the implementation learners report (C4) the ongoing status of the projects and update information about achieved improvements (changes in KPIs of the job). A post-implementation review finally assesses the application of training content as well as performance improvements. Throughout the development of the project idea until the implementation of the project, supervisors and peers are encouraged in structured process to provide feedback on the specific projects.

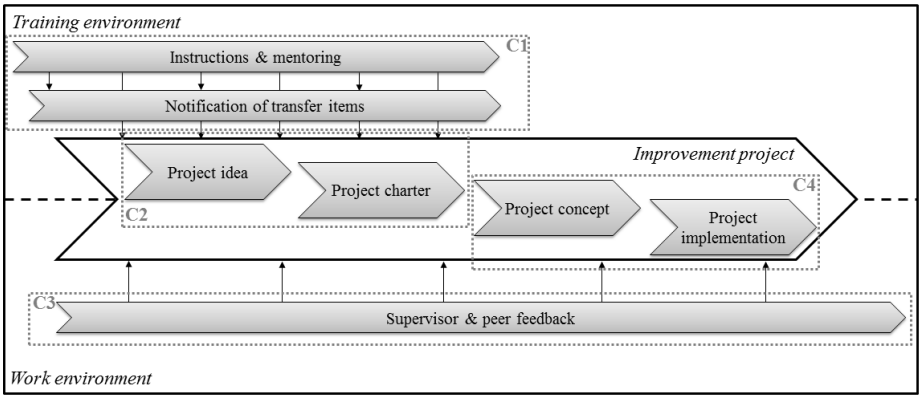

Fig. 3. Context of use of derived transfer-supporting IT components

In earlier research we identified requirements for transfer-supporting components and showed that transfer-of-training has not yet been sufficiently addressed within Learning Management Systems [18]. Table 1 gives an overview of the derived functions for transfer-supporting IT components and the corresponding factors of the transfer-of-training work environment determinant.

Table 1. Mapping of work environment factors to derived IT components

Work environment factors	Description of factors	Derived functions for IT components
Opportunity to perform (Fig. 1, 2a)	Possibility to utilize training content and learnings in daily business [37, 42, 43].	Transfer journal (C1), knowledge assets for project (C2), project review and authorization (C3), regular traffic-light-report on improvement project (C4)
Supervisor Support (Fig. 1., 2b)	Supervisor involvement in process of adapting training content in work environment [40, 42-44].	KPIs (C2), milestones (C2), project review and authorization (C3), detailed feedback function (C3), regular feedback cycles (C3)
Peer Support (Fig. 1., 2c)	Support of colleagues at training and work environment and of other learners at corporate training service [45-47].	KPIs (C2), milestones (C2), project review and authorization (C3), detailed feedback function (C3), regular feedback cycles (C3)
Transfer climate (Fig. 1. 2d)	Circumstances at work environment, where learner has to utilize the training content. [36-40].	Responsive light-weight web-based service, easy access to stakeholders, tracking of measureable improvements of improvement project (KPIs; C4)

The components are implemented as responsive web-based services that give ubiquitous access to all information needed and to all actors of the corporate training service. Since it is not easy for companies to give all stakeholders (e.g. trainers) access to the infrastructure (e.g. project management software and network). This concept ensures that training content and support is utilized on the job and that the value of a corporate training service is explicated. In summary, the solution described provides IT components that allow the learner to:

- Reflect important training content to capture new competencies.
- Develop and document transfer-related projects in a structured way.
- Request and receive feedback from supervisors and peers as well as provide feedback to peers.
- Communicate the status of the project to supervisors and interested colleagues.

Moreover supervisors have the opportunity to authorize the project of the learner and to influence the project by feedback. Finally, the training can be evaluated by the service provider and customer, to improve the training constantly. According to our knowledge base neither learning management systems nor project management software provides such a combination of components and functions like the transfer supporting IT components described (feedback, project definition and trainings content). Each component is derived from the transfer-of-training work environment determinant, to be able to measure the improvements that could be achieved by addressing

the factors of this determinant with IT components. An exemplary view of the web-based service with highlighting key functionalities is given in figure 4.

