ASPIRING BEAUTICIANS' SELF-REGULATED LEARNING: AN EXAMINATION OF REGULATION ACTIVITIES AND CONCEPTIONS OF LEARNING IN AN ON-DEMAND EDUCATIONAL PROGRAM

Master Thesis

Figure 1. Background self-regulated learning (Quigley, Muijs, & Stringer, 2018).

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Abstract

In Vocational Education and Training (VET), teachers have increasingly moved towards on-demand education based on the idea of learner-controlled activity selection. Being a self-regulated learner is a prerequisite to function effectively in an on-demand learning environment since VET students are required to choose learning activities according to their personal learning needs. This indicates that the student must be proactive in his effort to learn and is guided by personal set goals and learning strategies. These strategies students use to learn are regulated by metacognitive strategies, which are in turn influenced by students' views and beliefs about learning, called learning conceptions. What the students are doing (learning strategies) and why they think they are doing it (learning intentions) may change if a context changes. Currently, little is known of how aspiring beauticians manage to regulate their learning and how their learning conception influences their approach to learning in this new on-demand learning program. Therefore, the goal of the present study was to explore this relationship and a mixed method design was used to gather cross-sectional data from 65 students about their learning conceptions and self-regulation activities. Before and after reflecting on learning experiences students' learning conceptions were explored with the Conceptions of Learning Inventory to categorise them as having a deep or surface conception of learning. In addition, the Learning Moments questionnaire was conducted to determine a certain degree of self-regulation to which students used various learning strategies when reflecting on multiple learning experiences. It was expected that students with deep conceptions of learning showed a higher degree of self-regulation than students with surface conceptions of learning. However, the relation turned out to be more complex than has been suggested in the literature. Before reflecting on multiple learning experiences, a negative relationship was found between students who saw learning as the development of social competence, which refers to a deep learning approach, and their degree of self-regulation. This relationship was no longer present after reflecting on multiple learning experiences. Students themselves indicated that their participation in the present study aided them to be more aware of their experiences in the past and how they actually learn. Therefore, VET could offer students more opportunities to become aware of what they actually learned after the performance of a self-chosen learning activity. It is also recommended for VET to support the development of SRL skills with tools such as reflection reports and (digital) portfolios which enhance becoming aware of personal strengths and weaknesses in on-demand learning environment.

Keywords: learning conceptions, on-demand, secondary vocational education, self-regulated learning

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1. Introduction

In today's education it is paramount to adapt education to students' learning needs to address personal differences such as diversity in prior knowledge. As Kicken, Brand-Gruwel, and Merriënboer (2009) point out, on-demand education is increasingly introduced to address the differences between students. The on-demand approach enables students to choose authentic learning activities according to their personal learning needs (Taminiau et al., 2014). This approach offers students the opportunity to plan their own learning trajectory by providing them with a certain amount of liberty to choose a particular learning activity within the curriculum during class (Kicken et al., 2009). The learning activity can be performed both within and outside the classroom, depending on the goal of the activity.

Many Vocational Education and Training (VET) schools have recently implemented on-demand education which should attract, inspire and challenge VET students to acquire knowledge, learning skills and attitude relevant for their future profession (Jossberger, Brand-Gruwel, Boshuizen, & Van de Wiel, 2010). Likewise, a VET school located in the eastern part of the Netherlands introduced an on-demand educational program for aspiring beauticians, offering them the opportunity to decide for themselves which competences within the curriculum they prefer to develop during class. For instance, managing a salon or maintaining health, hygiene, skin and beauty care. Students choose a learning activity in which they either practice in dyads, on each other or on models. Additionally, they learn from multiple sources of information and various contexts to become better beauticians in an authentic way such as the activity to watch a vlog, communicate with a professional, read a blog or do an internship for a day. Through this wide range of activities, students are given the opportunity to learn both inside and outside the classroom. According to Lage, Platt, and Treglia (2000), learning activities that take place outside the classroom are frequently authentic, hands-on, interactive and enrich educational experience by showing real-life applications of theories that students are learning at school and build on classroom learning to prepare aspiring beauticians for life beyond school.

Since the control over the selection of learning activities is given to the VET students and they are increasingly required to make their own study decisions addressing personal differences, they must be able to work independently and be aware of the learning strategies they use to learn (Vrieze, Van Kuijk, & Van Kessel, 2001). This puts emphasis on self-regulation. A self-regulated student is proactive in his effort to learn and is guided by personal set goals and learning strategies (Quigley, Muijs, & Stringer, 2018). These strategies students use to learn (e.g. focussing attention on a learning activity) are regulated by metacognitive strategies, which are in turn influenced by students' views and beliefs about learning, called learning conceptions (Vermunt, 1996; Vermunt & Donche, 2017). This indicates that conceptions of learning are considered to influence how students approach learning activities. The deep approach correlates with an intention to understand something that is complicated or unusual, whereas the surface approach correlates more with memorization and task completion (Vermunt, 1996). Most often self-regulation is related to having a deep conception about learning and external regulation to having a surface conception about learning (Lonka & Lindblom-Ylänne, 1996).

