Vocations and Learning
https://doi.org/10.1007/s12186-022-09286-8

ORIGINAL PAPER

Vocational Students' Perceptions of Self-Regulated Learning in Work-Based VET

Laura Pylväs[1] · **Petri Nokelainen**[2] · **Heta Rintala**[3]

Received: 28 October 2019 / Accepted: 3 March 2022

Abstract

This study's aim is to examine vocational students' perceptions of self-regulated learning in work-based settings regarding Finnish vocational education and training (VET). We examined the participants' self-reported thoughts and experiences of VET learning and vocational development that were reflected against SRL theory. The interview data ($N=33$) included apprentices ($n=15$) in work-based and students in school-based VET ($n=18$) in the fields of social and healthcare, business and administration, and construction. Overall, the results indicated that learning at work promoted vocational students' cognitive engagement and motivation. The interviews also introduced certain SRL strategies that guided the participants' efforts to learn. In particular, many of the vocational students had taken the initiative to set goals, done strategic planning, and monitored their own performance jointly with their teachers or co-workers. However, the self-reports also revealed some shortcomings in the students' SRL behaviour. The importance and availability of social support and positive feedback from VET teachers and workplace trainers/co-workers to vocational students' learning and self-efficacy were underlined in the self-reports.

Keywords Self-regulated learning · Vocational student · Apprentice · Work-based learning · Vocational education and training

✉ Laura Pylväs
laura.pylvas@helsinki.fi

Petri Nokelainen
petri.nokelainen@tuni.fi

Heta Rintala
heta.rintala@hamk.fi

[1] Faculty of Educational Sciences, University of Helsinki, Helsinki, Finland

[2] Faculty of Education and Culture, Tampere University, Tampere, Finland

[3] Häme University of Applied Sciences, HAMK Edu Research Unit, Hämeenlinna, Finland

Published online: 26 March 2022

Introduction

Work-based learning has been widely considered a means to increase the labour market responsiveness of vocational education and training (VET). Changes in people's expectations about their place in the workforce have also increased educators' interest in authentic learning and the potential of workplaces as learning environments. For instance, the reform of vocational upper secondary education in Finland, which was implemented in 2018 (Act 531/2017), has emphasised the role of work-based learning and more intensive collaboration between vocational schools and workplaces. Consequently, more research is imperative to nurture students' performance in variable learning contexts and to enable students to become involved with learning processes both within and outside the classroom.

During the past few decades, educators globally have been interested in developing expertise that enables students to act in various environments, manage transitions, and build a career with a continuous learning approach. To deepen the understanding of individuals who can handle learning to enter a profession in various environments while developing their expertise throughout their careers, research on education has addressed some important perspectives on self-regulated learning (SRL). SRL refers to the process in which students regulate their own learning through the systematic use of motivational and behavioural strategies (Zimmerman, 1989, 1990). Self-regulation theories assume that SRL involves temporally delimited processes, strategies, or responses that students must initiate and regulate proactively, and that self-regulatory skills allow them to modify their performance based on personal characteristics and environmental conditions (Zimmerman, 2000). International research has shown that even if SRL practices have been developed in VET contexts, there are opportunities for improvement in both student and teacher SRL behaviour (e.g., Khaled et al., 2015; de Bruijn & Leeman, 2011; Smith, 2003; Gordijn & Nijhof, 2002; Jossberger et al., 2020). Therefore, this study's aim is to examine vocational students' perceptions of SRL in work-based settings regarding Finnish VET. We examined the participants' self-reported thoughts and experiences of VET learning and vocational development. The self-reports were reflected against the theoretical framework of SRL. More precisely, student experiences were itemised through three self-regulatory phases based on Zimmerman's (e.g., 2000, 2013) cyclical model of SRL. The research question we addressed is as follows: How do the 1) forethought, 2) performance, and 3) self-reflection phases of SRL emerge in the VET students' self-reports of learning and development during VET?

Theoretical Framework

SRL

The SRL perspective clearly recognises that there are biological, developmental, contextual, and individual difference constraints that can impede individual efforts

at regulation (Pintrich, 2004). However, students can be considered self-regulated such that they personally initiate and direct their own efforts to acquire knowledge and skills (rather than relying on teachers, parents, or other agents of instruction) and that their learning involves using specific strategies to achieve academic goals (Zimmerman, 1989). To address the issue of causal relations among SRL processes, key motivational beliefs, and learning outcomes, Zimmerman (2000) proposed a cyclical model of SRL. According to the model, a student's learning processes and accompanying motivational beliefs fall into three self-regulatory phases. However, like most SRL models, all phases can be ongoing simultaneously and dynamically (Zeidner et al., 2005). In this study, we applied the three phases of the cyclical SRL model to structure vocational students' self-reports of VET learning and vocational development.

First, the *forethought phase* processes of Zimmerman's (2000) cyclical SRL model of task analysis and self-motivation have been used in preparing the effort to learn and are intended to enhance that learning. Based on growing empirical support for the model, the forethought phase involves a number of well-known motives to self-regulate, such as self-efficacy beliefs, outcome expectations, task interest or value, and goal orientation as well as two key self-regulatory processes: goal setting and strategic planning (Zimmerman & Campillo, 2003). The general distinction in SLR research has been acknowledged between two classes of goals: target-and task-specific goals that represent the specific outcome an individual is attempting to accomplish, unlike a broader purpose of goals or goal orientations that reflect more the reasons an individual wants to pursue a task (Zeidner et al., 2005). A learner's efforts to break a learning task into its key components, goal setting, and strategic planning require personal initiative and persistence, not to mention high levels of key self-motivation beliefs/values (Zimmerman, 2013). According to Bandura (1991), most human (purposive) behaviour is regulated by forethought, and people motivate themselves and guide their actions in an anticipatory, proactive way through the exercise of forethought.

