# Digital Scaffolding for Non-Traditional Students:
# Framing Social Interactions in Educational Online-Settings at Universities of Applied Sciences

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## Abstract

*The project presented here contributes to reducing educational barriers for non-traditional students as well as providing a needs-based individual support of this specific target group. In particular, the social relationships in learning and teaching processes will be taken into account. Especially, cooperative and project-based pedagogies, which are commonly established at universities of applied sciences, will be addressed. It will be tested whether an online-based „scaffolding" can contribute to strengthening the academic and social integration of this specific target group. Within the general framework of „scaffolding", different educational technologies are applied and their potentials are systematically evaluated with regard to the design of flexible, individual and socially networked educational processes. In addition, students' competencies in dealing with virtual forms of interaction and media-based learning are promoted. The use of digital media and their effectiveness in shaping learners' social interactions in educational settings will be closely interlinked during the entire project period. Therefore, a high degree of transferability of the results to adjacent fields of practice can be expected.*

Keywords: *digital scaffolding, shift from teaching to learning, social integration, university teaching.*

## 1 Introduction

Universities of applied sciences benefit institutionally and culturally from a highly heterogeneous student body with diversified educational biographies (e.g. students entering the university based on a vocational baccalaureate, a master craftsman's certificate, previous professional training). The heterogeneity offers potentials for mutually stimulating learning processes. Consequently, up-to-date concepts of university teaching are increasingly focusing on cooperative learning and project-based studies („shift from teaching to learning" [1]. One side effect of this shift, however, is an increasing centralization of student presence at the university location, which might tend to disadvantage individual students with special needs or in exceptional life circumstances. However, less participation in on-site events at the university is associated with a lack of academic and social integration [2, 3]. With the universal spread of mobile technologies and 'social' software, new possibilities for interaction are emerging, offering a wide range of possibilities for cooperative and collaborative learning, social exchange and peer interactions.

## 2 Theoretical Approach and State of the Art

Given the heterogenous student population, it can be assumed that participating in collaborative pedagogical settings poses a challenge for a considerable number of students at universities of applied sciences. Educational support measures in terms of „digital scaffolds" are supposed to help to address individual challenges. By the term „digital scaffolds" we refer explicitly to media-supported, online-based educational support functions that mediate social interactions at a distance.

The concept of scaffolding has been used in educational discourse since the 1970s to describe educational support for solving particularly complex problems: „a 'scaffolding' process [...] enables a [...] novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts" [4].

Research on scaffolding initially focused on the interaction between expert and novice (ibid). Later research concentrated more on student learning processes, expert strategies during scaffolding interactions, challenging of peer group contribution or characteristics for „ideal" scaffolding learning guides. The term is used today in the context of both formal and informal education („scaffolding incorporated in formalized activities" vs. „informal scaffolding"; see for example [5]).

A distinction is often also drawn between *social* and *technological* forms of scaffolding (ibid.). We refer to this distinction in an exclusively analytical way: This means that we focus both on interactions (*pro-*

*cess perspective*) and the research-based development of supporting digital learning architectures (*structural perspective*).

Our research focuses on digital scaffolds that support non-traditional students' academic and social integration: It has been shown that academic and social integration is usually a relevant criterion for completing a degree (see e.g. [6]). Integration, however, requires students to participate in dedicated activities such as on-site courses or peer learning communities. Special attention will be paid to non-traditional students who face challenges participating activities because of circumstances such as familial duties or intensive part-time. Besides the social context, the academic context will also be included: Key qualifications, such as the ability to cooperate and work in a team are increasingly important [7]. To emphasize such competencies goes hand in hand with a shift from content-oriented teaching approaches to more student-centered teaching („shift from teaching to learning").

Collaborative, action-oriented teaching-learning formats are finding their way into modern university teaching [8]. Consequently, the forms of communication and cooperation of all higher education actors are changing. Currently, the support of teaching-learning processes through digital media in university teaching is increasingly being examined from theoretical perspectives (e.g. [9]) and isolated empirical analyses (e.g. [10]). Empirical longitudinal studies on the digital support of academic and social integration of students in general and especially the non-traditional are scarce.