Despite of the potential benefits of the on-demand educational program (Kicken et al., 2009), difficulties arise when on-demand education does not function optimally. Teachers often incorrectly assume that students already possess self-regulated learning skills, or that they will simply these skills by just using the new curriculum which requires them to regulate their own learning process (Levet-Jones, 2005). However, setting up an on-demand learning curriculum does not automatically lead to the development of self-regulated learners (Evensen, Salisbury-Glennon, & Glenn, 2001). Learning in an on-demand learning environment requires different skills than a teacher-directed approach in

which teachers assess students' performance and select appropriate tasks for them. Since the teacher is not anymore largely in control of the content and course of lesson, students must become more active and responsible for their learning, set goals for themselves, compete expected tasks and review their completed task to determine what they have learned (Zimmerman, 1989).

In sum, being a self-regulated learner is a prerequisite to function effectively in an on-demand learning environment (Kicken, 2008). This means that the student has both the intention to understand something (learning intention) and is guided by personal set goals and learning strategies. However, learning approaches seem to be context-dependent (Case & Marshall, 2004). What the students are doing (learning strategies) and why they think they are doing it (learning intentions) may change if a context changes (Endedijk, Brekelmans, Sleegers, and Vermunt, 2016). In other words, a student may also approach learning in different ways from one context to another. For instance, the same student may adopt a surface approach to learning in the theorical course and a deep approach in the practical course. It is not clear yet how aspiring beauticians manage to regulate their learning and how their learning conception influences their approach to learning in this new on-demand learning program. In the present study, both the learning conceptions as well as self-regulation activities will be examined. Students' regulation activities across multiple learning experiences will be used to obtain insights into their learning strategies. The results contribute to the understanding of how and to what extent VET students regulate their learning in an on-demand learning environment. The results also contribute to the understanding of the concept self-regulation in a relatively new context on-demand education where learners need it most since they need to plan their own learning trajectory and due to the absence of a teacher-directed approach.

2. Theoretical framework

2.1 On-demand approach in education

In many traditional educational programs, all students are engaged in compulsory activities within the classroom, despite their diverse levels of knowledge and skills. Learning activities are imposed upon students regardless of their ability, interests and motivation which has a negative effect on students' learning and performance (Van Merriënboer & Kirschner, 2007). Additionally, the learning activities on school and work were not sufficiently linked to one another (Jossberger, Brand-Gruwel, Boshuizen, & Van de Wiel, 2010). The ministry saw competence-based education as the solution to attract, inspire and challenge students to learn for their vocational profession. As a consequence, vocational programs had to be competence-based since August 2010 (Jossberger et al., 2010). Educational programs were replaced by internships and more authentic learning environments at Vocational Education and Training (VET) schools. Therefore, Kicken et al. (2019) state that on-demand educational programs in VET are becoming increasingly popular because it addresses the uniqueness of students' individual learning needs. On-demand education represents a learner-controlled approach which offers students the opportunity to plan their own learning trajectory by providing them with a certain amount of liberty to select particular learning activities within the curriculum, which can be executed both inside and outside the classroom (Kicken et al., 2009). For instance, during class, one student may proceed from a self-chosen learning activity to another with limited support of the teacher because the student does not need it, while another student may need more time for one self-chosen learning activity with additional support of the teacher. Addressing students' learning needs will lead to more effective preparation of producing informed decisions for lifelong learning in their future employment (Richards, Brown, & Forde, 2007). According to Hartley (2000), the on-demand approach is associated

with the students' role in determining what they want or need to learn at any given time. Students' responsibility to create their personal learning trajectory might be expected to have positive effects on their intrinsic motivation (Boekaerts & Martens, 2006). This is in line with Knowles (1975), who states that learners who take initiative in learning learn better and more purposeful. However, the effectiveness of on-demand programs has not been established consistently by empirical research (Levett-Jones, 2005; Niemiec, Sikorski, & Walberg, 1996). As Kicken (2008) points out, students' ability to regulate their own learning process should be taken into account since students are increasingly required to make their own study decisions to address personal differences.

2.2 Self-regulated learning

Self-regulation represents the extent to which learners are aware of their strengths and weaknesses and the strategies they use to learn (Quigley, Muijs, & Stringer, 2018). It explains how learners can motivate themselves to engage in learning and develop strategies to improve their learning process (Quigley et al., 2018). For instance, by taking notes or allocating time and resources. Zimmerman (1989) offered a helpful description of what a self-regulated learner should look like; an effective self-regulated learner should be proactive in his effort to learn since the learner is aware of personal strengths and weaknesses and is guided by a personal set goals and learning strategies. The learner should also able to monitor their behaviour in terms of goals and self-reflection. Zimmerman's (1989) definition of a self-regulated learner is in line with Pintrich (2000), who provided one of the most commonly cited and extensive definitions of self-regulated learning (SRL), as an "active, constructive process whereby learners set goals for their learning and attempt to monitor, regulate and control their cognition, and behaviour, guided and constrained by their goals and contextual features in the environment" (p. 453). Both definitions are based on the social cognitive theory meaning that learning occurs in a social environment and is determined by the reciprocal interactions among personal, behavioural and environmental influences (Schunk, 2004). This stresses the idea that much learning occurs in a social environment. For instance, acquiring new skills by observing other people.