Second, the *performance phase* processes of the cyclical SRL model are employed during efforts to learn, as they are intended to facilitate self-control and self-monitoring of one's performance (Zimmerman, 2013). Self-control refers to the use of specific techniques to direct learning (e.g., self-instruction, imagery, attention focusing, task strategies, environmental structuring, and help seeking), and self-observation guides learners' efforts to self-control, such as metacognitive monitoring (informal mental tracking of one's performance processes and outcomes) and self-recording (creating formal records of learning processes and/or outcomes). Adding to students actually executing the task and monitoring how they are progressing in the performance phase, they use self-control strategies to keep themselves cognitively engaged and motivated to finish the task (Panadero, 2017).

Third, the *self-reflection phase* processes, self-judgments (self-evaluations of the effectiveness of one's learning performance and attributions of causality regarding one's outcomes) and self-reactions, occur after efforts to learn and are intended to optimise people's reactions to their outcomes (Zimmerman, 2013). According to the Zimmerman's (2013) model, attributions of one's results to personal control induce a greater sense of satisfaction and adaptive inferences for errors (e.g., improved strategic

planning and shifts in goals) compared to attributions to uncontrollable causes and defensive inferences (e.g., reducing motivation and lack of adaptive inferences). Consequently, these attributions generate self-reactions that can positively or negatively influence how students approach the task in later performances (Panadero, 2017). Further, the sense of self-efficacy the individual possesses influences decisions of behaviour and self-regulatory processes in which efficacy beliefs determine how environmental opportunities and impediments are perceived (Federici & Skaalvik, 2011). When people believe the environment is controllable in matters of importance to them, they are motivated to exercise their personal efficacy, which enhances the likelihood of success and provides behavioural validation of personal efficacy and environmental controllability (Bandura, 1991).

Even if the SRL approach considers learning to be an activity that students proactively do for themselves rather than as a covert event that happens to them due to teaching experiences (Zimmerman, 2001), the three relevant classes of student responses (self-observation, self-judgement, and self-reaction) are treated as observable, trainable, and interactive (Zimmerman, 1989). Also Panadero (2017) has reminded that 1) SRL is a powerful umbrella to anchor crucial variables that affect learning while offering a comprehensive framework that explains their interactions; 2) SRL interventions are successful ways to improve students' learning, if properly designed; and 3) SRL interventions have differential effects based on the students' educational level. At the first level, the multilevel sequence of self-regulatory development begins with the most extensive social guidance (e.g., observing and modelling), but it is systematically reduced as learners acquire self-regulatory skill (Zimmerman, 2013). Similarly, regarding VET, the contribution of individual assistance and support by more experienced co-workers has been acknowledged as a significant basis for learning at work (Billett, 2001; Virtanen et al., 2014).

Dignath and Büttner (2008) indicated that SRL can be promoted effectively at the secondary school level (35 studies) by giving students feedback about their strategic use, increasing their knowledge about strategies and the benefit of using them. They proposed that this occurs because secondary school students already dispose of a complex strategy repertoire resulting from their experience with strategic situations. Their meta-analysis also showed that SRL training programmes that focus on metacognition (e.g., problem-solving strategies and metacognitive reflection) revealed the highest effect sizes. When learners become self-directed, personal influences are mobilised to strategically regulate both behaviour and the immediate learning environment (Zimmerman, 1989). However, Jossberger et al. (2010) suggest that while SRL is focused on the micro level that deals with the execution of a task, self-directed learning (a concept prevalent in adult education) is situated at the macro level and refers to the planning of the learning trajectory (p. 419): "a self-directed learner is able to decide what needs to be learned next and how one's learning is best accomplished". Thus, although SRL can help learners to develop both knowledge and skills more effectively, a self-regulated learner does not have to be self-directed at all, and consequently, using self-regulatory processes will not automatically produce high levels of performance (Jossberger et al., 2010).

To exemplify some empirical SRL studies concerning VET in the Netherlands, de Bruijn and Leeman's (2011) 11 case studies in the technical domain, including

observation of lessons and interviews with teachers and students in vocational education, revealed that reflection by students on their results and learning strategies was missing, as was critical coaching as part of the teachers' guidance. Likewise, Khaled et al. (2015) undertook structured observations of vocational teachers' SRL-promoting strategies and students' SRL strategies in eight hands-on simulations as part of the vocational education curricula in the life sciences. They found that teacher strategies involving "modelling" and "scaffolding" were often used, while "giving attribution feedback" and "evaluation" were lacking. The student strategy, "proposing methods for task performance", was used regularly, while "goal setting" and "self-monitoring" were often absent. In Australia, Smith's (2000) research showed that eight apprentices (from the electrical, engineering, and hairdressing trades) interviewed for the study could be characterised by their low levels of self-direction, with a preference for hands-on practice and demonstration in socially constructed environments, and for learning environments that are well structured because of the learning materials and/or by the instructor. In the Finnish context, the lack of time, resources, and pedagogical approaches has been found to challenge workplace learning by hindering individual guidance and reciprocal workplace learning between students and experienced workers, and thus to provide fruitful learning environments for apprentices with strong self-regulatory skills (Pylväs et al., 2017). Furthermore, Finnish VET teachers from three vocational fields (social and healthcare, business and administration, and construction) self-reported having limited control over workplace learning to promote students' goal-oriented learning (Lehtonen et al., 2019). Overall, the increasing VET research on SRL addresses several targets for development.

Methods

Participants and Study Design

The interviews ($N=33$) were held in 2017 (see Table 1). The sample included apprentices ($n=15$, 45.5%) and students in school-based VET ($n=18$, 54.5%). Participants' selection was random. However, the participants were chosen to represent three different vocational fields to consider some of the variation among students in Finnish VET. Both *school-based VET* and *apprenticeship training* followed the same national qualification requirements and led to vocational upper secondary qualifications that aim to provide broad-based basic vocational skills for work in the field and more specialised skills in at least one specific area. During the data collection, which occurred before the reform of VET in Finland, school-based VET included on-the-job learning periods comprising about six months of the three-year study period. Apprenticeship training was mostly organised within the workplace, often including two days per month at a vocational school. The interviewed students in school-based VET were in their first year (business and administration) or second year of study (social and healthcare, construction). The apprentices had recently started their training, mainly in 2017.