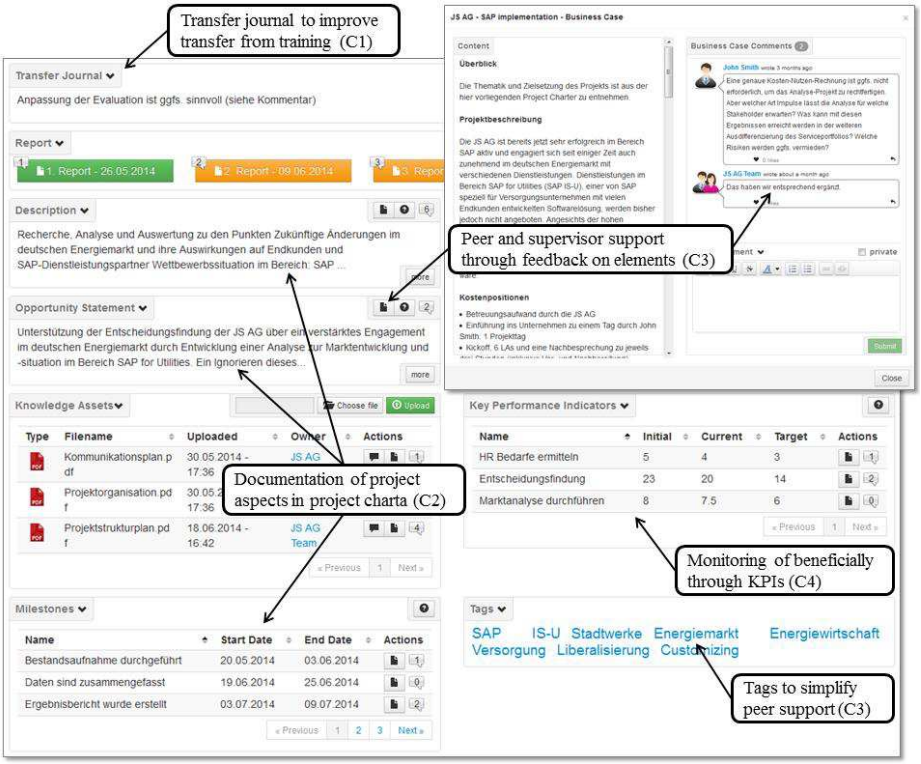

Fig. 4. Exemplary view of the web-based service highlighting key functionalities

4.2 Competency development, project definition, coordination and feedback

The components competency development, project definition, and coordination and feedback enable learners to specify their projects in detail. The center of the project definition component is the project charter (C2), which helps to define projects in a structured way and enforces an explication of the utility. For example, a business case as well as an opportunity statement has to be defined. This project charter has to be accepted by a supervisor who commits to the project (C3). This gives the learner the mandate to implement change in current work practice (opportunity to perform). Moreover, knowledge assets that match to the content of the corporate training service have to be specified and give the opportunity to easily access training materials (opportunity to perform). This association can help to implement the learnings in the actual work setting and support the utilization of it. This ensures a comprehensive utilization of the content on the job. Furthermore, it enables the learner to get feedback of supervisors as well as peers on the chosen approach and afterwards to comment on it and share the experience gained (C3). Nevertheless, other users (e.g. future

learners) can easily retrace certain knowledge to a certain training over the tag function and learn from the experiences (e.g. comments) of prior projects. Furthermore, learners can note information out of the training within the project charter to connect their project ideas with the training content (C1, C2).

In this structured manner it is easily possible for peers as well as supervisors to give feedback in the form of comments on every item of this project charter (peer and supervisor support, C3). As a consequence critical commitment is enabled. The components encourage supervisors to evaluate project proposals and provide feedback. Moreover, the component can require the supervisor to accept or reject proposals and indicating their sponsorship for individual projects. The intention is to encourage commitment of supervisors, mentors as well as trainers to the project and thus ensure their ongoing support. Moreover, such formal agreement can also corroborate the opportunity to perform. From the peers point of view it is possible to discuss the project and identify barriers, possible problems and improvements in the project plan based on this charter. Finally, the level of involvement of peers should be transparent to enable a high visibility towards supervisors. This visibility is a strong incentive for learners to engage in peer feedback.

