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HOW TO CREATE MICRO LEARNING CONTENT IN ENTERPRISES? BRIDGING THEORY AND PRACTICE FOR DERIVING DIDACTICAL REQUIREMENTS

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Extended Abstract:

I. INTRODUCTION

A large field of research discusses the challenges of digitalization for vocational education and training (VET) [e.g., Distel, Ogonek and Becker, 2019; Nokelainen, Nevalainen and Niemi, 2018; Frey and Osborne, 2013]. Besides this discussion, digitalization also offers potentials to unite work and learning in enterprises by enabling flexible training proposals [Decker, Hausschild, Meinecke, Redler and Schumann, 2017]. Previous studies like [Busse, Lange and Schumann, 2019] show concrete effects on VET. On the one hand, training and learning departments observe a shift from traditional forms of learning to digital learning, which results in an enrichment of learning opportunities and an individualization of educational pathways. On the other hand, as a result of increasing knowledge and technology-intensive activities, learning needs of employees are rising [Busse et al., 2019]. To address the learning needs, situated and small learning units promise to support employees in their moment of need, e.g., when a problem with a machine occurs in a production facility. Micro learning and mobile learning as modern and technology-enhanced learning concepts are two of several promising approaches to offer flexible and situative education and training opportunities [Alkhatib and Rensing, 2016]. Moreover, 91 % of the enterprises in Germany, Austria, and Switzerland emphasize micro learning as a central learning concept in their digital enterprise learning environment [mmb Institut, 2018b].

However, prior research on micro learning as a facette of digital learning figured out that the didactical design of learning content, i.e. "the design of teaching and learning with web-enabled technologies" [Jahnke, Bergström, Mårell-Olsson, Häll and Kumar, 2017], is a major aspect for its successful implementation [Kerres, 2007; Belaya, 2018; Jahnke, Lee, Pham, He and Austin, 2019]. Nevertheless, a lack of research is on this subject [Busse, Decker and Schumann, 2018] and represents an essential challenge for training and learning departments in enterprises during the implementation process of micro learning [Busse, Lange, Hobert and Schumann, 2019]. To support enterprise training in the implementation process, didactical requirements offer a guideline of important aspects that need to be considered in the design process of micro learning content. This wouldn't be only beneficial for enterprise training, but also for research on this topic. For the IS research, the requirements will add an important viewpoint that needs to be considered besides functional and non-functional requirements when implementing technology-enhanced learning forms like micro learning.

Notwithstanding these facts, a large field of research exists on didactical preparation of traditional as well as digital forms of learning (e.g., established learning theories and the discipline of

instructional design). Even if the theories do not focus on micro learning and its characteristics in particular, it seems to be a fruitful approach to transfer these central and established results on the specifications of micro learning. Besides this theoretical perspective, a large field of enterprises like e-learning agencies is specialised in designing digital learning concepts. They consult and offer other enterprises digital learning solutions. According to a recent survey, 40.8 % of surveyed enterprises jointly develop digital learning units with an e-learning agency. 17.8 % of enterprises obtain their digital learning units completely from an e-learning agency [Siepmann and Fleig, 2017]. As the daily work of e-learning agencies mainly consists of developing digital learning content and consulting enterprises regarding questions of digital learning [mmb Institut, 2018a], it seems to be a major source for obtaining expertise knowledge about the subject of didactical design of digital learning forms like micro learning.

Comparing and combining these theoretical and practical perspectives to derive didactical requirements for the design of micro learning content come as a solid and both, theoretically und practically sounded framework. Therefore, the aim of this extended abstract is to present a proposal for a research approach.

II. MICRO LEARNING

Micro learning is a technology-enhanced learning format [Lindner, 2006]. It refers to small learning units (micro content) which can be dealt in a short period of time (up to 15 min) [Kovachev, Cao, Klamka and Jarke, 2011]. Due to its small size, micro content enables high (didactical) interactivity which influences the learning process positively (e.g., improve knowledge, learners' motivations, engagement and performance, retention and support continuous learning) [Bruck, Motiwalla and Foerster, 2012; Jahnke et al., 2019]. In a work-integrated learning context, micro learning causes only short interruptions of the actual working process [Alkhatib and Rensing, 2016]. In combination with mobile learning that can be defined as "technology-enhanced learning using mobile devices (like smartphone or tablet PCs) in time and location independent learning processes and contexts." [Decker et al., 2017], (mobile) micro learning offers concrete starting points to enhance enterprise training with new and work-integrated learning offers and learning perspectives [Robes, 2017].

