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## **Learning Pathways Between University, School and Working Life When Student Teachers Use Digital Multimodal Logbooks to Cross Boundaries**

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### **Abstract**

This study aims to provide insight into the learning processes that take place when vocational student teachers work with multimodal digital logbooks at the campus and between school and placement. The study will highlight vocational student teachers' experiences of using logbooks between university and practicum as well as between school and pupils' practicum. It will also highlight how student teachers learn when working with logbooks. The data consist of transcripts from eight interviews with vocational student teachers about their experiences of working with a digital, multimodal course logbook in their placement course and 19 essays about working with digital, and sometimes multimodal, logbooks between secondary school and practicum. A thematic analysis was conducted based on the key concepts in a previously developed model (Kilbrink et.al., 2021) to find out how student teachers experience the use of digital multimodal logbooks and their own learning processes during it. The analyses also show that both kinds of logbooks worked well for the students as a means of both advancing and showing their professional development. There are as many learning examples as there are essays, and the student teachers learn from failure as well as success. When the Identification model is applied to the data, pedagogical aims seem to play a greater role than the choice of digital technology. In addition, how the technology is used becomes a crucial factor for which level of communication is reached. By using the Identification model to analyse vocational student teachers' experiences of using digital, multimodal logbooks as boundary objects between university and practicum as students and between school and practicum as teachers, as well as their experienced learning processes in relation to the use of the logbooks, the study provides insight into some of the learning processes that take place across learning institutions and practicums.

### **Keywords**

continuing vocational education and training, cross boundary learning, digital multimodal logbooks, relations between learning institutions and practicum, vocational student teachers



## 1 Introduction and aim

In previous research, we have found that digital technology such as multimodal logbooks can be used to bridge gaps between school and workplaces (practicum) in vocational education (Enochsson, et.al., 2020; Kilbrink, et.al., 2021) as well as between university and student teacher practicum at vocational secondary schools in teacher education (Ådefors, 2020). In this study, we will compare vocational student teachers' experiences of digital multimodal logbooks as students during their third practical placement period, and as teachers during their fourth (and final) practical placement period. The study aims to provide insight into cross-contextual learning processes that take place across contexts, which is a key factor in lifelong learning.

### 1.1 Research questions

- 1) What are the experiences that vocational student teachers have of using digital, multimodal logbooks as boundary objects between university and practicum as students and between school and practicum as teachers?
- 2) How do the student teachers' experience their learning processes in relation to the use of the logbooks?

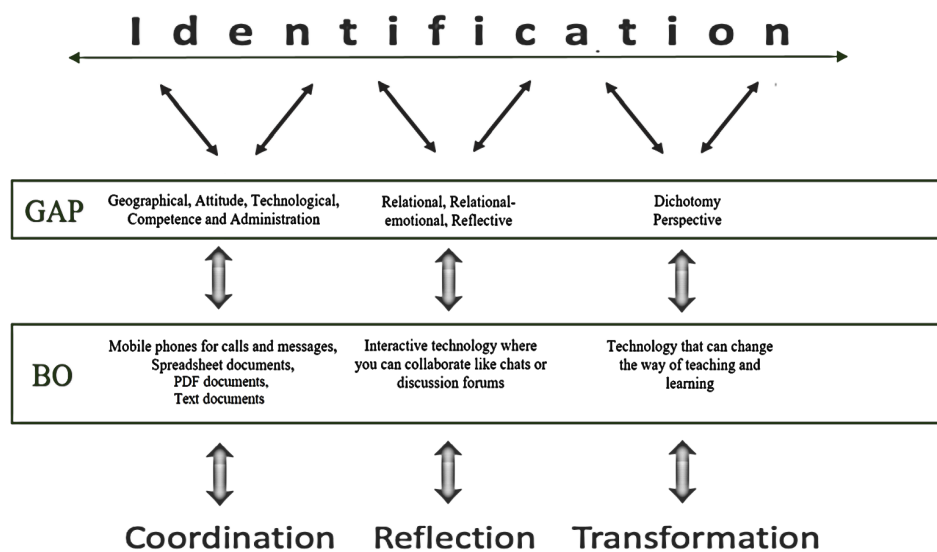
## 2 Theoretical framework

Theoretically, the starting point for this project is the Identification model (Figure 1) developed in Kilbrink et.al. (2021). The model is based on the theoretical framework of boundary crossing (Tuomi-Gröhn & Engeström, 2003) and more specifically the learning potential linked to transition, transfer and the four concepts, identification, coordination, reflection and transformation based on level of communication, described by Akkerman and Bakker (2011) as learning mechanisms. In previous studies (Enochsson et.al., 2020), we have seen a hierarchy between Akkerman and Bakker's (2011) concepts; teachers who discuss on a transformation level also give examples of reflection and coordination, and those who discuss reflection build on coordination as well. Identification, on the other hand, precedes each of the other three concepts and it reappears in a repetitive process where new gaps are identified, and new technological tools are chosen to bridge these gaps.

