



Vocational students' literacy practices at a construction site: Nexus analysis of reading the blueprint

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Abstract

This study examines professional literacy practices in vocational education and training (VET) in Finland. The participants of the study are eleven 16–18-year-old students of technical building service and their vocational teacher, who work at the construction site located in the college's premises. The focus is on reading the ventilation blueprint at the work site: What kind of literacy practice is the blueprint and what kind of situated factors affect its' use? The data consist of field observation data at the work site and interviews with the students and they were analysed using nexus analysis. The results are discussed through three cycles of discourse: the discourses in place, the interaction orders, and the historical bodies of the participants. The results show that reading the blueprint is the prerequisite of performing the work task. Its' material substance is relevant, as it enables using embodied methods in the concrete working environment. Interaction around and with the blueprint has four significant activities: 1) Resolving a problem, 2) Organising the work, 3) Checking the work, and 4) Bridging theory and practice. Reading the blueprint requires a concrete environment of the work at hand, support of the learning community, and interaction.

Keywords: literacy practice, professional literacy practice, multiliteracies, nexus analysis, work site, manual work, blueprint



Introduction

Literacy is one of the key competencies for lifelong and continuous learning (European Commission, 2019). Today, literacy skills are seen as multiliteracies, as texts are increasingly comprising linguistic, visual, audio, spatial, and gestural semiotic systems (Bull & Anstey, 2018). A multiliterate person is, among other things, flexible in understanding and using traditional and new communication technologies, has a repertoire of literate knowledge and practices, and can engage with new texts in different contexts (Anstey & Bull, 2006). Thus, multiliteracies are the key competencies for self-development and lifelong learning in different domains of life, including working life and education.

In this study, multiliteracies are examined as professional literacy practices in vocational education and training (VET). In Finland, VET is part of compulsory upper secondary education until the age of 18, and it is popular among young and adult students (Organisation for Economic Development and Co-operation [OECD], 2023). VET is positioned at the junction of education and working life, as it includes practical training. The primary objective is to develop vocational competence and cultivate general competencies that are necessary in society, working life and further education (Finnish National Agency for Education, 2024). Literacy teaching in VET has two types of targets: the development of literacy skills needed in the vocational field, and the development of general literacy skills for all domains of life, including eligibility for higher education and lifelong learning. These general literacy skills are mostly acquired in the general subject called 'Communication and Interaction in the Mother Tongue, Finnish' which covers each vocational upper secondary qualification. In this subject, literacy teaching is combined with vocational content, but it is often completed without genuine integration into professional tasks. However, Pietilä and Lappalainen (2022) argue that the scope of this subject is too limited, and the content is market-oriented and used to meet work-related needs. Even if the literacy curriculum in this subject is mainly delimited to labour context and topics, professional literacy practices are mostly learned in vocational units. Visén (2020), who studied reading practices in vocational studies in Sweden, notes that they are complex and need to be explicitly taught by vocational teachers.

In this study, literacy practices are studied in the context of Finnish VET as part of a manual work task. The participants are 11 young students of technical building services and their vocational teacher. They installed a ventilation system at a work site located on the school campus. The research data consist of ethnographic data: field observation data and interviews with students. It soon became evident that there was one essential literacy practice at the core of the installation work: reading the ventilation blueprint. It was intertwined in all stages of the project and thus became a prerequisite for performing the task. In

this study, I focus on reading the ventilation blueprint as a professional practice. It is necessary to look not only at the sole action of reading the blueprint but also the manual work task and the social activity at the work site, as reading as professional practice means performing the actions of picking up tools and equipment, negotiating with other students, drilling, measuring, writing notes, cutting ducts, and so on. I use the concept of reading the blueprint because this concept is commonly used in the construction sector. However, the blueprint is a multimodal text that consists mainly of visual semiotic resources (Cope & Kalantzis, 2000), such as routes and lines, numbers, symbols, and abbreviations. Making meaning with the blueprint requires interpreting these modes and using specific professional knowledge, which is part of socialising in the vocational field. Thus, reading in this context cannot be equated with reading linear texts.

The research questions are as follows:

1. What kind of professional literacy practice is reading the ventilation blueprint in the context of work?
2. What kinds of situated factors affect reading the ventilation blueprint?

By answering these research questions, this study provides information about the role of acquiring multiliteracies in a technical blue-collar field, in which literacy skills are not as obvious as in white-collar jobs (Sulkunen et al., 2021). The results provide information about learning and mastering a complex, multimodal professional literacy practice that is entangled with manual work task and includes teamwork and support from other students and the vocational teacher.

