

CROSSING BORDERS BETWEEN EDUCATION AND WORK-PLACES

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ABSTRACT

This paper presents a case study on workplace learning where Swedish and Norwegian public authorities participated in an academic course in business process modelling. The aim has been to develop an understanding of how partners in a transnational project can build bridges between the academic teaching and the students' local learning at work. A sociocultural framework was applied in the study focusing on the use of tools, the building of knowledge and learning in the zone of proximal development, the crossing of borders, and interaction and networking between activities. The source of data consisted of interviews, surveys, observations, data from learning management system, and student's reports. Analyse of the data was based on four dialogical learning mechanisms – identification, coordination, reflection and transformation. Our findings show that students' local cases acted as key drivers for their developmental process, as the course transformed from distribution of information to case based knowledge building process at local work places. A mutual learning process occurred when teacher and students taught each other in a zone of proximal development. Further, the use of business model techniques made the interpretation of academic discipline easier, since it created a common language that served as a foundation for shared understanding when they discussed their local cases.

Keywords: workplace learning, sociocultural framework.

1 INTRODUCTION

The case in this study is the BitStream project where participants move between flexible, organized, academic education and work. In this project, the crossing of borders is meant literally in reference to crossing the border between Norway and Sweden, and also as a model and platform for delivering courses that cross the borders between university teaching and workplaces. The course content was adapted and implemented in the public sector in Norway and Sweden (Söderström, Hedestig, Fallmyr, Ellingsen, Hegerholm & Klæboe, 2014).

There is an ongoing debate about whether – and if so, how – knowledge can be transferred from academic courses into workplaces, but undisputable answers have not yet been established (Tynjälä 2013; Reich, and Hager 2014). The sociocultural framework of this research questions the ways and possibilities for participants to cross borders and use knowledge acquired in the context of an academic course within their workplaces (Lambert 2003;). Star and Griesemer (1989) introduced the concept of boundary objects to describe how artefacts can be used to cross borders between different intersecting practices. The sociocultural framework shifts the focus from the metaphor of 'transfer' to the term 'boundary crossing' (Säljö 2003) whereby the building and transformation of knowledge are the basis (Döös 2011). Concepts of boundary crossing are used to refer to ongoing, two-sided actions and interactions between contexts (Wells 1999; Tuomi-Grøhn, Engeström and Young 2003). Boundary crossing is a term used to describe how professionals at work need to enter unfamiliar territory where they are to some extent unqualified (Suchman 1994; Isaksen and Karlsen 2015). Furthermore, it also describes the challenges of combining different "ingredients from different contexts to achieve hybrid situations" (Engeström, Engeström and Karkkainen, 1995, p. 319; Nederveld and Berge 2015). This article raises the following question: How does knowledge cross the borders between university courses and workplace practices? The aim of the

study is to develop an understanding of how partners in a transnational project can build bridges between the academic teaching and the students' local learning at work.

2 THE BITSTREAM PROJECT

BitStream is a virtual and physical transnational platform for capacity building including cross-border exchange of experiences, research and developments in innovative business development (Söderström et al, 2014). The participants comprise three academic institutions: one university in Sweden (uiS), one university in Norway (uiN) and one university college in Norway (uciN). The working languages in the project and the course were Swedish and Norwegian. The project had these goals:

- To develop a virtual and physical transnational platform for capacity building that includes a cross-border exchange of experiences, research and developments in innovative business development.
- To develop prototypes of methods and tools for sustainable innovative business development in the public sector.

The pilot course was a 7.5 ECTS course in Business Process Modelling (BPM). The BitStream project had three plenary sessions in Norwegian and Swedish communities:

- A boot gathering in September 2013 where an introduction and the necessary information about the subjects were presented.
- A mid-term gathering in November 2013 where participants presented their case for one another and where lecturers had lessons.
- A final gathering in May 2014 where participants orally explained the work for evaluation.

Education was developed between the gatherings on the LMS Moodle – an open source LMS platform that offers different tools. The LMS gave the teachers and students access to the desktop video tool Adobe Connect. The teachers guided the students in their workplace via online synchronous video. There was one physical guidance session where the teachers met the students in their workplace between the second and third gatherings.