III. RESEARCH FRAMEWORK AND RESEARCH QUESTIONS

Within the study context, the major goal is to derive both, theoretically and practically sounded requirements for the didactical design of micro learning content. During our work, we attempt to answer two main research questions:

***RQ1:** What theory-based requirements can be derived from established learning theories for the didactical design of micro learning content?*

***RQ2:** What requirements are relevant for the didactical design of micro learning content according to practitioners?*

To answer these two research questions, we divided our research framework into three steps:

The literature on micro learning figured out that micro learning cannot be assigned to a specific learning theory. Rather, micro learning content must be flexibly adapted to the respective learning situation under psychological and didactical points of view [Breitner, Guhr, König, Köpp and Maske, 2017; Hug, Lindner and Bruck, 2006; Kerres, 2007]. Therefore in a **first step** and to answer our first research question, we examine established learning theories that we identified throughout a literature analysis in the research field. In general, there are three main orientations of learning theories [Schunk, 2012]: behaviorism [e.g., Thorndike, 1913; Pavlov, 1927], cognitivism [e.g., Gagné, 1980, 1985] and constructivism [e.g., Brown, Collins and Duguid, 1989; Geary, 1995]. Each orientation is characterised by different learning theories and representative principles. Depending on the concrete learning situation, each of the three orientations has its certain relevance for technology-enhanced learning formats like micro learning (e.g., the behaviorist orientation proved itself especially in the teaching of factual knowledge like language learning) [Hu, 2013]. Subsequently, we will consider established and frequently quoted theories and approaches that explicitly deal with the didactical and multimedia design of learning content. Therefore, we will

consider the cognitive theory of multimedia learning [Mayer, 2001, 2005], an important theory in the cognitivist orientation, which explains established principles for the design of multimedia learning forms along with the cognitive load theory by [Sweller and Chandler, 1991; Sweller, 2005]. In addition, we will consider the integrated model of text and picture comprehension [Schnotz, 2005, 2014]. Beyond that, we will analyse theories of instructional design which are particularly established in the anglo-american literature. We will consider the component display theory [Merril, 1983], the elaboration theory [e.g., Reigeluth, Merrill, Wilson and Spiller, 1980; Reigeluth, 1983, 1999], the four-component instructional design model (4C/ID) [e.g., Merriënboer, Clark and Croock, 2002; Merriënboer and Kester, 2005] as well as the anchored instruction approach [The Cognition And Technology Group At Vanderbilt, 1990, 1997]. Since these theories are partly also contradictory based on their assumptions, our main work in this first step will be to work out the insights of the individual theories, but also the possible contradictions between them. We then use this result to evaluate the suitability of the theories with regard to their transferability to the micro learning format. Doing so, we finally derive theoretical requirements for the didactical design of micro learning content.

In the **second step**, we follow an explorative approach where we will conduct a qualitative interview study among experts in the field of didactical design of micro learning content. Professionals in the field of instructional design, didacticians as well as pedagogics are predestined for our purpose as they can provide us valuable insights into the practice of digital content design. To consider the specifications of micro learning it is a constraint in the selection process that the experts have experience in the didactical design of micro learning content.

During the interview study, we will conduct three steps (see Figure 1). In step A, we need to identify experts through publications in practice-relevant journals [e.g., in Siepmann, 2019]. The articles in the journals mostly consist of practice-related implementation scenarios of digital learning in enterprises and show procedures, pitfalls and lessons-learned. As another acquisition channel for experts, we will visit the established learning conference LEARNTEC in Germany, where exhibitors present their work in the context of digital learning and education. In step B, we will conduct interviews using a semi-structured guideline. Due to the flexibility of a semi-structured guideline, the order and the specific formulation of the questions can be adapted ad hoc during the conversation [Flick, 2014; Myers, 2013]. To make a further in-depth-analysis possible, we will record the interviews and transcribe them afterward. To analyse the transcripts and code the relevant statements in step C, we will use structured content analysis [Mayring, 2014]. Finally, we will derive empirical-based requirements for the didactical design of micro learning content.