Research theory and previous research

The theoretical framework for this study is based on a sociocultural view on literacies, where literacy skills are considered literacy practices defined by the professional community and field. These practices are intertwined with the community's goals and activities and are learnt in different contexts as part of social relationships and behaviour. Managing literacy practices in each situation means acquiring the discourses and social practices of the community (Baynham & Prinsloo, 2009). The literacy practices mean doing something with texts, and the ways of 'doing' are practices in different environments of the community. Lave and Wenger (1991) introduced the concept of 'community of practice' into a theory of learning as a social process that takes place within communities of people who share practices and learn by participating in them. In this study, the community of practice is the learning community of technical building services, which is formed by the students and the teacher who work together on a common

task and engage in the same practice: installing a ventilation system at the work site.

Professional literacy practices can be equated with disciplinary literacies. According to Moje (2015), each discipline has its own culture in which certain types of texts are read and written appropriately. In different occupations the literacy practices are formed by the nature of the work. In Sweden, Karlsson (2009) studied literacy practices in the occupations of construction worker, truck driver, shop assistant, and preschool teacher. The functions of reading and writing relate to different types of work depending on whether their orientation is towards things or people. The truck driver and the construction worker who work mainly with things, use smaller number of different texts than people-oriented occupations, but this doesn't necessarily correlate with the amount of reading and writing. As things are related with items of projects that can be completed, the use of texts is often related to organising the work: the beginnings and ends of projects. Construction ground workers read construction plans and specifications to plan the following day's work (Karlsson, 2009).

Karlsson (2009) also states that linear reading has little validity in the work of construction ground workers, whereas search reading, whereby the reader locates specific items or information within a more extensive text, is common among them. Similarly, Visén (2020) identifies the use of pendulum-reading as one of the central reading practices in Swedish VET. In pendulum-reading, the reader moves back and forth between text and task, and as examples of this, Visén mentions the students of Industrial Technology who work on building chairs from draughts and instructions and the students of Restaurant Management and Food who work with recipes. The effectiveness of pendulum reading is measured with how the understanding of the text materialises in process and product (Visén, 2020). Lensjø (2020), who studied Norwegian plumbers' and apprentices' vocational learning at the construction site and in a training agency, argues that action skills required in manual work are learnt through hours or sometimes even years of training and practice, and they contain 'embodied, tacit knowledge which is often hard to describe or to identify as explicit knowledge' (p. 151). She also notes that the plumbers are close to materials and systems on the construction site, where tools and materials look different from the plan. Therefore, the tacit communication between the craftsman and 'the thing' are often difficult to explain in words (Lensjø, 2020).

The participants of this study read the blueprint and perceive the work task at the work site, which is full of 'things', for example rooms, scaffolding, tools, and copies of the blueprint. The blueprint in itself is full of 'things' as well: lines, routes, arrows, numbers, written words, symbols, and abbreviations. Making meaning with these 'things' requires professional multiliteracies, which I consider as professional knowledge combined with embodied methods for a

restricted working environment in which the meaning making of the blueprint also requires the meaning making of the working environment and material artefacts. This meaning making is measured through the progress of the installation work, which is the shared goal of the community formed by students and the teacher.

Research data and methodology

The participants were 11 native Finnish-speaking students of technical building services and their vocational teacher. The students, who were 16–17 years old during the data gathering, could work after vocational qualification as plumbers or ventilation installers. The student-participants are referred to as students or participants. According to the principles of ethnographic data collection (see e.g., Lillis, 2008), data were collected using multiple methods in a natural environment, which in this study means field observation data gathered at a construction site and student interviews. The field observation was of a short duration and was designed to provide insight into the role of literacy in the working environment and the students' engagement in literacy practices at work. The interviews provided information about students' perceptions of professional literacy practices.



Image 1. A typical workstation at the work site on the campus.

The field observation data were collected over approximately 40 hours in nine days. The participants worked at a construction site on their own college campus, installing a ventilation system in new social facilities. The site was occasionally noisy and confined due to numerous rooms filled with scaffolding as the participants fixed the ventilation ducts in the ceiling. They worked in small teams of 2–3 students in many workstations. Typically, one student would stand on the scaffolding and one or two remain on the ground reading the blueprint, passing out tools, talking, or just waiting. The students mostly wore hearing protectors, which complicated oral interactions. Image 1 shows a typical setting at the work site: the teacher is instructing the students on how to read the ventilation blueprint. Three students are actively engaged, while others are sitting and waiting.