Table 1 Overview of the Sample

Participants, Finnish VET students ($N=33$)	Social and healthcare	Business and administration	Construction	Total N (%)
Apprentices ($n=15$)				
Male n (%)	3 (9.1)	3 (9.1)	3 (9.1)	9 (27.3)
Female n (%)	4 (12.1)	1 (3.0)	1 (3.0)	6 (18.2)
Age M (SD)	38.9 (11.1)	24.5 (8.7)	20.5 (4.5)	30.1 (12.1)
Total n (%)	7 (21.2)	4 (12.1)	4 (12.1)	15 (45.5)
Students, school-based VET ($n=18$)				
Male n (%)	1 (3.0)	1 (3.0)	5 (15.2)	7 (21.2)
Female n (%)	5 (15.2)	5 (15.2)	1 (3.0)	11 (33.3)
Age M (SD)	17.5 (0.5)	16.8 (0.4)	17.7 (0.5)	17.5 (0.8)
Total n (%)	6 (18.2)	6 (18.2)	6 (18.2)	18 (54.5)

To consider the variation between work environments (e.g., job description) and students (e.g., gender and socio-demographic information), the data collection was conducted in the fields of social and healthcare (male $n=4$, 12.1%; female, $n=9$, 27.3%), business and administration (male $n=4$, 12.1%; female, $n=6$, 18.2%), and construction (male $n=8$, 24.2%; female, $n=2$, 6.1%). In Finland, vocational qualifications are designed for both young people without upper secondary qualifications and adults already in the workforce (Ministry of Education and Culture, 2019). However, school-based VET is the pathway for most VET students, whereas apprenticeship is based on an employment relationship and has mainly been used by adults (Mazenod, 2016; Rintala & Nokelainen, 2019). Thus, the participants' ages ranged from 16 to 49 years, with a mean of 23.2 ($SD=10.3$). The participants in the school-based VET included young students aged between 16 and 19 years, whereas the apprentices varied from 16 to 49 years.

Semi-structured interviews served as the research method used in this study. All the participants were interviewed individually. The interviews lasted approximately from 30 to 60 min. Development of the interview instrument was based on earlier research modelling vocational expertise and excellence in work-based learning environments and empirically tested research instruments (e.g., Nokelainen et al., 2013; Pylväs & Nokelainen, 2017; Pylväs et al., 2017; Nokelainen, 2018). The interview instrument was pre-established in some respects, as it enabled the interviewer to focus the conversation on issues considered important to the research. The discussion themes from the interviewees focused on studying, learning, and instruction during VET. Questions such as "How do you learn the best?", "Do you prepare yourself for upcoming school or work assignments? How?", "Do you reflect on your performance? How?", and "How is your performance being monitored/evaluated during VET?" were posed to the participants. Even if the specific predefined questions were posed to the participants, they were free to emphasise those issues and focus the discussion on those learning contexts that they considered particularly important to their learning. Whereas interviewers and their questions set the background for the social interaction of the interview, so do the specific times and spaces within which the interview takes place, and in which the respondents bring

to the table their own interests, agenda, and biography (Warren, 2012). The semi-structured interview as the research method enabled the participants to discuss and qualitatively describe their own realities of learning in VET learning environments.

Analyses

The data analysis method was qualitative content analysis. Content analysis entails a research method for the subjective interpretation of the content of textual data through the systematic classification process of coding and identifying themes or patterns (Hsieh & Shannon, 2005). The semi-structured interviews were recorded and transcribed into text data. The data were processed using NVivo software, that is, organising data sources (creating categories) and managing coding, including counting numeric values of the coded references. The numerical accounts were indicated particularly for some main components of the three SRL phases, for instance, to indicate how many students reported participating or not participating in goal-setting. In addition, we identified those differences and similarities between the different groups of participants that stood out in the analyses. Otherwise, the results were based on qualitative descriptions.

The analyses followed the directed (or deductive) content analysis approach, in which the framework of the analysis is based on the existing theory (e.g., Hsieh & Shannon, 2005), the internationally acknowledged SRL theory. Rather than providing an analysis of the entire dataset, the aim of the analysis was to focus on a more nuanced account of the vocational students' learning experiences and on identifying those aspects of discussions considered meaningful parts to be reflected in SLR. The first author conducted the trial coding, modified the coding frame, and evaluated the quality of the coding process. The unit of analysis distinguished for coding was a meaningful piece of text in the interview transcript—here, a sentence or short/long narrative (Krippendorff, 2012; Schreier, 2014).

The coding frame comprised the three main categories following Zimmerman's (2000, 2013) cyclical SRL model, the three self-regulatory phases: *forethought, performance*, and *self-reflection*, followed by the subcategories and sub-subcategories. The data were coded under the main categories based on the SRL characteristics related to the three phases. The qualitatively different descriptions of learning processes, the more detailed themes that aroused in the discussion, were grouped together and conceptualised as subcategories. For example, a student's *strong internal motivation* (subcategory) about a vocational field was coded under the main category *forethought phase*, a student's *activeness in information retrieval* (subcategory) was coded under the main category *performance phase*, or a student's *experiences of reflecting on study performance together with school and work representatives* (subcategory) was coded under the main category *self-reflection phase*. The subcategories' role is to specify what was said in the data regarding the main categories (Schreier, 2014). To structure and deepen the analyses, some of the subcategories were further divided into the qualitatively different sub-subcategories. For example, a student's *external motivation* (subcategory) about a vocational field was devided into such sub-subcategories as *entering the labour market* or *family traditions and recommendations*.

