

KONNEKTIVITÄT UND LERNORTINTEGRIERTE  
KOMPETENZENTWICKLUNG IN DER  
BERUFLICHEN BILDUNG

CONNECTIVITY AND INTEGRATIVE COMPETENCE  
DEVELOPMENT IN VOCATIONAL AND PROFESSIONAL EDUCATION AND TRAINING (VET/PET)

Herausgegeben von / Edited by  
Carmela Aprea, Viviana Sappa, Ralf Tenberg



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# **Digital Technology as Boundary Objects**

## Teachers' Experiences in Swedish Vocational Education

NINA KILBRINK / ANN-BRITT ENOCHSSON /  
LINDA SÖDERLIND

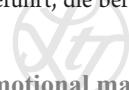
### **Digitale Technologien als Grenzobjekte**

Erfahrungen von Lehrpersonen der beruflichen Bildung in Schweden

**Abstract:** Digital technology can work as boundary objects in connecting learning in different learning arenas within vocational education. However, there is a lack of research on how teachers can work with digital technology as boundary objects to help students in their learning processes. In this study, we therefore focus on teachers' experiences of using digital technology, such as apps, blogs and videos, as boundary objects in Swedish upper-secondary vocational education. Narrative in-depth interviews with five teachers who had already been using digital technology to connect learning at school and workplaces were conducted. The results show that there are different learning mechanisms related to digital technology as boundary objects present in the empirical material. Moreover, although all the participating teachers had already been working with digital technologies in connecting learning at school and learning at workplaces in vocational education, their focus and experiences were very different.

**Keywords:** boundary objects, digital technology, learning mechanisms school and workplace integration, teachers' experiences, vocational education

**Kurzfassung:** Digitale Technologien können als Grenzobjekt dienen, um das Lernen in verschiedenen Lernkontexten der beruflichen Bildung zu verbinden. Bislang fehlt es jedoch an Forschung dazu, wie Lehrpersonen mit digitalen Technologien als Grenzobjekte arbeiten können, um die Lernprozesse ihrer Schülerinnen und Schüler zu unterstützen. In dieser Studie konzentrieren wir uns daher auf die Erfahrungen von Lehrpersonen, welche digitale Technologien wie Apps, Blogs und Videos als Grenzobjekte in der schwedischen Berufsbildung der Sekundarstufe II einzusetzen. Es wurden narrative Interviews mit fünf Lehrkräften geführt, die bereits digitale Technologien verwendet ha-



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ben, um das Lernen in der Schule und am Arbeitsplatz zu verbinden. Die Ergebnisse zeigen, dass es unterschiedliche Mechanismen des Lernens mit digitalen Technologien als Grenzobjekte gibt, die sich im empirischen Material wiederfinden. Obwohl alle teilnehmenden Lehrkräfte bereits mit digitalen Technologien gearbeitet haben, um das berufliche Lernen in Schule und Betrieb miteinander zu verbinden, waren ihre Schwerpunktsetzungen und Erfahrungen sehr unterschiedlich.

**Schlagworte:** Grenzobjekte, digitale Technologien, Lernmechanismen, integratives Lernen in Schule und Betrieb, Lehrerfahrung, berufliche Bildung

## 1 Introduction

In vocational education, teaching and learning are often organised in different learning arenas such as schools and workplaces. Students are expected to move between these arenas and to integrate their experiences from them. However, students can experience problems in connecting learning at school with learning at different workplaces during their programmes, and a gap between different learning arenas is often emphasised (i.e. AARKROG, 2005; AKKERMANN/BAKKER, 2012; SCHAAP/BAARTMAN/DE BRUIJN, 2012; TANNGAARD, 2007). Research in the field of vocational education discusses how learning can be enhanced through bridging this gap between schools and workplaces (cf. ILLERIS, 2009; SAPPA/CHOY/APREA, 2016; TYNJÄLÄ, 2009). Research has also discussed different ways of bridging this gap in order to integrate different aspects of learning (cf. ILLERIS, 2009; KILBRINK/Bjurulf, 2013; SAPPA ET AL. 2016; TUOMI-GRÖHN/ENGESTRÖM, 2003; TYNJÄLÄ, 2009). One way of bridging the gap has been through discussing different kinds of *boundary objects* in research on *boundary crossing*, which highlights the value of learning in different arenas (AKKERMANN/BAKKER, 2011; 2012; BERNER, 2010). AKKERMANN AND BAKKER (2011) also discuss different learning mechanisms which can contribute to learning at the boundary.