The data gathered during fieldwork comprised 40 pages of field notes, observation charts, and photographs taken on site. In the observation charts, I noted down the literacy practices the students encountered in the installation work: the concrete text, the function or result of the action, the people involved, and their agency or role. In the field notes, I wrote as much as possible about what happened, but because of the noise and space constraints, I usually observed only one workstation at a time. I transcribed the field notes after each observation session and pseudonymised the participants. Six months following the field observation, small group interviews were conducted with the students in groups of 2–3 students each. As they worked in teams at the work site and interacted with each other at work, they were also interviewed in small groups. In the interviews, the participants complemented each other's talk, yet the interviews consisted mainly of question-and-answer sessions rather than in-depth group conversations. The interviews were conducted in a semi-structured manner (e.g., De Fina, 2019), which enabled further questions and following interesting topics even though there was a structure to follow with questions on literacy practices and eight photos from the work site. The photos stimulated talk about literacy practices and helped the participants recall the work site. The interviews were recorded and then transcribed, which produced 60 pages of anonymised transcription. In the interviews, the objective was to provide a platform for students to articulate their perceptions regarding their activities at the work site. It should be noted that no interview was conducted with the teacher, which was a deliberate decision; the studies conducted in VET frequently incorporate teacher interviews and observational data, yet the voices of the students are often absent. For this article, I have translated the excerpts from the field notes and interviews into English. Additionally, the original interview transcripts have been simplified. For instance, instances of overlapping speech have been removed to make the excerpt more comprehensible.

The ethnographic orientation is compatible with the sociocultural perspective on literacies, where literacy practices mean doing something with texts in a community. I have a background as a literacy teacher in VET and many years of working experience. During those years, I have heard countless times from students that literacies do not relate to manual work tasks. Therefore, as a researcher, I wanted to see what the participants do with texts in a working environment. As a teacher, I have gained contextual knowledge about Finnish VET and its day-to-day operations, particularly those related to the literacy curriculum and its incorporation into the classroom setting. However, I didn't have a deep understanding of literacy practices outside my classroom. The participants already knew me as their literacy teacher, when I started my field observation. Weinreb et al. (2018) propose that familiarity is a continuum, where on one end are insiders who are familiar with the community, and on the other end are outsiders who represent the 'stranger interviewer' norm. Their study showed that the participants disclosed more information to insiders and were less likely to lie to them than to outsider interviewers. On this continuum, I would be somewhere between an insider and an outsider. I knew the students and the vocational teacher, but I was unfamiliar with the work site and the installation work. I will analyse the possible impact of my dual role on the results of this study in the discussion of this article.

The data were analysed using nexus analysis, which is a multi-method research strategy that can use the tools of ethnography, critical discourse studies, and interactional sociolinguistics as appropriate (Scollon, 2001; Scollon & Scollon, 2004). In this study, nexus analysis is aligned with the ethnographic orientation both in terms of the data collection and analysis methods. Nexus analysis is useful in this research because it is multifaceted; it identifies how literacy practices are defined communally but are also influenced by an individual's past experiences. In linguistics, it has been applied especially to second language research (e.g., Leskinen, 2023; Strömmer, 2016, 2017). In nexus analysis, the analysed phenomenon is the nexus of practice, which Scollon and Scollon (2004) define as 'the social actions and actors which are crucial in the production of a social issue and bringing about social change' (p. 153). In this study, the nexus of practice is reading the ventilation blueprint. The data were analysed mainly through ethnography and data-driven content analysis. In the analysis of discourses in place, I used the tools of discourse analysis.

The research process is divided into three phases. The first phase involves engaging in the nexus of practice, in which the researcher identifies the crucial social actions related to the nexus. In this study, engaging with the research topic started years ago because of my vocational educator's background, but the nexus analysed in this article, reading the blueprint, appeared during the field observation. The second phase is the actual analysis phase, navigating the nexus

of practice, in which the researcher focuses on the connections, trajectories, and links that exist in the different data (Scollon & Scollon, 2004). The nexus of practice is examined at both micro and macro levels, with the micro level looking at how people interact in each situation and the macro level examining the broader relationships and factors that influence the whole. It is necessary to zoom in and narrow down to a clear focus as the centre point for nexus analysis. Through the analysis of this centre point (i.e., the nexus), the researcher can zoom out to scale the whole picture (Pietikäinen, 2012). In this study, I focus on one specific literacy practice in one vocational field to examine the role of multiliteracies in the context of acquiring professional literacies in blue-collar work. The third phase is changing the nexus of practice, where the researcher reveals the links, connections, and trajectories in social action where social change becomes possible (Scollon & Scollon, 2004). The results of this study provide knowledge that can serve as a basis for the development of teaching and learning literacies in VET and in the context of work in general.

The nexus of practice occurs in the intersection of cycles of discourses: the discourses in place, the interaction order in the social action, and the historical bodies of the participants (Scollon & Scollon, 2004). These three cycles of discourse cannot be entirely distinct or precisely delineated because the nexus of practice in the data appears at their intersections and junctions. Scollon and Scollon (2004) base their definition of discourse on Gee's (1992, 1999) distinction between two levels of discourse: discourse – Discourse, where 'discourse' refers to the ways in which people interact and communicate and 'Discourse' to broader social practices and multimodal semiotic systems that people implement as members of different communities. The discourses in place reveal the discourses and perceptions within the literacy practice of reading the blueprint and their meaning in the context of VET and as part of blue-collar work. Conversely, the interaction order, which originates from Goffman's (1983) views on how interaction is organised in different situations, provides information about the activities intertwined with reading the blueprint and the roles of the participants. The third cycle of discourse, historical bodies of the participants, means the cumulated experience, memories, and accustomed practices which affect their actions and participation at the work site. In the analysis of the historical bodies, it is possible to show the social patterns and registers that create 'the template' for this practice (Scollon & Scollon, 2004).