According to a survey (S1), at the start of the course, there were 22 students from Norway and Sweden:

Organization	Participants
Bodø Municipality	8
Sorsele Municipality	5
Storuman Municipality	4
Norwegian Collection Agency	5
Total	22
Completion	19
% compl	86,4%

Table 1: The cohort for the course

In the cohort 19 of them completed the whole course and received ECTS credits. The average age was 47.8 years, and there were 11 women (57,9%) and eight men (42.1%). Their occupations were mostly in senior management. The level of experience within business development varied among the participants: 12 students (63%) claimed that they had worked with those issues in some way. Examples of activities that they expressed were organizational change within a unit, implementation of new work processes and adaptation of information systems. Among the students eleven students (58%) stated that they were currently involved in such a development project. Very few of the students had prior experience of distance or net-based education, accordingly they had low level of knowledge on learning management systems. With exception of one organisation they all had experience of Adobe Connect since it was a common tool within public sector both in Norway and Sweden.

The course was case-oriented, and the students were to define and work with a real-life process in their own organization during the course. Cases should be developed on the basis of Unified Modelling Language (UML). There were differences in how and when the local cases were established. The NCA case was established before the BitStream course. The cases for the Swedish municipalities were established as part of the BitStream project. Bodø municipality had both an ongoing project and established two more goals as part of the BitStream project. The local cases of the student groups were:

- The Norwegian Collection Agency (Mo i Rana, Norway);
 - Local case: Digitalising the inquiry/application process
 - Goal: Implementing the digital agenda into the business. Efficiency due to economic circumstances.
- Bodø Municipality (Norway);
 - Local case: Recruiting and aiding management in homecare
 - Goal: To make the process clearer and more structured. Efficiency due to economic circumstances. Create better competence and knowledge of their business and processes.
- Storuman Municipality (Sweden);
 - Local case: School transportation of pupils, building and land permits
 - Goal: Decrease the complex process and time-consuming activities. Efficiency due to economic circumstances.
- Sorsele Municipality (Sweden)
 - Local case: Home care process, reception of unaccompanied pupils and pupils with special needs, strengthen prerequisite to get more people into work.
 - Goal: To secure responsibilities, make the process clearer and more structured. To identify bottlenecks. Efficiency due to economic circumstances.

3 THEORETICAL FRAMEWORK

The use of tools is central in sociocultural theories with roots in Vygotsky's theories (1978, 1986) of learning. People use tools to develop and change objects. According to this framework language is the most important tool. Leontév (1978) developed these viewpoints into a description of collective object-oriented activity where the use of tools is based on interaction in the community. The rules, the division of labour and the use of tools in communities make an activity, which develops both social and individual knowledge. Engeström (2001) expanded the sociocultural model of Vygotsky and Leontev into a model where subjects in at least two activity systems use tools based on rules and division of labour to affect the objects. A part of these objects will potentially be shared (Konkola, Tuomi-Gröhn, Lambert and Ludvigsen 2007). The objects and their shared parts are developing and changing in the process. Learning in such a framework, can be seen as participation and interaction in communities where division of labour, rules and tools are fundamental for the knowledge building process (Säljö 2000). Engeström (1987, 2001) describes such learning processes as expansive learning. According to Wenger (1998), learning is to participate and interact in communities of practice. Wenger defines learning as "an interplay between social competence and personal experience" (2003, p. 78). Wells (1999) describes the knowledge building process as "appropriation through participation in activity". Knowledge building is a dialectic process where information and building of knowledge contradict and complement each other. Information is second-hand: it can be distributed and shared, and is an important part of the knowledge building process (p. 84). The knowledge building process is formulated as follows (p. 91): "Knowing starts with personal experience which amplified by information, is transformed through knowledge building into understanding ...". Wells continues by describing the relationship between information and knowledge (ibid.): "... the level of information has little or no impact on students' understanding until they actively engage in collaborative knowledge building ...". The building of knowledge involves processes in the zone of proximal development (ZPD) where learners can interact with teachers or more experienced participants. Vygotsky

(1978, p. 86) defines the concept of ZPD as follows: “It is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers”. Wells (1999, p. 314) links teaching in the ZPD to the pupil’s goals and tools. Engeström (2001) argues that people’s development in the ZPD is an interaction between social context and individual knowledge. This study will focus on how learning processes interact and develop in ZPD.

