

Seamless learning through students' eyes

A qualitative case study on students' perception of seams in cross-contextual learning

Abstract

This short paper presents a study on problems that *students* experience regarding cross-contextual learning. The data was collected in the context of a project where several seamless learning interventions were designed. Eight focus groups were implemented with a total of 34 students to collect their perspective on the seams that were aimed to be addressed in the projects. The preliminary results show a centralization of problems regarding pedagogical and learning psychological aspects of cross-contextual learning. Also, different kinds of problems within the mobile seamless learning dimensions of Wong and Looi (2011) could be illuminated from the student perspective.

1. Introduction

The last decades, possibilities and requirements to use more and different contexts for learning are increasing (Dilger, Gommers & Rapp, 2019). Students learn at schools, universities, in different classes, on exchanges, in internships, at workplaces, with self-study, with and without online learning contexts, with different learning methods and material. Beyond that, private contexts and situations can (unintendedly) turn into learning contexts as well. Consequently, the relevance of cross-contextual learning increased. Learning in different contexts has the potential to enhance learning, because different settings provide different experiences and opportunities for individual and collaborative learning (e. g. learning in authentic contexts, using resources from different domains of life) (Rusman, 2019). However, cross-contextual learning also brings challenges, because the learning environments a student moves through are separated in many ways (Wong & Looi, 2011). Fragmentation of learning may occur when learning experiences get spread out over separated contexts (Sharples, 2015; Dilger et al., 2019). Students are often left to themselves to integrate learning experiences from different contexts in order to develop their competences (Dilger et al., 2019).

There are different communities working on questions, which arise when learning experiences are spread out over different (kinds of) contexts (e. g. transfer theories, boundary crossing), including the community of seamless learning researchers. Kuh (1996) described seamless learning as following:

The word seamless suggests that what was once believed to be separate, distinct parts (e.g., in-class and out-of-class, academic and nonacademic; curricular and co-curricular, or on-campus and off-campus experiences) are now of one

piece, bound together so as to appear whole or continuous. In seamless learning environments, students are encouraged to take advantage of learning resources that exist both inside and outside of the classroom. Students are asked to use their life experiences to make meaning of material introduced in classes. (p. 136)

In the seamless learning literature, there is a focus on how educational technology can help to align or bridge contexts, so that learning experiences can be continued and integrated despite a change of context. Wong and Looi (2011) did a systematic literature review and identified ten features which characterize seamlessness.

- (MSL1) Encompassing formal and informal learning
- (MSL2) Encompassing individualized and social learning
- (MSL3) Across time
- (MSL4) Across locations
- (MSL5) Ubiquitous knowledge access
- (MSL6) Encompassing physical and digital learning
- (MSL7) Combined use of multiple device types
- (MSL8) Seamless switching between multiple learning tasks
- (MSL9) Knowledge synthesis
- (MSL10) Encompassing multiple pedagogical or learning activity models

Next to bridging contexts, a second focus is on seam-aware learning (Lackner & Raunig, 2016), with the question how students can be supported to develop competences that help them to deal with seams themselves (Wong, 2013). For both kind of research objectives, a broader conceptualization of contexts and seams is needed (Dilger et al., 2019).

Yet, most research found place regarding primary and secondary education (Durrak & Çankaya, 2018). This is remarkable, because it can be assumed that students in higher education contexts learn (or have been learning) in a higher variety of contexts than younger learners (e. g. elective courses, internships, exchanges, personal and work experience). In order to further develop the conceptual understanding of seams, students can be asked to reflect on their cross-contextual learning experiences. In the seamless learning literature, a research gap has been found in this regard. Despite a lot of research on seamlessness and seam-awareness regarding student-learning, no research has been found where students' subjective perception has been researched explicitly. Most research highlights the teachers' perspective. The present study aims to address this gap and takes up the question "how students experience seams when they learn across different contexts". A deeper understanding of students' perspective can contribute to the theoretical conceptualization of seams and seamless learning as well as help to design more suitable educational environments and interventions to improve seamless learning.

2. Methods

To research students' perspective on seams, which they experience while cross-contextual learning, a case study found place. Data was collected in a seamless learning lab, where seven teams designed interventions to overcome seams in students' learning. For this study, four teams that designed interventions for formal courses at three universities of applied sciences were sampled¹. In the courses, a broad range of topics was taught: math, project management, physics, and crowd-management. Although different collection methods were used (such as focus group interviews and questionnaires), for this short paper only the focus groups were analysed. In the focus groups, students were sampled who participated in the course – at the moment of the focus group or before – as well as students who would participate in future. They were asked about their experiences as well as their expectations with cross-contextual learning in order to achieve the learning objectives of the course. First, students were asked generally (e. g. what makes learning difficult in the course). In a second phase, the students were asked specifically along the 10 MSL dimensions.

Table 1: Overview of the data.

Course topic	Number of focus groups	Number of students
Math	3	6+3+4
Project management	1	5
Physics	2	3+3
Crowdmanagment	2	8+2
Total	8	34

The focus groups were recorded and transcribed verbatim. The problems and challenges that students articulated were coded with MAXQDA (explicit articulation of a negative annotation was a requirement while coding, because seams can also be a positive trigger for learning. However, the focus of this study is on students' experience of challenges with regard to cross-contextual learning). In this first phase, the analyses were done mainly deductively, based on the 10 MSL dimensions. However, a first cycle of inductive coding has found place as well.