However, the historical bodies of the participants are not broadly analysed in this article because they are seen more as a general background of students in the technical field of VET.

Results

I present my results through the three cycles of discourse: discourses in place, interaction order, and participants' historical bodies.

Discourses of reading the blueprint at the work site

The blueprint was a visual text full of visual modes and symbols. It contained some written text, but most importantly, it was an image that showed how the ventilation system should be installed. Before arriving at the site, the participants had already been reading it with the vocational teacher both in distance and face-to-face teaching.

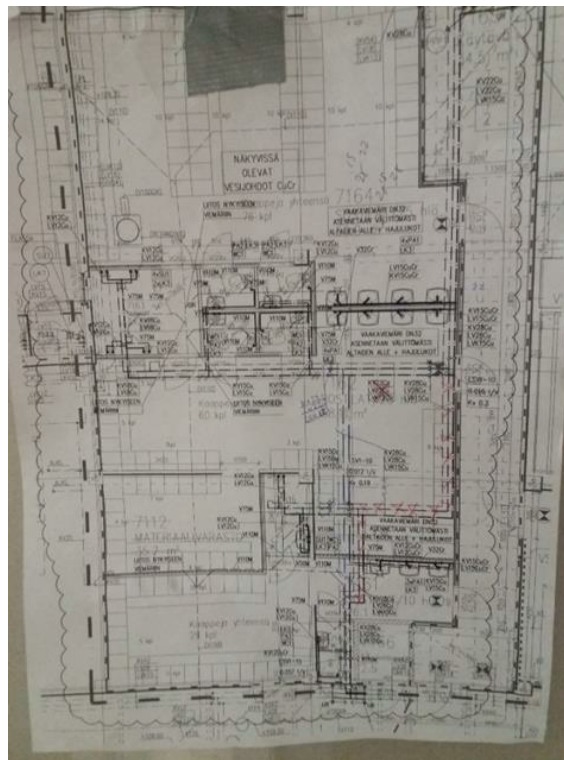


Image 2. The ventilation blueprint is full of visual modes.

The discourses of reading the blueprint at the work site relate to the concrete task and the material environment. To understand its modes, students should master professional multiliteracies: the interpretation of visual modes and written texts related to vocational content. Image 2 shows the visuality and the multimodality of the blueprint. In the work task, the blueprint's modes should correspond with the actual world: abbreviations should turn into tools and other equipment, dimensions into the lengths of the ducts to be installed, and so on. Reading the

blueprint functioned as a means to organise participants' work at the site: it was simultaneously the list of tools and equipment, working instruction, and an image of the desired outcome of the entire project. Therefore, it contained information over a large timescale, from planning the work until controlling the finished work. The blueprint was a material object: an A3-sized blueprint – or in fact, multiple copies of the same blueprint – at the work site. The copies were attached to walls or scaffoldings with tape, and they were often moved to places where the participants needed them: when they were drilling the ducts to the ceiling, they could fold the blueprint and take it up to the scaffolding, and when they needed help from the teacher, they could take it to the teacher. They would even joke about the paper by taping it on somebody's back, as in the next excerpt of field notes (day 5).

The two boys called Ville and Timo read the blueprint but then ask help from the teacher. The teacher doesn't hear them at first, so the boys take the blueprint off the wall and tape it to Ville's back. The boys march over to teacher to ask for advice. The teacher jokes around, takes the plan, and tapes it to the wall.

The blueprint was used similarly to a tool: it was taken to where it was needed and used to solve the problem. By taping the blueprint on Ville's back, the blueprint 'walks' to the teacher when the students need help. As different students used and moved the same copies from one room to another and up to the scaffolding, the copies often went missing. The teacher would be the one seeking them. When students asked him for help, he would often reply: 'Where's the picture?' This way, the teacher instructed the students to look for the solutions in the blueprint. At the work site, the teacher referred to the blueprint with more official terms of 'the document' and 'the picture(s)', whereas the students talked about 'the big paper' or 'the white paper'. This implies that the teacher considered the blueprint an official document received from a higher authority. In the working culture of the construction site, workers perform manual work through instruction that comes from elsewhere. By using more official terms, the teacher also mediates the tacit knowledge of the dichotomies in the field.

Because of the material substance of the blueprint, it was possible to use embodied methods when reading the blueprint, such as tracing the lines with a finger or a pen, pointing at some detail in the blueprint to focus one's gaze, pointing spots or places in the working environment, or measuring. The students often measured lengths of the ducts or distances with a measuring tape, as in Image 3.