When students develop knowledge on their objects both in university courses and in their workplaces, knowledge and information will cross boundaries. Akkerman and Bakker (2011) define boundaries (p. 152) as: “sociocultural differences leading to discontinuities in action and interaction”. According to Wenger (2003, p. 84), boundaries are important to learning for two reasons: “They connect communities and they offer learning opportunities in their own right”. Boundary crossing means moving into unknown areas and presupposes the formulation of new mediating concepts (Lambert 2003; Engeström, Engeström and Karkkainen 1995). In their extensive literature study of borders and boundary crossing, Akkerman and Bakker (2011, p. 150) identified four dialogical learning mechanisms of boundaries: (a) identification, (b) coordination; (c) reflection; and (d) transformation. These dialogical learning mechanisms will be used as categories in this study.

The BitStream project is within the research field of workplace learning. International studies show that this area is both complex and diverse. According to Fenwick (2008), the concept of workplace learning has expanded. Important topics can be connected to the understanding of key purposes of adult learning at work and the border crossing process to academic courses. Ertsås and Irgens (2012) claim that the dichotomy between theory and practice should be overcome, especially because practice includes theoretical perspectives as a basis for action. These interactions across sites are argued to affect the individual and the social practice as well (Döös 2011). Topics of interest in this study include access to knowledge in the training situation within the organization. Filliettaz (2010) argues that access to such knowledge depends on the willingness of supervisors to provide adequate guidance and participation formats through which apprentices can engage in production work tasks. Virtanen, Tynjälä and Eteläpelto (2012) showed that close integration between school-based and work-based learning was crucial to the outcome of the learning. Another perspective on border crossing between work and school is the concept of networking (Tynjälä 2013), or the similar concept formulated by Engeström (2004) as knotworking. The concept of networking in educational programs is conducted in close collaboration with workplaces (Tynjälä 2013). According to Engeström (2004, 2011), the negotiated knotworking involves co-configuration, which requires the collaboration of partners in the movement of tying, untying and retying together separated threads of activity. Questions on guiding, integration, network and local work tasks will be raised in this study.

4 A CASE STUDY OF LEARNING IN BITSTREAM

The BitStream project involved two academics from each of the participating universities and the university college. Three of these academics have followed the scheme as a research project. The research questions developed in the process were: How does knowledge cross the borders between university education and work? How do the local project cases and the teachers’ guidance support students’ learning? To answer these questions, we used both quantitative and qualitative tools in accordance with the guidelines for case studies (Yin 2009; Cresswell 2007). Yin (2009, p. 2) argues, “In general, case studies are the preferred method when (a) ‘how’ and ‘why’ questions are being posed, (b) the investigations have little control over events, and (c) the focus is on a contemporary phenomenon within a real-life context”. The case study research design will usually include five components (ibid., p. 27): a study question, its proposition, its unit(s) of analysis, the logic linking the data to the propositions and the criteria for interpreting the findings. One of the basic differences in case studies is whether you have one or more cases, and whether you have one or more sources to investigate. The design for this case study is “embedded – single case design” (p. 39); i.e. one case, many sources. The sources of data in this project are:

- Interviews
 - Semi-structured interviews (of approximately 30 minutes) after the second gathering of all participants in their workplaces with a focus on how they perceived the course concept, and how they had worked on the course case within their own organization.
- Surveys. Two student surveys presented and answered on Moodle.
 - The first survey (S1) was done at the beginning of the course. This survey focused on the students' expectations at the start of the course and their knowledge of e-learning.
 - The second survey (S2) was conducted at the end of the course. It focused on the course contents and the impact, if any, this course had on their own organization.
- Observation in different contexts; the teachers' preparation of the project, at the gatherings and in connection with tutoring at each workplace.
 - At the first two gatherings, observations were made by note taking where the observers were positioned at the back in the classroom. The third gathering at the end of the course was recorded by audio, together with note taking. The participants' presentations were between 45 to 70 minutes in duration.
 - Between the second and third physical gatherings, the teacher group organized a tutoring tour among the participating organizations in Sweden and Norway. They travelled for five days and visited each city for one day. One of the participating teachers acted as an observer during this event and made notes at each workplace.
- Traffic data from the Learning Management System (Moodle).
 - Student activity on the platform was structured according to the delivery sequence of the course.
- Reports.
 - The student groups wrote and illustrated two reports (R1 and R2) of the local cases and delivered them on Moodle before the second and third gatherings.

According to the sociocultural framework of this study, we focused on the use of tools, the building of knowledge and learning processes in the zone of proximal development, the crossing of borders and interaction and networking between activities. We investigated the learning processes that developed at the learning arenas of gatherings, Moodle and the workplaces. The focus was on how the trajectories of the local project cases developed through these learning arenas. According to Wenger (2003, p. 94), a trajectory in progress “includes where you have been and where you are going, your history and your aspirations. It brings the past and the future into experience of the present”. The history and future of the students' work on local cases are linked to the movement between learning arenas and the crossing of borders. Akkerman and Bakker (2011, p. 137) analysed 187 selected references based on two rules: “(a) boundary objects and/or boundary crossing are used as central analytical concepts in theoretical or empirical analyses and (b) the study focus on learning understood in its broadest sense”. They identified four dialogical learning mechanisms of boundaries (p. 150):

- (a) Identification, which is about coming to know what the diverse practices are about in relation to one another;
- (b) Coordination, which is about creating cooperative and routinized exchanges between practices;
- (c) Reflection, which is about expanding one's perspectives on the practices; and
- (d) Transformation, which is about collaboration and co-development of (new) practices.

In this study, we used these four dialogical learning mechanisms as categories to develop an understanding of the students' learning at the different arenas. To answer the research questions, we focus on the trajectory of the students' work on the local project cases at the learning arenas. This focus was used to sort and reduce the amount of data gathered from the observations and the students' statements. The trajectories of the local cases – with a focus on the dialogical learning mechanisms – were the criteria for interpreting the findings and linking the observations and statements to the research questions and the theoretical framework.

5 ANALYSING LEARNING IN BITSTREAM

The students' project cases were developed in three gatherings, between the gatherings with digital tools and in the students' workplaces. The starting and closing points for the local cases were different, but all of them were developed in these learning arenas.

5.1 LEARNING AT GATHERINGS

The first gathering was the starting point of the BitStream project. After this session, the teachers presented and gave the participants enough information to continue the project work in their workplaces. The teachers introduced the new tools that they were supposed to use when they started to perform business modelling on their local cases. Notes from the preparation tell about the teachers discussing the necessity of giving the students the appropriate tools to continue their work in their workplaces. Students had to understand the idea behind business modelling, which most of the participants had little or no experience of. The challenges for the teachers were based on giving them both an understanding of the principles of business modelling. This gave the students the necessary perspective before they could start to use modelling techniques and creating their first descriptions of their case.

The students brought with them their own cases from their organization that had been troublesome or problematic in some way. At the first gathering, the students gave short presentations of their local project cases. Our observation notes describe situations where the teachers were the main speakers – they did the talking about organizing the project and the content and goals of the BitStream project. The students were listening and asking some questions. One student said, "I'm afraid this course will be too academic". In the interview, the participants discussed their confusion and attempts to see possible links between what was mentioned at the plenary session and their challenges in the workplace. Trude (NCA) said, "The first gathering was a little bit straight on. We fumbled a bit. There were many long lectures with little known examples. Not much time was spent on our case". Despite the one-sided communication, participants managed to identify process descriptions that could be discussed further when they went back to the workplace. According to Hanne (NCA) in the interview, "...the group continued working on their own case back home, and ideas from the gathering were considered". The learning processes at the gathering were sufficient for further work in adapting project tools to the local project cases.