The categorisation of the data was conducted by the first author. After modifying the categories, the examination of inconsistency in the major categories and subcategories was re-evaluated and revised. To meet the consistency criteria in the coding process, the categories were created to cover one aspect of the material to meet the requirement of un-dimensionality (Schreier, 2014). The validity of the analyses, the extent to which the findings adequately described the material and answered the research question, was evaluated initially by the first author but later also by the third author, who had thoroughly examined the data. The theoretical relationships in the categorising system were also discussed with the second author. All three authors drew the final conclusions based on the analysed data.

Results

Forethought

Motivation To answer the first part of the research question, we analysed the interview data to see how issues related to the forethought phase of SRL emerged from the Finnish VET students' responses. To address the issue of self-motivation used in preparation for the effort to learn, the participants were asked to describe their work/study career interests and thoughts in general. All the participants' ($n = 33$) intrinsic motivation for their vocational field and vocational development was apparent. The participants discussed their "professional drive" to develop their vocational skills and knowledge alongside working in the vocational field of their interest and appreciation. Moreover, the results indicated that workplace learning promoted the participants' cognitive engagement and motivation. According to the participants, authentic environments and hands-on experience particularly enhanced their motivational beliefs regarding their ability to learn vocational duties. The participants also acknowledged several workplace learning practices that they found most efficient in their vocational development.

> I learn much in practice, I have learnt, for example, to use the cash register pretty much in the situations in which a real customer came in, and I was behind the cash desk and [name of the colleague] was there by my side and gave me instructions. [School-based student, business and administration]

Some arguments ($n = 8$) regarding professional development and career choices were also based on externally driven motivation. Motivation for vocational development came from external driving forces, such as entering the labour market, making a living, or family traditions and recommendations. In addition, the participants justified their study and initiative concerning the pressure of learning new skills quickly or doing well at school or at work. For instance, a hectic work environment and the long working days in apprenticeship training combined with VET studies were considered to require one to take initiative and to cause stress for some participants.

> Well I usually feel nervous about all new situations and assessments […], and then I am always in a panic about those assessments; then they go well after all, so maybe it is….and I pretty much prepare those things such that I study them and think carefully. [School-based student, social and healthcare]

Goal Setting and Strategic Planning The participants were also asked to describe their learning goals and their experiences of setting learning goals. The goals that the participants discussed were mainly work task-specific goals or curriculum-related learning goals for VET. The findings indicated that approximately half of the participants ($n = 17$) had set their learning goals jointly with their teachers and/or workplace trainers, employers, and co-workers. According to those participants, setting learning goals was often included with systematic strategic planning of study or work progress by the person in charge in the school or workplace. In this group of participants, the common view was that they all acknowledged their own role in goal setting at some levels, including the social support that they considered having received.

> At the beginning of the [work-based learning] period, we had a kind of goal-setting discussion. A teacher from the school participated, the one who was responsible for work-based learning supervision. So, then we go through all the personal goals and plan the competence demonstration, how it will be in practice, and how to fulfil the criteria in this particular workplace. They want you to have your own goals, and, of course, it is a very good thing that they are asked for it, and you can think about your own development sites and goals and learning. [School-based student, social and healthcare]
>
> We do not really discuss in the workplace [about learning goals], but in the school we do. Only recently in the summer did we take a look at my progress. I personally reflect on myself very much. [Apprentice, social and healthcare]

Learning goals hailed both from external requirements and recommendations (e.g., curriculum, workplace requirements) and the participants' internal interests and objectives regarding vocational development. Some of the participants emphasised the role of school representatives in goal setting, whereas others discussed learning goals with their workplace representatives. No notable differences between the participants from school-based VET and apprenticeship training were found in the systematic planning of learning goals, even if there were several variations between the practical implementations in the participants' descriptions. However, even with the minor difference, more participants from social and healthcare ($n = 8$) than participants ($n = 3$) from business and administration emphasised their own involvement in setting learning goals during the training. Age did not seem to be the factor here, as those participants from social and healthcare were between 17 and 33 years old, and the participants from business and administration were between 17 and 46 years old. Some of the participants ($n = 16$) did not emphasise their own role in setting learning goals and strategic planning during the training. Those participants rather acknowledged the

role of their teachers or workplace representatives in setting study or work tasks that are needed to accomplish an assignment or training. Alternatively, some of the participants considered that their study progress or vocational development was not systematically planned or monitored by their instructors or themselves.

> No, it [study] has not been really planned in my opinion; it is only when you had to choose where you are going to do your [competence] demonstrations. [Apprentice, construction]
> I have always been a little bit lazy about learning at work. I do not really remember any goals, so I kind of just go on and try to pass it once I can. I do all the required written assignments. [School-based student, social and healthcare]

To reach the study goals or manage work tasks, the participants' introduced various strategic activities that they use for proactive planning of a learning or working task, such as information retrieval, going through and mentally preparing for the upcoming work/study task, or preparing oneself for a work interview, examination, or presentation. The participants described how they tried to prepare themselves for work situations by reading study material and notes and finding information from the internet. Some of them relied on the knowledge of experienced colleagues, whereas others focused on trying to get a full understanding of the authentic task that they would have to manage (e.g., visiting the construction site). The descriptions of proactive planning indicated the participants' awareness of vocational learning situations that require them to integrate theory and practice.

> Well, of course, I think things over if I can, or I have visited the construction site to see what needs to be done, and if it is something new, then I will think about how to carry out the field of work and do it effortlessly. [School-based student, construction]
> I go towards things spontaneously. Because of my personality, I kind of just start doing, and then...but of course I usually need to read some instructions or then just shout to another side of the room that "hey, has anybody got some time to help me". I do not know. I just start doing. [Apprentice, business and administration]

While most of the participants found proactive planning and independent learning enjoyable, a few ($n = 5$) provided information about not usually preparing themselves for an upcoming study or work task. Those participants' learning orientation to authentic work situations either relied on their work community and social support when facing new and challenging work situations, or they did not give any specific justification. A few of the arguments also acknowledged a preference for improvising in new situations.