Image 3. A student using measuring tape with the blueprint.

Measuring was a concrete action, followed by calculating the proportions, before cutting the ducts or drilling the supports into the correct places.

In the episode of the next excerpt from the field notes (day 5), the teacher explicitly instructs one student, Timo, to use an embodied method, tracing the blueprint's lines with his finger, to find out the sizes of pipe collars. This happened after the students have taped the blueprint in Ville's back and gone to ask help from the teacher. First, the teacher asks Timo and Ville multiple questions about the blueprint.

Timo tries to find a specific marking on the blueprint but cannot find it. The teacher advises him to run his finger along the line on the blueprint. The boys continue searching but cannot find the marking. Finally, the teacher points to one spot on the plan: 'Could it be there?' The result of a long (about 10 min.) discussion: they figure out what kind and what size of pipe collars are needed.

In the interview, Timo says that he doesn't remember this specific situation of the teacher instructing him to trace the lines with his finger, but he says that 'he [the teacher] always says things like that' and that it was 'probably useful'. In this case, the teacher wants him to find a certain symbol, which is difficult to find. We don't know, if Timo remembers what the symbol looks like or if he just can't locate it. At the end, the teacher spots the correct place in the blueprint. In this meaning-making process the professional knowledge and the 'things' of the material working environment combine through the embodied method of tracing the lines with a finger and interacting with the teacher. Similarly, Lensjø, (2020), who studied Norwegian plumbers' learning at the workplace, argues that

plumbers are extremely close to materials and systems at the construction site, where tools and equipment look different from the plans and progress on paper. Skilled workers can apply the plans to the reality of the environment (Lensjø, 2020).

During the installation work, the students performed a vocational unit called 'Installation of Ventilation Systems' (OPH-2790-2017). The vocational requirements (valid until July 31, 2021) demanded 'collecting the materials in accordance with *the list*' and 'carrying out installation work in accordance with *drawings and specifications*', 'making *material and labour cost calculations* and collecting materials according to *a catalogue*' and 'carrying out routine installation work on ventilation systems in accordance with *drawings and specifications*'. The application of italics serves to denote texts that are referenced by name in the curriculum. The blueprint plays the roles of 'the drawing', 'the specification' as well as 'material catalogue', and thus, literacy practices are embedded inside the professional practices. Instead, the literacy skills are not specified: What kind of professional multiliteracies do the participants need to 'carry out installation work in accordance with drawings and specifications'? Nevertheless, the teacher was aware of the meaning of reading the blueprint, as he used resources in teaching the participants to read the blueprint before starting the installation work and at the work site, even if he was busy most of the time. The students told in the interviews, that they had had multiple lessons, where the teacher explicitly taught the symbols and other semiotic resources of the blueprint. The students had also used colours and wrote down notes during the lessons.

Interaction order of reading the ventilation blueprint

Reading the ventilation blueprint requires interaction with other students and the teacher. This interaction has four different activities at the work site: 1) resolving a problem, 2) organising the work, 3) checking the work, and 4) bridging theory and practice. These activities relate to the blueprint's different roles as the plan, the work instruction, the list of tools and supplies, and the desired outcome. Karlsson (2009) argues that construction ground workers use literacy practices to organise their work. In this study, this is evident in activities of resolving a problem, organising the work, and checking the work. The most typical activity during the field observation was that the participants encountered a problem in the installation work and tried to resolve it by themselves, sometimes for more than an hour, as Timo said in the interview. Then they would try to ask for help from other participants and eventually go to the teacher, who would turn to the blueprint. The following excerpt from the field notes is from the first day of the field observation.

A typical recurring situation in teaching is when the students ask for help, the teacher takes the ventilation blueprint, and they look at it together. This is repeated

at least five times in a couple of hours. The students clearly still need the teacher's help in interpreting the blueprint at the stage of fixing and cutting the ventilation ducts.

In this activity, the direction of the interaction varies: The students interact with each other and the blueprint and with the teacher and the blueprint. This interaction originates from the blueprint and leads to the blueprint: The students talk with each other and with the teacher when they cannot read the blueprint by themselves, and the teacher usually takes the students back to the blueprint to look for answers in it.

In Figure 1, the arrows symbolise the direction of the interaction in the interaction orders of four activities. The green triangles represent the students, the orange triangle is the teacher, and the brown rectangles represent the blueprint. As the students' working team combinations might vary at the work site, the number of students' triangles in Figure 1's activities also differ.