The second gathering made a change. The teachers had prepared more presentations of the subject content. The student groups had delivered descriptions of their work in their local project cases (R1) on Moodle. They had also prepared a presentation of their work on local project cases for the teachers and the other students. According to our observation notes, there was an intention of ten minutes per presentation. The student groups did not approve this low priority, and the limit was greatly extended to an average of 30 minutes. This change of agenda represented a situation where students and their local cases now dominated the presentations and discussions. The students expressed a lot of interest in and discussed the different cases. The teachers supported the process with examples from the course content. Similarities and differences between the local cases were discussed. Our observation notes from the Sorsele presentation tell:

The sequence was from 11.03 to 11.27. Lena and Elin presented the employment situation. When presenting the diagram, they were interrupted by the teacher (Tore) who asked questions about the employment situation. Lena explains. Elin ended the presentation (11.17). Participants from NCA, Storuman and Bodø asked about the process and gave examples from their own processes. Elin and Lena answered and explained details in their case. The teachers (Tore and Anders) summed up briefly how the employment process can be illustrative of the project tools.

At this point, it became clear that the negotiation and interpretation of the diagram in relation to the working context had become crucial. According to our notes, the students were the active part, spending their time at the expense of the teachers. The importance of the local projects in the presentation and discussion were significant, and laid a foundation for further work. In the interview, Ulla from Storuman said, "At this gathering, we were the active part and the teachers had to listen to understand our project. The project

is important – both for the course and for the municipality”. Eva in Sorsele claimed, “...when we presented our case they did not understand how complex it is – they made wrong interpretations and many times we had to discuss the the situation”. The importance of the local projects was the focus of the presentations and discussion, and made a foundation for further work.

The third gathering presented and evaluated the project cases of the participants. The student groups had delivered reports on Moodle beforehand where processes at their local cases were described as standardized procedures. The oral presentations were a story about success and the importance of their local work. According to the reports (R2) and presentations, the student groups formulated new perspectives where standardized procedures were implemented in their local cases. All the local cases were planned to continue despite the course closing down (R2). In their final presentation, the participants made some interesting comments according to our observation notes. Elin from Sorsele said, “We understand much more now of how work processes shall be structured and we will continue to realize our goal in the public sector. This work is important to all the citizens in our municipality”.

In the first part of the course, there was a lack of interaction between the participants, especially the communication between Swedish and Norwegian organizations. This situation developed into what Geir from Bodø expressed as “a good integration and communication at the gatherings”. Ingrid from Storuman said that the differences of national language were not a big problem and less problematic than the language used in the books. Local competence and deep process knowledge combined with tight interaction was, according to the participants, a key driver for common understanding and change management. The teachers also recognized this; Anders commented at the third gathering that they did not have enough knowledge to create appropriate solutions for each case since they lacked important experience of work processes.

Some outstanding results of the presented local project cases are summarized according to the delivered reports (R2) and our observations. All the participants stated that they had the following conditions:

- Support from the top management, and that this was important for the development of the project;
- The business model and the UML-language gave clear visibility of the process and clarified what really is happening in a process;
- The models gave useful tools to analyse and explore processes, especially for identifying bottlenecks and problems in their local cases.

Some interesting issues were described in the reports or in the presentations of the different work organizations:

- As a result of the project work in Sorsele, they became appointed as the development team at the municipality. During the presentation, Sven said, “A problem for me now is that everything I’m looking at is considered as processes. Everything is a process”.
- Bodø municipality included business modelling in their three-year leadership training program. They also included business modelling as a key evaluator in conductor agreements and yearly performance evaluation among leaders. Lastly, they also made an organizational change and implemented a project office – a center of Excellence for business development.
- In Storuman, they realized that key personnel were a bottleneck when they had to develop too many tasks. This has been changed accordingly.
- NCA included the strategic dimension in their current business model. They have been working with process mapping and business development for a long time, but realized that they had not fully focused on the strategic level.