4.3 Project benefits tracking

This component subsumes functionalities to track a project and its benefits. Based on the project charter, the progress in terms of development of addressed KPIs and completion of milestones is possible (C4). This high transparency based on facts helps to explicate the value of a corporate training service. Supervisors and peers can monitor the projects with the help of this component. These groups are encouraged to give feedback on every progress report (peer and supervisor support, C3). Besides milestone reports, these components demand regular traffic-light-reports that state the current status of the project and specify possible changes in the chosen approach by the definition of necessary activities or problems with the transfer-of-training content (opportunity to perform). From a peer's perspective these reports can help to learn from the experience of other learners by applying the training contents to their work. Moreover, good practices can be identified and generalized to support transfer-of-training. For supervisors it bears the possibility to compare pre- and post-training performance. Such a comparison can explicate the utility of corporate training and encourage supervisors as well as human resource managers to constantly give opportunities to perform. Over time and with experience, this approach can influence positively the expectation regarding corporate training services. This influences the transfer climate in a company by providing measureable improvements in work practice as a consequence of the corporate training service. To enforce this change the perception and relevance of a corporate training service has to be clearly highlighted. This can be done by the explication of utility of the corporate training service in terms of making positive effects visible. For instance, improvements have to be captured, reported and related to the corporate training service. This should lead to a change in the corporate mindset over time. This explication is done throughout the whole concept of the intervention where clarification of utility is the main focus.

5 Evaluation

We utilized the "Comprehensive Framework for Evaluation in Design Science Research" by Venable et al. [59] to ensure that the selected evaluation strategy and method for the evaluation of the transfer-supporting IT components are appropriate.

The framework by Venable et al. [59] differentiates between evaluation strategies along two dimensions: (1) ex-ante vs. ex-post evaluation and (2) artificial vs. naturalistic evaluation. In the first dimension, ex-ante evaluation seeks to evaluate an artifact prior to implementation and use, while an ex-post evaluation does so while the artifact is in use. In the second dimension, an artificial setting denotes an evaluation outside the intended context of use of the artifact (e.g. through simulation or in a lab), while a naturalistic setting refers to a real context of use. Over the entire development process of four iterations, we chose an ex-ante, artificial evaluation approach for the first three iterations and a naturalistic, ex-post approach for the last iteration. The outputs of the first three iterations are uninstantiated artifacts (design, partial prototypes). Accordingly, these artifacts cannot be used in a naturalistic field setting, e.g. a real corporate training service. These artifacts can be evaluated in a formative way using feedback from potential users and domain experts [60]. In contrast, the robust prototype as the output of the last iteration should be subjected to a naturalistic evaluation by using it in field settings like a corporate training service.

As of now, we concluded three iterations. In the first iteration, we developed service blueprints to align the theoretically derived transfer-of-training insights with the process of corporate training services [61]. The blueprints were evaluated in a workshop with four domain experts. In the second iteration, we designed mockups based on the service blueprints to ensure that the required functionalities are integrated in the early-stage concept and the design is appropriate to support learners. We evaluated these mock-ups during two independent expert workshops with four and two domain experts. In the third iteration, we developed a demonstrator based on the feedback of the prior iterations. It was used to show the workflow of the main processes of the improvement projects and represented the dashboard for training program managers. The demonstrator was evaluated with both domain experts and participants the training program. We conducted six in-depth interviews with program managers and trainers of training services who have many years of experience in customer-centered programs. In addition, we presented the demonstrator to seven participants of a national corporate training service and collected their feedback in in-depth interviews.