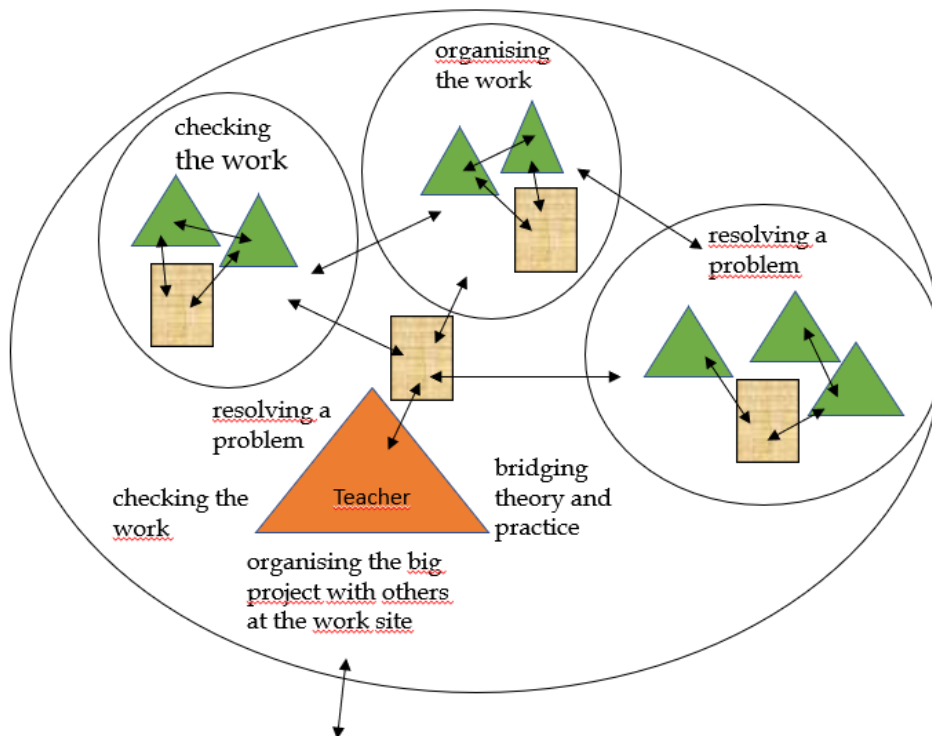


Figure 1. Interaction order of reading the blueprint.

Resolving a problem and organising work both include many interactions and negotiations – especially if there is something new going on: at the beginning of

the day, after lunch, or when a new working phase is about to start. The role of the blueprint is to bring the participants back to the agenda, as they work in teams to contribute to a project with several phases and have the responsibility of progressing to a certain phase during the day. While the participants organise their work at their workstation, the teacher plays the role of managing the big project as he interacts with the entire work site, including the students and teachers from other classes and fields. Two participants, Jenna and Anton, say in the interview that they do not find it difficult to organise their work themselves. Jenna talks about reading the blueprint as the most natural thing: 'You just look at the blueprint what isn't installed yet, so you continue from there'. The participants in this study did not interact with other students or teachers as they were bound to their own class and even more to their small working team and their own teacher. Thus, the teacher has the role of a site manager. Both in observation data and interviews there are multiple occurrences on situations, in which the students don't want to negotiate with students from other fields or groups, yet the teacher tries to encourage them to do this as a practice of the work site. This excerpt is from the field notes from day 8.

Jenna and Anton should go and ask the painter about the scaffolding. Jenna: 'You go; I don't dare.' Anton: 'No.' The teacher arrives and asks the students: 'Are you really afraid to go and ask?' He takes Anton by the hand and leads him over to the painting student to discuss the scaffolding.

In this case, the teacher actually takes Anton's hand to take him to talk with people he doesn't know. This way he suggests that talking to other people at the same work site is an essential part of working.

The third activity, checking the finished work, has two different aspects, and the direction of the interaction is reversed. The blueprint is not necessarily materially present every time, but it lies in the background as the correct result of the work. When the students start negotiating with each other, their aim is to check the work, such as whether the duct or support is set in the right place. Instead, when the teacher begins the discussion, he often tries to motivate them to work more effectively by checking to see what they have done and instructing them how they could continue. In the next excerpt of field notes (day 9), the teacher tries to make Anton and Aleksis work.

Anton and Aleksis are fooling around on Friday mood. The teacher asks them how they plan to proceed with their work, then they discuss the measurements. Aleksis sneaks away somewhere. Anton doesn't want to answer, but asks where Aleksis is. 'We don't need Aleksis here, you're all in the same boat,' the teacher replies. Anton: 'Yes, we do!' Teacher: 'Where was the picture?' The teacher finds the blueprint and goes over to it. He shows the measurements on the picture and explains how to proceed.

In the excerpt above, the teacher uses the blueprint to bring the students back to the work task. At first, they don't want to continue without Aleksi, but the teacher's comment 'You're all in the same boat' emphasises the community's shared responsibility to achieve the common objective.