## 3    Research Design and Methodology

We examine the academic and social integration of non-traditional students by means of effective digital support functions („scaffolds"). Our overall aim is to gain knowledge about (a) how to interlink diverse formal learning processes and (b) how to effectively improve digital scaffolds in a research-led way (see section 4). Therefore, we conduct a longitudinal analysis of how students with diverse individual requirements interact with digital scaffolds that support their social and academic integration.

Our working hypothesis is that, paradoxically, up-to-date variants of teaching at applied universities (e.g. project-based teaching, laboratory work placements, field studies, cooperative and practice-oriented learning formats) run the risk of disadvantaging or even excluding non-traditional or special-need students. This may result in particularly stressful situations and can potentially have a negative impact on academic success [11]. Effects may include exceeding the standard study period, lower self-efficacy expectations, and more frequent doubts and discontinuation of studies (cf. [11] and [12]).

We follow a *Design-Based Research* agenda consisting of four core activities feeding into one another (Fig. 1). All project phases target both design and theoretical objectives: In the analysis phase, qualitative individual and group interviews will be used to grasp the heterogeneous life situations and need structures of the target groups in a differentiated way. The development phase will be accompanied by a longitudinal study. Both quantitative and qualitative methods are used. Short surveys will be integrated into the digital support services and the evaluation of usage data to differentiate the surface structure of the use of the services by different target groups. In the evaluation phase, the depth structure of the interaction of selected users with the offer is recorded. In addition to surveys, ethnographic approaches are also used here (daily accompaniment in the sense of „shadowing"). The results of the research are incorporated into the development of digital support offers and dissemination of research findings.
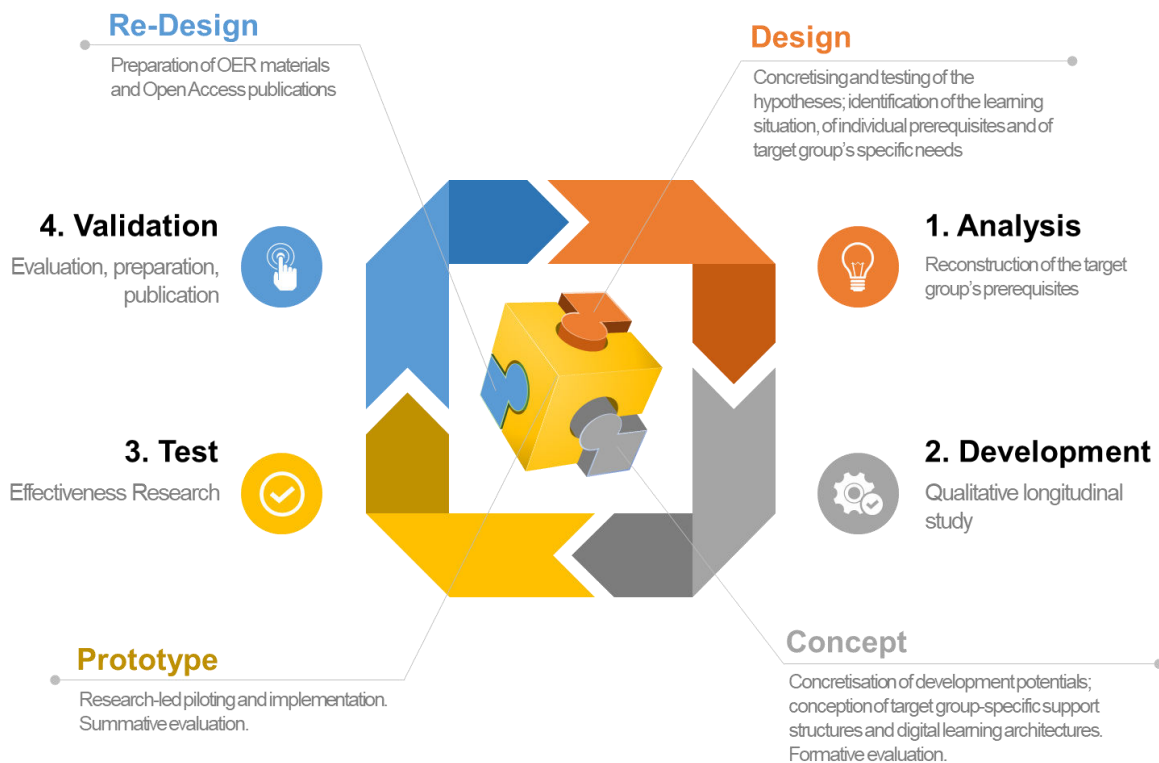
**Re-Design**
Preparation of OER materials and Open Access publications