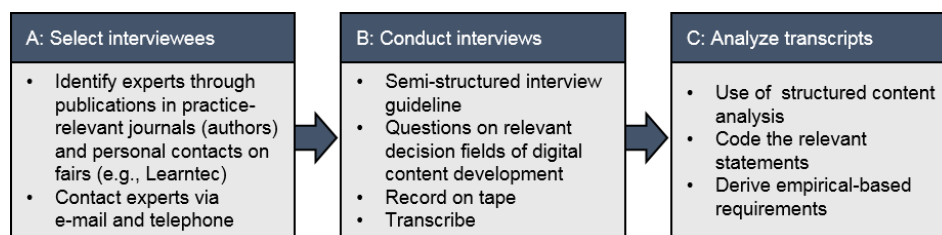


Figure 1: Methodical Approach of Empirical Study

In the **third step**, we compare and combine the results of both perspectives using the approaches of qualitative content analysis [Mayring, 2014] and deductive reasoning [Ochara, 2013; Miles and Huberman, 1984]. Doing so, we will derive a catalogue of systematized requirements for the didactical design of micro learning content which are theoretically and practically sound. At last, a validation of the requirement catalogue is necessary. Therefore, we will conduct a second interview loop in order to discuss our results with experts in the field of didactical design of micro learning content. In addition, we will validate the derived requirements by comparing them with existing micro learning prototypes. Bringing these three steps together, the research framework illustrated in Figure 2 can be derived.

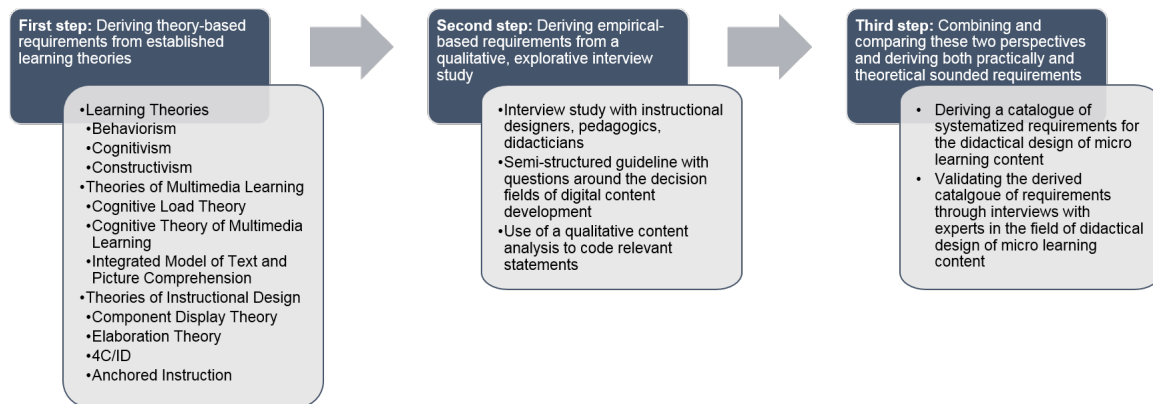


Figure 2: Research Framework

IV. POTENTIAL STUDY IMPLICATIONS

The study shall provide us with rich information to understand how to design didactically appropriate micro learning content. Bringing fundamental theory results together with best-practices and lessons learned from experts of digital content design provides additional value in theory and practice. Commonalities between the theoretical and practical requirements are shown by the procedure as well as differences. Especially the differences should be of importance for both perspectives, as they are on the one hand the impulse for further research. On the other hand, differences between theory and practice show enterprises aspects in their didactical development process that may require adaptation (e.g., a more differentiated view of the target group). For the IS research stream the didactical design requirements deliver a valuable starting point in the implementation process of micro learning in enterprises. Alongside with functional and non-functional requirements, the didactical requirements need to be considered in the development process. Implementations of micro learning that ignore the didactical requirements are likely to be random in their effectiveness and run the risk of missing the acceptance of the learners and thus the intended learning success of micro learning. Furthermore, the derived requirements are the basis for the development of design principles. The design principles can address the challenges enterprises face when developing micro learning content. They will support enterprises in their design process, achieve a signal effect and show important decision fields during the design process of micro learning content.

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