We (Kilbrink et.al., 2021) have found that the model can be helpful in both the implementation and analysis of digital technology as boundary object when working with integrating learning arenas such as school and placement in vocational education. The model can be used to support teachers in understanding their own way of working. It can also be used by researchers when analysing the relationship between teachers' pedagogical aims, identified gaps (GAP), and chosen digital technology (boundary objects, BO) to reach the desired level of communication (coordination, reflection or transformation). In this study the model is used to explain student teachers learning on the borders spanning different contexts.

Coordination appears when the teachers focus on sharing transparent information and trying to find ways to collaborate between the different learning arenas. Teachers with the ambition of getting students to reflect (reflection) on what they learned in the workplace in relation to what they learned in school look for more interactive technology. In relation to transformation, the teachers seek to create a holistic view of school and workplace to make it easier for the students to connect the different learning arenas. Here, different types of technology are used to bridge the perspective differences that are experienced in order to create an open discussion climate between teachers, students and the students' supervisors in their practicum.

**Figure 1**  
Identification model of boundary crossing with boundary object (BO)



*Note.* Kilbrink, et.al. (2020).

### 3 Data and analysis

Eight vocational student teachers have been interviewed about their experiences of working with a digital, multimodal course logbook in their third practical placement within teacher education. The logbooks were created during a practicum period of 20 working days and consisted of three or four assignments that had to be carried out in different ways and with different foci. The data also consist of 19 essays about working with digital, and sometimes multimodal, logbooks between secondary school and practicum. The essays were included in the last semester of vocational teacher education, where the student teachers wrote about a development project. They got to choose what they wanted to develop, and even though most chose other areas of development, several students chose to work with logbooks. Although the vocational student teachers take on different roles (student versus teacher) when they write a logbook themselves at the university and when they work with logbooks with their pupils in school, they participate in boundary crossing between school and practical placement. Both forms of working with logbooks offers insight into learning processes that take place across different contexts and are part of the student teachers' transitions into teachers.

As a first step in the analysis, the statements about the student teachers' experiences of using digital multimodal logbooks in the interviews and essays have been analysed thematically based on the key concepts in the Identification model. In the next step of analysis, we look for statements in interviews and essays that say something about the student teachers' own learning processes linked to the concepts we have identified in the first step.

### 2 Findings

The results show that the student teachers' use their previous experiences (for example from working with digital multimodal logbooks at university) when working with logbooks as boundary objects between school and practicum. In addition to the experiences they gain in the work with the logbooks, they generate new thoughts and ideas on how logbooks can be used to bridge gaps between school and practicum.

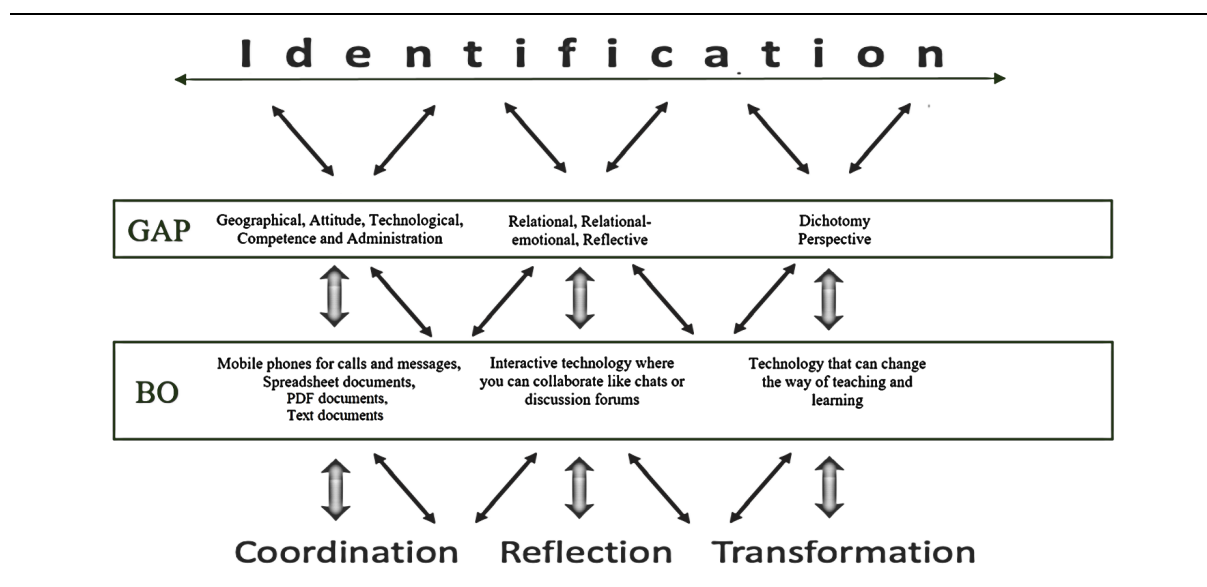
Some of the essay writers mentioned that they got inspired by working with logbooks in their university education and therefore wanted to try logbooks with their pupils. For example,