5.2 THE USE OF DIGITAL TOOLS BETWEEN THE GATHERINGS

The LMS Moodle was central in the work of the students between the three gatherings. Moodle gave access to different course tools. *The first mid-sequence* was between the introduction session and the session where local projects were presented. The course structure on Moodle presented information about the

course content. The working tasks were presented by the teachers as text and illustrated files. The students had to transform their local cases to descriptions anchored in the project tools presented by the teachers. The students delivered a first draft of their project case (R1) on Moodle where they tried to implement standardized procedures in their descriptions of work routines. This was a preparation for the presentation of their local case at the second gathering. To support this process, the teachers had two video meetings with each of the local project groups where the local cases were discussed. Mona (NCA) said in the interview:

These video meetings were important to us. We got the dialog with the teachers on our workplace on things that matter in work. It is easier to focus on these working processes when the teachers talk to us about our cases at work. I think the teachers also learnt a lot of how public service works and how important this project is for public business.

The second mid-sequence gave priority to develop and implement standardized tools and procedures in the local cases. The teachers supported this process via video meetings available on Moodle. The work was further developed with the visit of the teacher at the students' workplaces. The work ended as a written and illustrated final report (R2) delivered on Moodle. These documents were to be presented at the third gathering. Nina (Bodø) said in the interview, "The focus on our case at the second gathering and the video support had made it possible to understand how we could describe our cases according to the course content".

Statistical data generated on Moodle told us that students downloaded and used files on subject content developed and delivered by teachers. All the student groups delivered their working tasks two times to the teachers in functions on Moodle. The teachers commented on these reports on Moodle. Student groups in Sorsele and Storuman met and cooperated in their groups in Adobe video group rooms on Moodle. All the groups met their teachers three times for video guidance in these Moodle video group rooms. Statistics from Moodle also indicate that the students did not have much work and cooperation in the discussion forum. According to the survey (S2), none of the students paid much attention to files with course literature. The communication in Adobe Connect was located on Moodle. Statistics shows that this was the most used function (time spent) on Moodle. Three of the groups had extensive experience in the use of Adobe Connect and was commonly used in their daily work. In the interviews, students described the importance of the video communication: a student from Storuman commented, "The tutoring in Adobe Connect has been incredible". The teachers continuously changed their cohort in such a way that Norwegian teachers could tutor Swedish students and vice versa. To switch between the groups was in part deliberately. In this way they were able to take part in students' local cases and create a better understanding when they entered into the grading process.

5.3 DEVELOPING THE LOCAL PROJECT CASE IN THE WORKPLACE

The teachers had organized a tour between the second and third gathering, where they visited the student groups at their workplaces. The student groups had developed their local project cases after the second gathering. The local cases were prepared for discussion with the teachers at their workplace. Our observation notes from the teachers' visits to the different workplaces mention that the students had to explain and teach the teachers about their work. Notes from NCA mention, "When the teacher arrived, the students showed and presented their workplace to the teacher. The teacher could visually see some of the context when the students explained their local cases". After the student group had guided the teacher around the workplace, the student group and the teacher sat down to discuss the local case and develop a standardized description. When the teacher arrived at Sorsele, Ellen said, "This project is important not only to me but for the whole home service in the village. We know the reality of the project. We had to explain how things work for the teacher". The teachers' meeting and the video communication with the student groups in the workplaces developed the work in an academic direction according to the course content. Harald from Bodø said:

Both the video discussion and the face-to-face guidance were of great help to sort things out and develop a common understanding of our organization. It has been a great success to describe our

case at different levels as standardized procedures and with standard tools. This common language helps the communication inside the group and with the teachers. We will also use this standard when we communicate in the work organization.

During the interviews, students expressed that the teachers' visits were of great importance for developing their local cases. The teachers had met the student groups in their workplaces with a common goal of developing the local cases. The personal cooperation and interaction between the students and teachers seems to develop a new practice. Hanne (NCA) stated in the interview:

We met the teacher at the workplace. This changed a lot. We had to show him and explain to him how things work. We discussed how these processes could be divided and illustrated according to tools and standards in the course. The teacher explained how standardized procedures could clarify and be adapted to our work processes. A lot of questions and misunderstandings could be answered and sorted out.