The fourth activity, bridging theory and practice, is educational, whereas the other activities also occur on a real work site outside the educational context (Söderlundh & Kahlin, 2022). Its purpose is to build a bridge between theory and practice through 'the lessons', as the teacher calls them. Compared with the three functions mentioned previously, the teacher was the only active participant with the blueprint in the background, as the interaction was directed from the teacher to the participants. They had studied reading the blueprint in theory before starting to work on the site, and through these 'lessons', the teacher built an educational bridge between these learning sessions, the manual work task and the actual environment. The teacher conducted this with some participants when they were looking at the blueprint together, but occasionally he would also gather all the participants in one or two groups and hold a 'lesson'. The following is an excerpt of the field notes (day 8), when he connected a material object – a fire valve – to the moment they had studied reading the blueprint:

The teacher arrives, he announces that it is time for the lesson. He picks up a fire valve and starts asking the boys questions about it: 'What is this?' and so on. 'Do you remember when we looked at the pictures?' Construction workers arrive at the workshop. It starts to get noisy. The lesson is interrupted when the surface treatment teacher wants to discuss something with the teacher. [...] The teacher continues the lesson, and the boys listen. Once he has finished, he moves to the other side of the room and holds a similar lesson there. The students swing on the scaffolding and listen. Mika, Veeti, and Samu are on the scaffolding. 'It's nice to sit here,' says Ville. The boys discuss installing a fire valve, and the teacher comes over to offer some advice.

Learning literacy practices are effective when they relate to the task and are supported by a professional at the appropriate time (Black & Yasukawa, 2011; Casey et al., 2007). The teacher's 'lessons' occurred when the participants had a problem, were about to proceed to a new phase in the work task or, as in the excerpt above, had to use a new tool or equipment. The participants of this study stayed for months at the work site without theory lessons, but the teacher brought theoretical knowledge of the blueprint at the site through his interaction.

Historical bodies of the students

The historical bodies of the participants were not deeply analysed in this study but were viewed through two different students to illustrate the participants of this study. I applied a nexus analytical approach to historical bodies, in which I first zoomed in on two participants, Timo and Jesse, and then briefly zoomed out to frame the general backgrounds of students in technical fields in VET (Pietikäinen, 2012). I chose the historical bodies of Timo and Jesse to demonstrate

students' diverse orientation towards reading the blueprint, because they talked differently about reading the blueprint and working. Timo is one of the key participants of the study, as he was active both at the work site and in the interview. At the work site, he often needs the teacher's and his fellow students' help to manage the work at hand and understand oral instructions. He says in the interview that he needs help from other students as he doesn't hear the teacher's instruction.. In the interview I talked with two students who have the same name, Ville, and Timo.

- Timo: I'll always do I come and do the physical work every now and then.
Ville 2: Yeah.
Me: Oh so you're like a hero [laughing].
Ville 2: We like plan and then to Timo.
Timo: I'm not a fucking engineer.
Ville 1: Then to Timo you just have to say precisely what to do.
Timo: 'Cause I don't know at what phase you hear those things that the teacher explains to you [laughing].
Me: So you feel like you are not somehow hearing.
Timo: Yes I do [...] like I haven't heard – like – I really am listening the teacher is like Timo you never listen [imitates the teacher's voice] but like I feel that I am not always hearing that thing like.
Me: Mm.
Timo: Yeah.
Me: So what do you do then you ask these others.
Timo: I ask these they say Timo are you stupid 'cause you don't listen.

In the interview Timo argues that he is not 'an engineer'. With regard to Timo, his team members say that they have to tell him precisely what to do. The typical distinction in the construction sector is that 'engineers' make the plans, while blue-collar workers perform the work through instructions. Timo positions himself as a 'worker' who does the physical work, rather than an 'engineer', who plans the work. In the interview Timo also states that reading the blueprint was difficult because 'there was so much stuff in it'. The teacher instructed students to read the blueprint and to use colours to perceive its markings. Timo says in the interview that face-to-face teaching worked more effectively for him than distant teaching. In Koivisto's (2013) study, some of the pupils in English lessons resisted to take an active role as learners due to their historical bodies as language learners. In the interview, Timo speaks negatively not only about receiving instruction at school, but also about his summer work at a construction site. He says that he couldn't ask anything, as the more experienced workers treated him like he was stupid and questioned why he was working there. In the interview, Timo uses the exact same word 'stupid' when he speaks about what two other participants might think of him. However, with the support of the teacher and other students, Timo is active at the work site, and he can proceed in the work task. Since I don't have data about Timo's school history, it is impossible to say,

why he considers himself as someone who only does the physical work and can't hear the instruction, but this may be due to his experiences both at school and at work.

Conversely, Jesse seems able to manage the blueprint. He usually works independently with two other students, and like Timo, he receives support from his team. He says in the interview that he learned more at the work site environment than in the school workshop because they did 'real work' there. He also says that he learned to read the blueprint during distance teaching but became most proficient at reading it while working. When asked if the participants felt that they could read the blueprint at the work site, Jesse replied without hesitation: 'Yes, we can'. He had also had a summer-time workplace, and he said that compared to school, people work harder in 'real' companies. Jesse was headed to practical training after the interview, and he was motivated to start working. Unlike Timo, Jesse didn't have the dilemma of asking for help or listening to instructions, but he felt confident about reading the blueprint, the work task, and working in general.