Performance

Task Strategies and Self-Control The second part of the research question focused on the performance phase of SRL. The interview questions focused on learning process experiences and experiences of social support during learning. The participants discussed their experiences of authentic learning and guidance by describing how they usually executed work tasks that were new for them. While some of the participants preferred to listen first and model experts after seeing how things should be done, some of the participants highlighted the importance of learning by doing, through trial and error, yet with guidance from experts. Learning at work was often included with monitoring and reflecting on study or work success with the person in charge in the school or workplace after setting the learning goals. However, those participants who did not underline their own role in setting learning goals did not emphasise the importance of self-monitoring of their study progress.

> "I learn the best when someone shows me at first, and then I will start doing it…and then if someone is also monitoring if I am doing it right, that is how I learn the best. But if someone tells me how to do it, that is when I learn the worst, it is not working out." [School-based student, construction]

The importance of certain self-regulatory abilities on study/work performance and vocational learning, such as rehearsing (e.g., seeking information) ($n=19$), perseverance ($n=10$), self-confidence (courage to participate and perform practical skills) ($n=8$), motivation ($n=7$), concentration ($n=2$), physical and emotional state and energy ($n=2$), and time management ($n=1$), were specifically mentioned in the interviews. Approximately half of the participants ($n=15$) underlined their initiative and the importance of keeping themselves cognitively engaged in learning new things at work. They justified their self-instruction in the workplace by emphasising their motivation to learn new things. Some of those comments revealed how the motivated vocational students had also directed their own learning by environmental structuring. Learning in a work environment has encouraged them, for example, to be active in creating different kinds of learning situations and to gravitate social contacts beneficial for their vocational development.

> "Well, yes, I have invited myself for various physiotherapies in here to see it. When a dentist visited here, I also went there […] to ask a million questions about how he/she is doing this and that. And then, when our customers have gone to some medical equipment places, those centres to make some orders, I have invited myself also for those trips to learn something." [Apprentice, social and healthcare]

The learning activities that the participant reported applying regarding proactive planning can be considered to overlap those in the performance phase. For instance, several participants ($n=10$) discussed the efficiency and pleasantness of independent theory-learning sessions regarding their self-instruction during workplace learning and preparation. However, adding to self-motivation towards the learning

topic, the application of independent learning behaviour was also related to external expectations. The participants justified their self-control, independent studying and initiative regarding the pressure of learning new skills quickly or doing well at school or at work. For instance, a hectic work environment and the long working days in apprenticeship training combined with studying were considered to require one to take initiative and to cause stress for some participants.

> Yes, I do prepare myself independently because there will be nobody looking after you all your life anyway, and showing how things need to be done, so I think it is nice to prepare independently, and then when you notice that you are developing so that is nice. [School-based student, business and administration]

Help Seeking Many participants ($n=13$) in the study emphasised the contribution of individual assistance and support by their co-workers, the appointed workplace trainer, or the employer for their learning in authentic environments. Several participants also acknowledged the role of peer students ($n=8$), vocational teachers ($n=6$), or parents ($n=4$) for their learning. Only the students in school-based VET, all of whom were aged between 17 and 18, mentioned consulting with other students or parents. For those students, the support received from other students especially seemed to play an important role in their learning and in providing a safe and reliable social environment. Overall, adding to practical guidance, the participants acknowledged the significance of social support and positive feedback for their learning and study success/work success.

> Well, I guess I first ask [for help from] my student friends and then, or if there isn't any, […] or they don't have the expertise, then I will ask a teacher. [School-based student, construction]
> I learnt much from those third-year students when they told me some things as they have been studying for a longer time. So, they told me all kinds of things, how to do this and that, and then I learnt it very well when I had a chance to do it myself. [School-based student, business and administration]
> Well I have learnt through errors and then, though older workers' [name of the professional status] taunting, so that has also been the way of… But then I wish that they would give some guidance about…and that they were explicit […] It's because I don't have the same work experience as they have. [School-based student, construction]

In workplaces, asking questions and seeking potential learning situations were emphasised more by the apprentices ($n=11$) than by the students in school-based VET ($n=4$). The apprentices discussed learning by themselves and actively sought help if needed. This seemed to stem from apprentices' role in the workplace as employees rather than as a student. For instance, some apprentices ($n=4$) in social and healthcare felt that the role of the learner was sometimes forgotten, and actual skills and competence contradicted expectations or that an introduction to the work was lacking. A few of the comments ($n=5$) revealed that insufficient guidance was

available in the workplace, that the instruction available was inconsistent, or that it was insufficient.

Self-reflection

Self-Reflection Processes The third part of the research question focused on examining the self-reflection phase, self-reflection of learning performance, and attributions of causality regarding learning outcomes. Analysis of the interview data revealed that a little more than half of the participants ($n = 19$) reported that they usually reflected on their successful or unsuccessful learning/working tasks with their teachers or peers. Whether based on formal evaluation procedures and official meetings or unofficial reflective discussions, the participants described the processes quite similarly: The discussions included students' self-reflection or evaluations of their learning outcomes that led to improved strategic planning to enhance performance for the future. The other part of the participants ($n = 14$) did not report taking a stand on reflective discussions at school or in workplaces systematically.

> Well, we'll [the student and colleagues) start thinking about how to succeed next time, of course. We'll start with a construction idea about how to do it better and what it will take. Well, of course, at first, we'll think over what was the reason why it failed and reconsider it through that. [Apprentice, construction]

Furthermore, the results implied that in many cases ($n = 19$), social reflection and support played an important role in raising participants' confidence in their ability to succeed in academic and work tasks and in promoting their perceived self-efficacy. Social support had led to the attributions that generated positive self-reactions; facing failures assisted by experienced workers or teachers was considered to improve later performances by the participants. Furthermore, enhanced self-confidence occurred as a positive attitude to learning. In addition, since social support seemed to both strengthen participants' self-efficacy, it also helped some participants to overcome low self-efficacy and provided them with new perspectives to see themselves as learners.