As digital technology evolves, new opportunities to bridge the gap between schools and working life in vocational education are developed. However, different studies and reports have shown that the technology available in schools is not always used (HYLÉN, 2013; LUND, 2012; SWEDISH NATIONAL AGENCY FOR EDUCATION, 2013), or that it is used in a way that does not contribute to learning. There are also reports claiming that teachers need to develop their competencies in the area to be able to use digital technologies (SWEDISH NATIONAL AGENCY FOR EDUCATION, 2015).

It is important to study teachers' view of the use of technology, since teachers play a central part in how teaching and learning are organised, and previous research has shown that the way teachers organise learning is one of the most important factors in student learning (HAELEMANS, 2017; FIVES/GILL, 2015; HATTIE, 2012). The teacher's role in linking school and workplaces has also been emphasised in research on vocational education (KILBRINK, 2013). Statistical surveys, conducted both in Sweden and in the United States, show that teachers' private use of digital media is at a lower



level than that of the average inhabitants of these countries (CMA 2009; SALAWAY/CARUSO/NELSON 2008). Studies have confirmed this later among Swedish student teachers (BUSKQVIST/ENOCHSSON, 2012; ENOCHSSON, 2017), and this could explain why technology is not always used in schools. However, the scope is large and there are good examples of using digital technology in a meaningful way (e.g. ENOCHSSON/RIZZA, 2009). Therefore, available examples are worth studying in order to gain further knowledge about how digital technologies can be used to contribute to student learning. In a number of degree projects written by prospective teachers on the vocational education programme at our university, the authors have seen examples of how different types of digital tools (mobile phones, blogs, portfolios, apps, etc.) can be used as boundary objects to strengthen the connection between school and working life.

Digital technology can work as boundary objects in connecting learning in different learning arenas (BAARTMAN/GRAVEMEIJER/DE BRUIJN, 2013; MOTTA/CATTANEO/GURTNER, 2014; SCHWENDIMANN/CATTANEO/DEHLER ZUFFEREY/GURTNER/BÉTRANCOURT/DILLENBourg, 2015). However, there is a lack of research on how teachers can work with digital technology as boundary objects and thereby help students in their learning processes (cf. KILBRINK/SÖDERLIND/ENOCHSSON, 2016; KILBRINK/ENOCHSSON/SÖDERLIND, 2017; ENOCHSSON/KILBRINK/SÖDERLIND, 2017). In this study, we therefore focus on teachers' work with digital technology, such as apps, blogs and videos, as boundary objects in Swedish upper-secondary vocational education and how those can support learning at the boundary, by relating them to different learning mechanisms. The aim is to increase knowledge of how this work can be done in a meaningful way and how teachers experience this work by studying teachers who already use digital technology to connect learning at school and workplaces. This will be done based on the following research questions:

- *How do teachers experience their work with digital technology as boundary objects?*
- *Which learning mechanisms at the boundary can be identified in teachers' narratives?*

Below, we present previous research relating to boundary crossing and digital technology as boundary objects. Thereafter, we present the theory and method used in this article. In the method section, we also shortly describe the Swedish vocational education context of this research. In the next section, we present the results from the empirical study in relation to the two research questions above, the results are then discussed, and we finish the chapter with our conclusions.



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