Students of technical building services in VET in Finland do not necessarily have a background as high-achieving students, as the field has low entry requirements (Education Statistics Finland, 2024a). Technical fields in general are dominated by male students (Education Statistics Finland, 2024b), which can also be seen in this study, with 10 male participants and only one female participant, Jenna. In this study, I do not focus on gender, but it is worth acknowledging that boys underperform in literacy in comprehensive school (Schleicher, 2019), and these boys most likely continue their studies in VET (Hakkarainen, 2016). Nevertheless, Timo and Jesse show that there are many kinds of students. Learning to read the blueprint in relation to work depends on the students' background and skills and on their vocational motivation to master the work task and become professional. As shown in Timo's case, other students can play an essential role in supporting students who need more guidance than the teacher is able to offer.

Discussion

The results of this study emphasise the importance of the material working environment and the support of the community in reading the blueprint at the work site. The material format of the blueprint – the big paper – allows for diverse forms of interaction, as the students and the teacher can easily move the blueprint and gather around it to talk about the work close to the tools, scaffolding, channels, pipes, and other 'things'. Therefore, the results presented in this article confirm Lensjø's (2020) findings that plumbers and other manual labour workers are, in fact, inside the practice. Similarly, the literacy practice is inside the

professional practice both in terms of practical work and the demands of vocational curriculum. Learning to read the blueprint is inseparable from the manual work task and is measured with how the work proceeds. Reading the ventilation blueprint requires pendulum reading (Visén, 2021) and search reading (Karlsson, 2009), since it combines the abstract plan with the concrete environment. Therefore, learning a complex, professional literacy practice can happen only in the concrete working environment, inseparable from the manual work task. This should be taken into consideration in the implementation of VET.

It is evident that the students need support from the teacher and other students to read the blueprint and complete the task. This was possible because the work site was located on school campus, there was no time pressure, and all participants were working on the same task together. This may not be the usual situation in actual workplaces where people often work independently with limited resources (Söderlundh & Kahlin, 2022). VET in Finland has become increasingly work-oriented and competence-based (Pietilä, 2025), which means that the students proceed according to an individual programme. Thus, they may not have a learning community or shared tasks. In addition to this, VET increasingly includes practical training in companies, where there is no teacher or co-workers available all the time. According to the results presented in this article, the shared task and the support from the learning community was essential at the work site. The teacher's role is to teach students how to carry out installation work and read the blueprint, as well as socialise them to work on site. This includes showing them example about respecting the blueprint as the official document and encouraging them to resolve problems, plan their work, and negotiate with other people on site.

There are factors that may have influenced the results of this study, most of all my background as a vocational literacy teacher. My previous knowledge of VET impacted the design of this study, but my knowledge and perceptions on the participants' attitudes and skills may also have affected what I perceived, what I wrote in my notes, and what I asked in the interviews. The students knew me as their literacy teacher and the vocational teacher as his colleague, which necessitated careful deliberation about my dual role and ethical concerns at each stage of the research, from obtaining informed consent to analysing and reporting data. My background as a teacher is evident in the research data, as the participants in the field called me 'teacher'. In the beginning of the interviews, some of them hesitated to answer my questions about literacy practices, which could be due to the fear of giving a wrong answer to the teacher. When reviewing the interview transcriptions critically, the participants probably did not give any wrong information, but they also did not tell me all that there was to tell. This could have been caused by my dual role but could also be related to the inconvenient topic of literacy practices in the context of work. Conversely, being

familiar with the participants and being their teacher had some positive consequences: they didn't seem to pay much attention to my presence at the work site, they talked to me frequently and allowed me to access the field at any time.

The interviews were conducted when the work site was almost finished, which may have affected what the participants remembered about working on the site and reading the blueprint. As the students didn't speak eagerly about the blueprint – or any other literacy practices – in the interviews, most of the data presented in this article consist of field observation notes. The field notes contain transcriptions of conversations between students and the teacher. As these were written down by me at the work site, they should be examined for their content rather than being read literally. I decided to document the interaction this way because the work site was too noisy for audio recordings.

This study was conducted in one vocational college in one field within one community. The ventilation blueprint is a technical drawing, and most of its semiotic modes and symbols are generalisable to technical drawings in different fields. Conducting the study in a work site environment but in an educational setting produces perspectives of both education and work. They can be applied especially in technical fields in which literacy practices are embedded in professional practices and combined with professional tasks. However, further research is required on the specific elements and procedures of work-related literacy practices to develop an effective pedagogy for VET and other professional settings.

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Notes on contributor

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