**Design**
Concretising and testing of the hypotheses; identification of the learning situation, of individual prerequisites and of target group's specific needs

**4. Validation**
Evaluation, preparation, publication

**1. Analysis**
Reconstruction of the target group's prerequisites

**3. Test**
Effectiveness Research

**2. Development**
Qualitative longitudinal study

**Prototype**
Research-led piloting and implementation. Summative evaluation.

**Concept**
Concretisation of development potentials; conception of target group-specific support structures and digital learning architectures. Formative evaluation.

Fig.1: Objectives of the Design-Based Research program (outside) and „building blocks" of the research plan (inside)

## 4    Objectives

The project aims to exploit the potential of digitization in order to use tried and tested solution arrangements for improving non-traditional students' academic and social integration. It pursues (1) a research and (2) a closely-related development goal. These objectives are methodologically intertwined and both conducted in an iterative-cyclical way (Design-Based Research methodology; see section 3).

(1) Our main **research objective** is to empirically test the working hypothesis (see section 3), to systematically evaluate the findings and to investigate the development and implementation of digital scaffolding. For this purpose, we distinguish two sub-goals:

a)  The *descriptive research goal* is to empirically determine patterns in the study behavior of the target group and to draw conclusions about interdependencies between individual life situation, didactic teaching/learning setting and social integration as well as study success.

b)  The *design-oriented research* goal is to derive recommendations from descriptive research for the (further) conceptualization of „digital scaffolding" and to evaluate its validity.

(2) Our main **development objective** of the project is to outline and implement digital support services for individualized scaffolding based on the descriptive and conceptual results, as well as the corresponding evaluation. This is done in a structural and a process-related target dimension:

a)  *Structural*: design of a digital learning setting. This involves the use of tried and tested e-tools (such as digital classrooms or learning platforms) that are already established at the OWL University (cf. [13]). In particular, self-directed learning phases, discourse phases and project-learning phases are digitally structured. Teachers are guided and accompanied in the development and implementation of flexible forms of teaching. Based on the needs of the addressed target group, coordinated and (partially) individualized digital-learning environments are developed [14].

b)  *Processual*: individual educational support. Students are provided with educational mentoring when using the online-supported learning structures. Especially, exchange and organization formats are established (e.g. through individual online tutoring and learning-path guidance). Tutoring remedies provide easier access to social learning processes and integrate them more strongly into the student community. In addition to supporting social participation, skills in using digital tools are also trained.

Both, the digital learning setting (2a) and the associated individual support (2b) are provided during the introductory phase of studies. Here, students are often confronted with a variety of academic and everyday challenges [15] which have a negative impact on self-efficacy [16] and can lead to study doubts. The strengthening of academic and social integration at the beginning of one's studies should counteract such negative effects (cf. [11]).

The „digital scaffolding" to be developed does not have a broad effect but rather addresses non-traditional students in a decidedly demand-oriented manner. This alone distinguishes the concept out-lined here from previous initiatives.

## 5   Conclusion

Our research and development project presented here was inspired by the naturalistic observation that well-intended complex pedagogies run the risk of excluding students living in special circum-stances, commonly referred to as 'non-traditionals'. Catering to these students' needs in traditional ways, e.g. by providing distance-learning settings as an alternative to on-site classes, may actually contribute to segregation processes rather than social and academic integration which are important for students' persistence. Thus, our approach tries to exploit the affordances of digital technology for distance education while avoiding the potential pitfalls of social isolation and segregation. As we focus on individual differences and needs, we favor a design research approach over correlational designs such as large-scale panel studies, which, however, may be a next step in our research agenda. The results of our research are to be classified against the background of further findings, for instance, empirical studies on drop-out factors (see, for example [2, 3 ,12]).

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