> I guess I have done my work well. At least, I think so. I have doubted it myself though. I asked my supervisor if s(he) is really sure now, that I feel that I don't deserve this but then s(he) justified it to me and told me why I have deserved it. Well, it did give me some self-confidence. [School-based student, social and healthcare]

Attributions of Causality In general, the participants' attributions of causality regarding their successful and unsuccessful performance and outcomes during VET included both thoughts of personal control alongside uncontrol over their performance and environment. Many of the participants ($n = 21$) argued that their unsuccessful

performances had occurred because of environmental factors, such as a lack of social support, misleading communication, insufficient information, or a hectic work schedule. However, several participants also considered intrinsic factors, the lack of practice/experience ($n=10$), problems with concentration ($n=7$), and low physical and emotional state and energy ($n=8$), as reasons for their performance/outcomes. A few attributions of causality were related to such uncontrollable conditions as the nature of work tasks or the work environment ($n=2$), natural (inborn) giftedness ($n=1$), and coincidence ($n=1$). Consequently, even if the participants acknowledged their self-control over their performance, unsuccessful performances were often considered to be caused by uncontrollable environmental factors.

Limitations

We acknowledge that there are limitations in this study. First, this study's results identified vocational student learning experiences both between and within school-based VET and apprenticeship training. Since the reform of Finnish VET was implemented in 2018, the current Finnish VET does not distinguish between modes of learning as strictly as it did during the time the data were collected. Nevertheless, what has not changed is that some of the vocational paths still include significantly more workplace learning than others, and that still justifies results comparing apprenticeship training and school-based VET. However, more data are needed on current student experiences of present competence-based VET that more strongly highlight the importance of students' SRL. Second, note that the participants in this study varied in age from 16 to 49, with the students in school-based VET being younger ($M=17.5$, $SD=0.8$) than the apprentices ($M=30.1$, $SD=12.1$). In addition, the standard deviations show the participants' major age differences within the selected vocational fields. When reporting the results, the participants' ages were discussed in those sections in which it was considered particularly relevant. However, when interpreting any of the research results, one needs to consider that the participants' life experiences and professional backgrounds may have influenced the way they discuss learning and professional development.

Another limitation is the small number of participants and the diversity of respondents (e.g., genders, vocational fields, work experience). Consequently, more comparative and perhaps narrative analyses of diverse groups of participants probably induced new perspectives on the data. Supplementing interviews with other kinds of data (e.g., SRL surveys) would have also strengthened this study's results. However, instead of drawing in-depth conclusions on the differences between the groups of participants or using larger datasets (e.g., survey data), the data sample used in the current study was included in the chosen research to develop an initial understanding of VET learning from a student perspective in general. Based on Gobo's (2004) idea of social representativeness, instead of observing the number of participants and generalising the findings, the aim of the study was to observe the relationships between the variables describing the general structures of the topic that can be reflected in other cases. Finally, it needs to be acknowledged that the research method always captures only one perspective on the research topic, and every

method has its limitations. As an integral part of qualitative research, it is always possible that there are alternative interpretations between the participants and the researcher that require consideration. For instance, the analyses would undoubtedly have benefited from the intercoding process. However, while an interviewer(s) may try to be systematic and objective, the constraints of everyday life will be a part of whatever transactions he or she initiates (Cohen et al., 2000).

Discussion and Conclusions

In this study, we examined vocational students' perceptions of SRL in work-based settings regarding Finnish VET. The findings were based on the participants' self-reported thoughts and experiences of VET learning and vocational development that were reflected against cyclical SRL theory (e.g., Zimmerman, 2000, 2013). The qualitative interview data revealed certain SRL strategies that guided the participants' efforts to learn. First, the results indicated that many of the vocational students had taken the initiative to set goals, implemented strategic planning, and monitored their own performance jointly with their teachers or co-workers. Second, several vocational students discussed the study/work tasks that they had regulated proactively by deepening both their theoretical and practical knowledge before the actual performance. Some students' self-motivation also encouraged them to modify their work environmental conditions (being active in creating different kinds of learning situations and gravitating social contacts beneficial for their vocational development) to be more favourable for their own learning. However, the self-reports also revealed some shortcomings in the students' SRL behaviour. The disconcerting finding was that some students' self-reported personal initiative, particularly in goal setting and self-monitoring alongside the environmental support they received, was quite limited in some cases, or even absent.

The results indicated that learning at work and authentic learning tasks promoted cognitive engagement and motivation among VET students. In addition, the participants acknowledged their "professional drive" to develop their vocational skills and knowledge alongside working in the vocational field of their interest and appreciation. For some vocational students, a hectic work environment and the long working days in apprenticeship training combined with VET studies can make one to take initiative. Overall, the vocational students acknowledged the importance of several self-regulatory abilities and physical and emotional states on study/work performance, learning and vocational development in work-based VET. Furthermore, the results from the current study underlined the importance and availability of social support and positive feedback from VET teachers and workplace trainers/co-workers to vocational students' performance, alongside their self-efficacy.