Eric wrote, “During my practicum I have found myself missing a documentation tool to be able to follow the pupils' work during practicum”. Clara expressed that she chose to work with a logbook because her university experience taught her that a logbook should aid the pupils' learning, but it can also serve as a good communication channel between student and teacher. Statements like this indicate that teacher students experience that they can use the knowledge they gain at the university in practice as well. Other student teachers describe how they aim to develop an existing logbook after gaining new logbook experiences in their university education. For example, the interviews show that the student teachers reveal mixed experiences of using multimodal digital logbooks as students. Using them, they experience a lack of feedback and dialogue with the university teachers. Several of them had also wished to supplement the logbooks with conversations between university teachers, supervisors and themselves as students. This is reflected in the essays when the student teachers often describe spending a lot of time on feedback or getting the supervisors involved in some way.

As in our earlier studies (Enochsson et al., 2020; Kilbrink et al., 2020) with experienced teachers, the analysis of the essays shows that the student teachers experience their choice of digital, multimodal logbooks as boundary objects to bridge different gaps between school and practical placement. In most cases we can use the Identification model to predict the technology and if the process will end up in coordination, reflection or transformation based on the identified gap. The results also show that the way the student teachers use digital technology (e.g., software for their logbooks, assignments or task to solve, supervisor participation etc.) becomes a key factor for which of the four concepts above come into being for pupils and for the student teachers. However, the essays do not always follow the predicted pathways in Figure 1. Instead the pathways are more like Figure 2.

What distinguishes the results in this study from our previous results is that even for gaps at the collaboration level, more advanced technology is sometimes chosen that could also be used to achieve reflection or transformation. A possible explanation is the fact that these student teachers may have more extensive digital competence than teachers who trained several years ago, like the teachers we interviewed in previous studies. But there are also student teachers who use simpler tools, such as an accompanying compendium, to bridge gaps higher up in the hierarchy.

**Figure 2**  
Identification model of boundary crossing in the essays



There are often two different pedagogical aims in the essays – one for the student teachers or their teaching, and another for their pupils. As this study concerns the student teachers' own experienced learning processes in relation to their work with digital multimodal logbooks, the aims that concern themselves are of particular interest. When analysing the essays in relation to the Identification model in Figure 1, pedagogical aims seem to play a greater role than the choice of digital technology. In addition, how the technology is used becomes a crucial factor for which concept eventually comes into being. The identified gaps, described in the essays as “areas of development”, are also related to pedagogical aims of bridging them.

The analyses also show that both kinds of logbooks worked well for the students as means of both advancing and showing their professional development. There are as many learning examples as there are essays, and it is not possible to reproduce them all in this paper. The essays are excellent tools for student teachers to reflect on what they have done and learned in their practicum. They are full of student teachers' own learning examples. However, the analysis shows one particular lesson learned that most student teachers highlight in their essays, and that is the importance of their role as teachers in the logbook work, both for the students' learning and for the relationship between school and practicum. We can also see that the student teachers learn from failure as well as success. When the student teachers explain failing to bridge the gap between school and workplace, they often focus on their own shortcomings as teachers, such as not providing their pupils and supervisors with sufficient information. Their success, on the other hand, they explain with having grown as teachers during their education and their development essay work. For example, Quentin wrote in his essay:

I believe that because I have had this work as a development area, I can develop the pupils' teaching in relation to the knowledge requirements. The didactic benefit that I see is that I as a teacher can make the student's education more visible in relation to what the students learn inside the school but also at practicum. By making this process visible, I can develop the students' abilities and increase both the pupil's and the supervisor's understanding of the learning process. (Quentin)

Also interesting, in this perspective, are the narratives of unexpected learning situations for the student teachers in connection with their pupils' logbook work. For example, student teachers aiming for coordination to set fair grades experience that it is not as simple as giving some task in a logbook, because all workplaces are different and students are allowed to do different things in their practicum. Teachers learn that they have to create logbooks with assignments that are possible for everyone to complete. Student teachers who aim for more and deeper pupil reflections experience that when they initiate discussions about the logbooks in their classrooms, the pupils help them to see things in the material that they have not discovered themselves. Sometimes the pupils reflect over things that were not even part of the assessment task. For one student teacher, working with a logbook application took him higher than expected in the hierarchy, almost to transformation, because his principal decided that all teachers and supervisors should use the application as a tool between school and practicum in the future.

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