In this situation, the division of labour was changed to fit the local case, and the education was moved to workplaces where the students' knowledge of the local context was in focus. According to our observation notes from the visit to Sorsele – Lena talking about the employment situation addressing the teacher: "... but it is obvious or we can't act in other ways, can't you see that?" Anders, the teacher, tries to fit the case to the flowchart and describe the local cases by their visual tools. Both the teachers and the students had to teach each other to develop a new common understanding.

6 DISCUSSION AND FINDINGS

The trajectory of the different local cases started and ended on different points. The interaction of knowledge building between learning arenas in the course were, however, common for the local cases. At the first gathering students tried to understand and identify the presented concept for describing standardized procedures. The students mentioned that this was problematic and raised criticisms of the course and the educational concept. Between the first and second gathering, the students were supported in their work on local cases by information in the LMS. The teachers also guided them via video meetings in their workplaces. According to the students, the teachers' video guidance in the workplaces was the main support that helped them identify the subject content and coordinate a standardized first description of their local case. These descriptions of the local cases were delivered on Moodle beforehand and prepared as a presentation for the second gathering. During the second gathering, the students wanted more time for the presentations and discussions of the local cases, and the agenda was expanded. This focus on the local cases established a foundation for further work in the workplace. After the second gathering, the teachers supported the students via video and met them at their workplace. The students developed a new practice in this process. Their local practices were described with standardized procedures and the UML language at different levels. This transformation made it possible to identify future goals and bottlenecks in their organization. These descriptions were their examination document delivered on Moodle. The third gathering was a presentation of their standardized descriptions of procedures in their local work organization. At this gathering, the students identified and coordinated the course content with their local case. They reflected and had a new perspective on their new and transformed practice. The work on local cases had already created changes within their organization and was going to continue in the future.

To support the analysis of the trajectory of the local cases, we have introduced four dialogical learning mechanisms: (a) identification, (b) coordination, (c) reflection and (d) transformation. These learning mechanisms can explain how bridges between the academic course and workplaces are developed.

Identification and coordination. According to the students, they tried to understand and identify different levels and tools for describing processes in public business at the first gathering. Criticism of the course was raised as being too academic. The teachers dominated the session and distributed information about new tools and processes. The students tried to find ways to implement these tools in their local cases in accordance with the teachers' advice. The teachers delivered information about the course content on

Moodle. Processes of identification and coordination were supported and strengthened by video meetings between the gatherings.

Coordination using Adobe Connect gave support to enhance boundary permeability and lessen awareness of moving between different practices, i.e. between the academic context and the work context. This can be done when actions and interactions run smoothly without breakdowns and costs. Our study shows that the tutoring sessions on Adobe Connect could be regarded as a smooth communicational channel that all participants appreciated.

In the second gathering, the students started to interact with each other on their local cases expressed in a 'common language' – that is, by their use of the business modelling notation system. Practices that were unclear or even tacit earlier suddenly became visible in the form of diagrams and pictures. In the physical gatherings, the students had to cross the border and express their local cases with the help of these diagrams. The other participants could give fruitful comments and responses due to the common understanding of the diagrams. The business modelling language became a key driver for interpreting and translating the local cases among the participants.

Reflection. The reflective mechanism can be observed in different ways. The opportunity to look at oneself through the eyes of other worlds was established when the teacher visited each workplace and conducted tutoring. Here, both students and the teachers tried to understand each other by perspective taking and perspective making. The students showed and informed on the local setting and explained the context in which their case was a part of. On the other side, the teachers had to present their perspective on business modelling and how to apply it on different levels in the local cases.

The third gathering, where the students presented their local cases, was much about reflection. The student groups presented their work and local cases for each other, and the teachers evaluated and marked their work. The students had developed their perspectives and adapted the process descriptions to their local cases. Cooperation and coordination with the teachers had developed new practices for the students. The participants summed up great progress, good work and that the local cases should continue. This process, where the students had to explain how their local cases fit the standardized procedures of business development in the public sector, involved making and taking perspectives that build bridges between academic courses and cases at work.