Our results revealed the processes of SRL regarding Finnish VET. The results also allowed for some comparisons among international empirical VET studies on self-regulated learning. Some of the earlier empirical studies painted a rather challenging picture of VET students as learners: they have a low level of self-direction and reflection, and they seek well-structured learning materials and environments (e.g., de Bruijn & Leeman, 2011; Khaled et al., 2015; Smith, 2000). Our findings

do not fully resonate with this. Although some of the Finnish students interviewed could be described in this way, most of the students clearly self-reported their ability (or their striving) to regulate their learning in different learning situations. Earlier studies by Smith (2000) and de Bruijn and Leeman (2011) also indicated that VET students look for clearly formulated and teacher-led learning episodes. This finding was partially supported in this study, as many of the students emphasised their preference for authentic learning tasks and guidance from experts—that is, their teachers or experienced co-workers in the workplace. Dissonance in findings with de Bruijn and Leeman's (2011) study may be due partly to its focus on technical fields and longer (four year) study programmes. Although there is a match between the Finnish and the Netherlands systems for qualification levels (4/5 EQF), comparability of the findings may be partly hindered by the differences in VET implementations. Reasons explaining the results that differ from those from the Smith (2000) study may be because his study was based on a cross-sectional survey regarding the Australian VET system and with a sample dominated by apprenticeship and technology students. Instead, Jossberger et al.'s (2020) study, which focused on exploring well-performing students' SRL behaviours in vocational education and training, properly agreed with the current research. For instance, although the well-performing vocational students engaged in self-regulation, their self-regulating behaviours were led by a combination of hands-on activities and evolving work outcomes rather than elaborated plans to regulate their learning behaviours. Moreover, students experience no distress in help-seeking (Jossberger et al., 2020). However, as the sampling in this study was not selective regarding study success, the limited SRL behaviour in some cases was clearer. Furthermore, a limited sample of self-reports, including the differences between the participants' vocational fields, age groups, and students from different training models, appears imperative when interpreting the current findings regarding actualised SRL behaviours.

SRL is one of the major areas of research in educational psychology and also a current interest of research in the area of workplace learning. Overall, this study's results parallel the earlier results regarding SRL and work-based learning because, according to the participants, self-regulatory processes included with sufficient social support were in the key roles enhancing students' learning and work performance alongside their self-efficacy. A meta-analysis of SRL in work-related training has shown that promoting SRL benefits learners, as "most of the self-regulatory processes exhibited positive relationships with learning, goal level, persistence, effort, and self-efficacy having the strongest effects. Together, these four constructs accounted for 17% of the variance in learning after controlling for cognitive ability and pre-training knowledge" (Sitzmann & Ely, 2011, p.438). Although SRL models provide a quite specific picture of their processes, there is still need to understand SRL mechanisms more precisely (Panadero, 2017). For instance, the fact that in this study, in many cases, social reflection and support played such an important role in raising participants' confidence justifies the need for more research in the future on regulating behaviour between students and their social environment. In sociocultural theories of workplace learning, learning is viewed a process that is located within the framework of participation (Hager, 2011). Hovever, by enhancing empirical research on collaborative models of SRL, more knowledge of cognitive processes

in person-person workplace interaction can be provided for using VET educators to versatile the processes of SRL in work communities. In their review study, Hökkä et al. (2019) also remind the potential of wider use of different paradigms on workplace learning (p.17): "For understanding learning at work, participatory practices can, and often are expected to, yield knowledge creation and innovation. Similarly, self-directedness at work is supposed to foster participation in (collective) appropriate learning activities in working contexts." Observation studies, for example, could enable a deeper understanding of SRL practices and social interaction in authentic learning environments that all form a unique social environment and learning context.

In this study, it is apparent that the participants' major age differences and experiential background may have influenced the way they viewed learning and working. Based on the available meta-analytic evidence, Panadero (2017) underlines that even if the SRL models form an integrative and coherent framework from which to conduct research and on which students can be taught to be more strategic and successful, there are differential effects of SRL models considering differences in students' developmental stages or educational levels. Compared to young students, adult students have gained a more extensive individual study and work history that emphasises the need for a long-term perspective on how they have approached learning earlier, and how their learning skills can be developed or updated in the future. Based on their recent research, Karlsson et al. (2021) have also shown that in addition to the adult student's specific life situation, there are a variety of rationalities behind the choice of pathway, including previous experience, self-perception with regard to both prerequisites and possible futures, and advice from external parties. Consequently, in the future research, using and developing SRL approaches will require not only careful consideration of their applicability to workplace learning but to the various types of learners in workplaces.

Funding Open Access funding provided by University of Helsinki including Helsinki University Central Hospital. No funding was received to assist with the preparation of this manuscript.

Declarations

Competing of Interest The authors have no competing interests to declare that are relevant to the content of this article.

References

Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes, 50*(2), 248–287.

Billett, S. (2001). Learning through work: Workplace affordances and individual engagement. *Journal of Workplace Learning, 13*(5), 209–214.

Cohen, L., Manion, L., & Morrison, K. (2000). *Research methods in education*. Routledge.

de Bruijn, E., & Leeman, Y. (2011). Authentic and self-directed learning in vocational education: Challenges to vocational educators. *Teaching and Teacher Education, 27*(4), 694–702.

Dignath, C., & Büttner, G. (2008). Components of fostering self-regulated learning among students. A meta-analysis on intervention studies at primary and secondary school level. *Metacognition and Learning, 3*, 231–264.

Federici, R. A., & Skaalvik, M. E. (2011). Principal self-efficacy and work engagement: Assessing a Norwegian Principal Self-Efficacy Scale. *Social Psychology of Education, 14*, 575–600.

Gobo, G. (2004). Sampling, representativeness and generalizability. In C. Seale, G. Gobo, & J. F. Gubrium (Eds.), *Qualitative research practice* (pp. 405–426). SAGE Publications Ltd.

Gordijn, J., & Nijhof, W. J. (2002). Effects of complex feedback on computer-assisted modular instruction. *Computers & Education, 39*, 183–200.

Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277–1288.

Hager, P. (2011). Theories of workplace learning. In M. Malloch, L. Cairns, K. Evans, & B. N. O'Connor (Eds.), *The SAGE handbook of workplace learning* (pp. 17–32). SAGE Publications Ltd.