3. Results

In total, a sum of 281 codes was given to students' sayings, which represent problems or challenges regarding learning in the course. 198 codes could be linked to the phenomenon of (cross-)contextual learning directly: 59 codes point to the fact that a certain context or a characteristic/resource in a context was missing, which was hindering learning (e. g. missing a setting where theory can be applied). The others point to

¹ The other three teams designed for different educational formats or different target groups.

problems with cross-contextual learning, thus, with switching between context, encompassing experiences made in different contexts, or encompassing learning processes which are characterized by the different features as described by Wong and Looi (2011).

Students mostly described problems regarding the integration or synthesis of different kinds (fragments) of knowledge (MSL 9: 39 codes). Within this dimension, three different kinds of seams can be subcategorized:

- Problems towards the integration of different pieces of knowledge (e. g. smaller pieces which are supposed to lead to a holistic understanding of a certain phenomenon);
“Often, you learn a lot of small pieces and you don’t see the whole thing. Maybe you understand small pieces individually, but you don’t see relations.” (student crowd management, transcript line 196)
- Problems towards the integration of theoretical/abstract and practical/concrete knowledge;
“In theory it always sounds like that and then the practice, at least in my experience, was a bit different.” (student project management, transcript line 38)
- Problems towards the integration of new learning content with prior knowledge. In this regard, students described a misfit because of disciplinary differences or gaps regarding the level of complexity between prior and new knowledge.

Students also described problems regarding the integration of learning experiences over time (MSL 3: 39 codes):

- Problems with bridging the actual learning context with prior educational contexts;
- Problems with bridging the actual learning context with future learning contexts such as future courses or a future job;
- Problems about just in time learning (e. g. access to resources at the right moment/sequence for the learning process).
“But if I go to theory class for eight weeks and after they say: ‘now we start with a student project’, I can’t remember what (theory) was learned in the first weeks.” (student project management, transcript line 365)

After MSLs 9 and 3, the dimensions MSLs 10 (25 codes) and 8 (20 codes) were coded most often. In these dimensions the pedagogical characteristics of the learning context are central. One of the most described problems was missing alignment of the learning context (mainly strategies and methods) and the assessment (setting).

“So, we have exams during the semester, and I have to say that there is always a little bit of a problem that the difficulty differs from the exercises we did in class.” (student math, transcript line 84)

Also, students described problems in the transition from instruction-based settings to more practical settings, where knowledge should be applied. This can be related to gaps between different kinds of tasks, and between tasks with a different level of complexity (Bloom's taxonomy).

"After an input session, it is difficult for me to solve an exercise for the first time." (student math, transcript line 80)

In the focus groups, the other dimensions were barely mentioned. Some sayings reported problems between individual and social learning (MSL 2, 6 codes). Here, most problems were about dealing with different perspectives and different roles in a group.

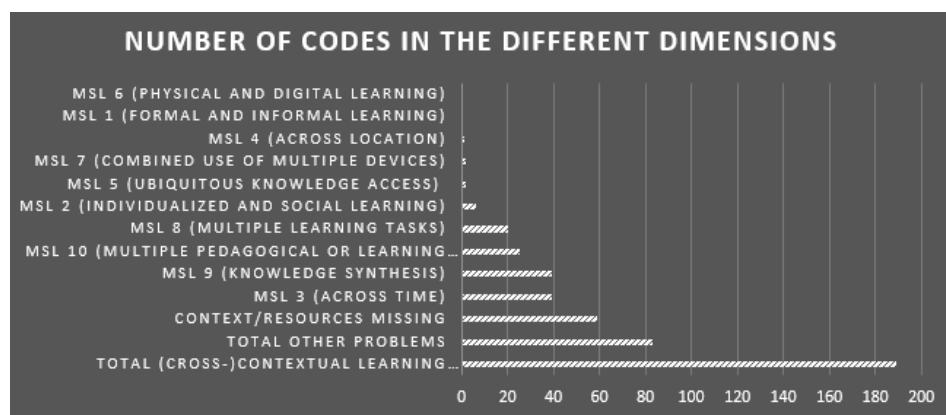


Figure 1: Number of codes in the different dimensions

4. Discussion

Although methodological restrictions should be considered (e. g. the preliminary state of the results and typical methodological issues regarding quantifying qualitative data), the results point to differences between the research focus in the seamless learning literature and students' perception of the main seams in their learning processes. Wong and Looi (2011) identified the majority of studies with a focus on encompassing formal and informal learning or on educational technology to bridge learning contexts. Students mentioned seams regarding pedagogical and learning psychological issues most. They do not seem to experience a rise of new seams when learning is supported by different devices and ubiquitous access to knowledge. Educational technology seems to offer potential to bridge contexts, however, the results point to the importance of interdisciplinary collaboration between educational researchers (also from the communities that research learning transfer and boundary crossing), designers and technologists to design conclusive, coherent seamless learning concepts and environments/context.

The first results can be interpreted as the need for a more detailed differentiation of the dimensions from the student perspective. First, intercoder reliability needs to be checked. After that, triangulation with the data collected with the questionnaires quantitatively will be used to increase the validity of the preliminary results. Also, a second phase of inductive coding will be applied. In addition, it seems to be necessary to look at the relation between the dimensions. This is in line with the literature of Dilger et al. (2019) who described that the MSL dimensions tackle very different aspects when it comes to the learning experience. Next, more analyses of the data are planned, which focus on students' perception of supporting and hindering factors regarding the problems they described. Therefore, students' experience with the implemented seamless learning interventions will be analysed as well. Finally, a better understanding of the seams from the student perspective as well as the relation between them can enrich the conceptualization of "seams" as research objects as well as educational designers, to improve seamless learning environments.

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