Transformation. According to the students, the implementation of the standardized procedures to their local cases was an interaction between the different learning arenas. At the beginning of the course, there were criticisms about lack of dialog. The students had problems linking the teacher's explanation with the reality at work. These tensions changed on the second gathering when the students' local cases started to dominate the process. The teachers tried to adapt the local cases to the standardized procedures of business development in the public service. These changes made it possible to identify processes, bottlenecks and coordinate processes in their local case with standardized procedures. This transformation process developed through dialog and confrontation at the gatherings and the students' workplaces. The students learned how to develop and describe their work processes in a new way with the UML language and develop a new practice. The teachers had to develop an understanding about the local processes at the workplace.

Transformation at work. Learning processes in the workplace were supported by information on Moodle and the video meetings. Parts of the education were developed at the students' workplaces as local cases. The teachers' knowledge of these procedures and the information in the course literature made it possible to describe the development process according to the standards of the field. According to the students, a dialog developed where the students guided the teacher towards understanding the local work processes. The teachers guided the students in the process of adapting standardized procedures and tools in their descriptions of the work situation. This process can be understood as a two-way guidance in the zone of proximal development whereby a common understanding of description of work processes emerged. This transformation process developed knowledge and established a foundation for a new practice. The transformation of the students' practice supported by the teachers in the workplaces made it possible to identi-

fy and coordinate the course content to their local cases. On the third gathering, students presented a new perspective on their transformed practice at work. The transformed practice was based on mentoring and interaction on local cases.

This study was limited to respondents in just one class of 19 students. The observations and interviews were few. These limitations make the generalisation of the findings problematic, and there was uncertainty in some of the findings. The result, however, are in accordance with theory and other studies. Further research should focus on large scale learning situations where knowledge can be built on local cases.

We have raised these research questions: How does knowledge cross the borders between education and work? How do the project cases and the teachers' guidance support students' learning? Our literature study raised questions related to guidance, processes of integration and networking, and the importance of local working tasks. We have observed how information from the teachers interacted with the students' experiences, and then developed into knowledge building in local cases at the workplace. We have identified changes, which represent boundary crossing between the teaching in the academic course and the students' local cases:

- Local cases dominated the building of knowledge during the last part of the project. Local cases expressed by their use of a modelling notation language made two-sided transnational communication possible.
- The dominance of the teachers' distribution of information changed in the process. Both the teachers and the students were teaching and learning in what can be formulated as the zone of proximal development.
- The teachers left their academic position and went out to the workplaces to develop the local project cases together with the local student groups. Education was partly moved from gatherings to the students' workplaces through video meetings and the teachers' visits.

In this project, we can understand the local cases and the teachers' support in workplaces as bridges where knowledge is crossing borders as a two-sided reconstruction and transformation both at workplaces and in and between the academic course.

7 CONCLUSION

Our study has shown that successful transformation of knowledge between academic courses and workplaces can be achieved if appropriate conditions are arranged in such a manner that important properties are considered in relation to the crossing of borders. The actual case shows that conflicting perspectives occurred in the beginning of the course, but common understanding was developed over time. Key drivers, conditions and properties for this developmental process can be retrieved from local cases, which motivated each student and made the interpretation of academic discipline easier. The use of business model techniques also created a common language that served as a foundation for shared understanding when everyone had a common language in the discussion of different local cases. The dual interdependencies between the teacher and student were also an important factor in the learning process. The teachers met and guided their students at their work places. By applying the perspective of a zone of proximal development, different participants could change their perspectives and scaffold each other to learn from each other and create a common understanding of the local case. Important part of the education was moved from delivering of information to case based knowledge building process at local work places. A prerequisite for this to happen was that the course design moved the physical setting from the academic campus to each workplace. Here, the use of communication technologies – especially synchronous communication tools – were important bridges for making this possible. Such guiding and interaction on local cases can be understood as bridges between academic education and knowledge building at workplaces.

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