Based on the findings of the third iteration, we developed a fully functional prototype. A key issue in the later iterations was to ensure comprehensive use of the transfer-supporting IT components to ensure their effectiveness. As a response to this issue, we developed a number of functional improvements for engaging learners, supervisors, and training professionals in the development and implementation of improvement projects. Among those functional improvements a transfer journal was implemented which learners can use throughout the training to note insights for improving their work. Also, we improved the feedback function and added regular reports (traffic-light-reports) to keep key stakeholders and peers involved. Finally, we added a fine-grained notification system that alerts all actors of new relevant infor-

mation with regard to improvement projects and reminds them about pending assignments for reviewing, giving feedback, and/or authorizing improvement projects. Most importantly, we developed a detailed guide with domain experts that illustrates how the transfer-supporting IT components should be used throughout the training and which actors need to become involved at which time to ensure the collaboration between customers and providers for creating a conducive work setting to improve transfer-of-training output.

Currently, the transfer-supporting IT components are subjected to a summative evaluation that seeks to determine the usability and effectiveness of the components. As argued above, we follow an ex-post and naturalistic evaluation approach with real users, a real problem and a real system [59] in two field settings. First, we introduced the prototype to an international corporate training program for service managers of a manufacturing company. This training program involves multiple courses with an embedded improvement program. The program has run several times in the last 36 months for the same company. Second, we introduced the prototype to an industry-based project module of an IT management master's program that has run recurrently. The evaluation focuses on the work environment determinant of transfer-of-training as well as on the transfer outcome of the improvement projects. We use a mixed-method design involving stakeholder interviews, data from system use and project documentation. Data on system use reveals the support provided by peers and supervisors. The project documentation establishes the opportunity to perform and the explication of utility based on the project plan and the outcome. Data from project documentation is analyzed using independent researchers for coding data. Finally, the results of the interviews (qualitative data) and the document analysis (quantitative data) are triangulated to improve the robustness of the findings [62]. This gives a comprehensive view on the usability and effectiveness of the components regarding an improvement of the transfer-of-training output.

6 Conclusion, Outlook, and Limitations

In the course of this paper we discussed transfer-of-training as a key output of corporate training services and the need for collaboration between service providers and customers for improving the productivity of these services. Inspired by service logic and based on training research, we presented the design and prototype implementation of transfer-supporting IT components that seek to improve transfer-of-training output with a focus on factors of the work environment determinant. We also evaluated the concept in a formative manner with an iterative approach and have completed three out of four iterations. The concept and prototype of transfer-supporting IT components proposed in the paper show how IT can be used to improve transfer-of-training output. Such improved transfer-of-training contributes positively to the process of value co-creation of corporate training services. Moreover, we contribute to the field of blended learning concepts on corporate settings where transfer-of-training is scarcely addressed and there is a lack of evidence-based design knowledge on transfer-supporting IT components.

As described before, the components are highly interactive to improve the transfer-of-training output of a group of learners. A main focus is the high interaction of learning with key stakeholders to explicate the value of the training content as well as use feedback for improving the application of new competences on the job. The proposed design of the transfer-supporting IT components contributes on an academic level to the knowledge base for designing learning technologies. Besides this scholarly relevance, the transfer-supporting IT components are highly relevant to practice, too. As mentioned before, the need of efficient corporate training services is simultaneously rising with the market volume. The increased transparency of transfer effects allows service providers to demonstrate the value created for customers of these services and to improve their training services in the future. Likewise, the customer can better gauge the extent of transfer and manage corporate training accordingly.

However, there are some limitations of the concept. The derived components aim to leverage the work environment bust there are other determinants that can also affect transfer-of-training output, such as the characteristics of individual learners. In further research, such determinants could be incorporated into the design. Moreover, there are post-training interventions other than improvement projects that could improve transfer-of-training output, such as coaching. Likewise, future research could seek to extend the set of components for supporting alternative post-training interventions. Finally, the transfer-supporting IT components have so far only been subjected to an ex-ante, artificial evaluation with the ex-post, naturalistic evaluation still ongoing. However, the readiness of a global manufacturing company to accept the use of the components in a strategic HR development program demonstrates the maturity of the design achieved in the first three iterations.

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