Hökkä, P., Vähäsantanen, K., & Paloniemi, S. (2019). Emotions in learning at work: A literature review. *Vocations and Learning, 13*, 1–25. https://doi.org/10.1007/s12186-019-09226-z

Jossberger, H., Brand-Gruwel, S., Boshuizen, H., & van de Wiel, M. (2010). The challenge of self-directed and self-regulated learning in vocational education: A theoretical analysis and synthesis of requirements. *Journal of Vocational Education and Training, 62*(4), 415–440.

Jossberger, H., Brand-Gruwel, S., van de Wiel, M. W. J., & Boshuizen, H. P. A. (2020). Exploring students' self-regulated learning in vocational education and training. *Vocations and Learning, 13*, 131–158.

Karlsson, T., Muhrman, K., & Nyström, S. A. (2021). Path towards a possible future – Adult students' choice of vocational education. *Vocations and Learning*. https://doi.org/10.1007/s12186-021-09280-6

Khaled, A., Gulikers, J., Biemans, H., & Mulder, M. (2015). Occurrences and quality of teacher and student strategies for self-regulated learning in hands-on simulations. *Studies in Continuing Education, 38*(1), 101–121. https://doi.org/10.1080/0158037X.2015.1040751

Krippendorff, K. H. (2012). *Content analysis: An introduction to its methodology* (3rd ed.). SAGE Publications.

Mazenod, A. (2016). Education or training? A comparative perspective on apprenticeships in England. *Journal of Vocational Education & Training, 68*(1), 102–117.

Lehtonen, E., Rintala, H., Pylväs, L., & Nokelainen, P. (2019). Ammatillisten opettajien näkemyksiä opettajan työssä tarvittavasta kompetenssista ja työelämäyhteistyöstä. *Ammattikasvatuksen aikakauskirja, 20*(4), 10–26.

Ministry of Education and Culture. (2019). *Qualifications and studies in vocational education and training*. Retrieved from https://minedu.fi/en/qualifications-and-studies_vet

Nokelainen, P. (2018). Modeling the characteristics of vocational excellence: A case study with Finnish WorldSkills competitors. *Talent Development and Excellence, 10*(19), 15–30.

Nokelainen, P., Stasz, C., & James, S. (2013). What contributes to vocational excellence? A pilot study of the individual characteristics of the WorldSkills UK 2011 squad (SKOPE Research Paper No. 118). SKOPE Publications, University of Oxford.

Panadero, E. (2017). A Review of Self-regulated Learning: Six Models and Four Directions for Research. *Frontiers in Psychology, 8*, 1–28. https://doi.org/10.3389/fpsyg.2017.00422

Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review, 16*(4), 385–407.

Pylväs, L., & Nokelainen, P. (2017). Finnish WorldSkills achievers' vocational talent development and school-to-work pathways. *The International Journal for Research in Vocational Education and Training (IJRVET), 4*(2), 95–116.

Pylväs, L., Nokelainen, P., & Rintala, H. (2017). Finnish apprenticeship training stakeholders' perceptions of vocational expertise and experiences of workplace learning and guidance. *Vocations and Learning, 11*(2), 223–243.

Rintala, H., & Nokelainen, P. (2019). Vocational education and learners' experienced workplace curriculum. *Vocations and Learning, 13*(113–130).

Schreier, M. (2014). Qualitative content analysis. In U. Flick (Ed.), *The Sage handbook of qualitative data analysis* (pp. 170–183). Sage.

Sitzmann, T., & Ely, K. (2011). A Meta-Analysis of Self-Regulated Learning in Work-Related Training and Educational Attainment. *Psychological Bulletin, 137*(3), 421–442. https://doi.org/10.1037/a0022777

Smith, P. J. (2000). Preparedness for flexible delivery among vocational learners. *Distance Education, 21*(1), 21–48.

Smith, P. J. (2003). Workplace learning and flexible delivery. *Review of Educational Research, 73*(1), 53–88.

Virtanen, A., Tynjälä, P., & Eteläpelto, A. (2014). Factors promoting vocational students' learning at work: Study on student experiences. *Journal of Education and Work, 27*(1), 43–70.

Warren, C. (2012). Interviewing as social interaction. In J. F. Gubrium, J. A. Holstein, A. B. Marvasti, & K. D. McKinney (Eds.), *The SAGE handbook of interview research: The complexity of the craft* (pp. 129–142). Sage. https://doi.org/10.4135/9781452218403

Zeidner, M., Pintrich, P. R., & Boekaerts, M. (2005). *Handbook of Self-Regulation*. Academic Press.

Zimmerman, B. J. (1989). A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology, 81*(3), 329–339.

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational Psychologist, 25*(1), 3–17.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekarts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13–39). Academic Press.

Zimmerman, B. J. (2001). Theories of self-regulated learning and academic achievement: An overview and analysis. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (2nd ed., pp. 1–38). Erlbaum.

Zimmerman, B. J. (2013). From cognitive modeling to self-regulation: A social cognitive career path. *Educational Psychologist, 48*(3), 135–147.

Zimmerman, B. J., & Campillo, M. (2003). Motivating self-regulated problem solvers. In J. E. Davidson & R. Sternberg (Eds.), *The nature of problem solving* (pp. 233–262). Cambridge University Press.

Dr. Laura Pylvas Is a Postdoctoral researcher in the University of Helsinki, Finland. Her research interests include professional and vocational expertise, regulation of learning, and workplace learning.

Dr. Petri Nokelainen Is a Full Professor of Engineering Pedagogy in the Tampere University, Finland. His research interests include development of professional and vocational excellence (self-regulation, competence) and engineering higher education (regulation of learning and active learning methods).

Dr. Heta Rintala Is a Principal Research Scientist (tenure track) at Häme University of Applied Sciences, Hämeenlinna, Finland. She works as a researcher and developer at HAMK Edu Research Unit and in the field of VET with a specific interest in the VET system and work-based learning.