SRL can be broken into three parts which are paramount to becoming an effective self-regulated learner, namely *cognition, metacognition* and *motivation*. C*ognition* refers to mental processes by which learners construct knowledge (Quigley et al., 2018). For instance, an aspiring beautician who learned for a theory test by thinking for various mnemonics and creating a word web. Secondly, *metacognition* addresses learners' awareness of their learning and their ability to monitor and control any aspect of cognition (Alexander & Loughlin, 2008). For example, the aspiring beautician recognised why using mnemonics and word webs were adequate tools because she was able to answer most of the questions during the test. Lastly, *motivation* refers to learners' intrinsic willingness to engage metacognitive and cognitive skills (Barak, 2010; Quigley et al., 2018). For instance, after the test the aspiring beautician was confident of her success and convinced herself to accept the challenge to create more word webs for the next test and answer even more questions correctly.

The focus of the present study is laid on *metacognition* to find out how aspiring beauticians monitor, direct and review their learning in an on-demand learning environment. However, Alexander and Loughlin (2008) came to the conclusion through their review that metacognition represents an overarching term for two separate classes. Endedijk, Brekelmans, Sleegers, and Vermunt (2016) called the two classes the stable and dynamic part of SRL. The stable part of SRL refers to learners' metacognitive knowledge. This knowledge involves monitoring and reflecting on personal current and recent thoughts (Alexander & Loughlin, 2008). The stable part of SRL is also defined as learners' combination of their conceptions of learning and preferences for certain regulation activities (Endedijk

et al., 2016). The dynamic part of SRL refers to metacognitive regulation. This regulation occurs when learners consciously adapt and manage their thinking strategies during purposeful thinking activities (Alexander & Loughlin, 2008). The dynamic part of SRL is also defined as the learners' combination of regulation activities as performed in concrete learning experiences, also called self-regulation activities (Endedijk et al., 2016). The present study will focus on both the dynamic stable part of SRL.

2.3 Dynamic part of SRL: self-regulation activities

According to Zimmerman (2000), self-regulated learners engage in actions, thoughts and behaviours in order to pursue determined learning activities. They do so by personal goal setting and learning strategies (Zimmerman, 1989). For instance, a strategy to learn could be to create mnemonic devices when learning facts. This are tools learners can use to help remember things more easily. Pintrich (2000) and Zimmerman (2000) describe three phases of self-regulation including underlying sub-processes that involve both behavioural and environmental self-regulation (Jossberger et al., 2010). The phases are cyclical since each sub-process within a phase of self-regulation influences the following one (Zimmerman, 2000). As Kitsantas and Dabbagh (2010) observed, the phases are useful in the acquisition of self-regulation skills. It reinforces learners' beliefs in their ability to control aspects of the learning experience towards a desired result. Research has indicated discrepancy in the phases between learners who show a high or low degree of self-regulation when using various strategies (Jossberger et al., 2010). A summary of the phases within the Zimmerman cyclical model follows.

2.3.1 Forethought phase

This initial phase can be described as the planning beforehand, in which the learner plans the steps to be taken for a learning activity and before the performance begins (Reis, 2004). In advance, self-regulated learners decide for themselves which competences within the curriculum they prefer to develop during class. According to their personal learning need they choose a learning activity. Subsequently, self-regulated learners analyse the learning activity, map out the task to minimalize the unknown, make plans and choose strategies (*strategic planning*) (Zimmerman, 2000). Thereafter, Goals will be chosen which match the chosen strategy for achieving the goal (*goal orientation*) (Jossberger et al., 2010). Students' ability to properly execute this phase depends on their intrinsic motives for accomplishing that set of goals and their belief in their innate ability to achieve these goals (*self-efficacy*) (Reis, 2004). Self-assessment or self-observation affect students' abilities to both set goals and maintain self-efficacy (Schunk, 1990).

According to Jossberger et al. (2010), learners with a high degree of self-regulation apply specific hierarchical goals that focus on learning. For instance, an aspiring beautician is enthusiastic about the self-chosen learning activity to conduct an interview with a professional. Because it is a challenging activity, she decides to start off with gathering information about the topic. Thereafter, she writes down a time schedule so that she knows what needs to be done first. As Zimmerman (1998) points out, learners with a high degree of self-regulation perceive themselves to be more self-initiated and they report significantly greater intrinsic interest in learning activities. In contrast, research reveals that learners who show a low degree of self-regulation during the forethought phase start the learning activity with unspecific goals that focus on performance aspects (Jossberger et al., 2010).

2.3.2 Performance phase

The second phase refers to performance control within the learner and different strategies merged to control their performance (*learning strategy control*) (Schunk & Zimmerman, 1998). A strategy refers to monitoring the learning results, because self-monitoring updates the learner about their progression in performing a set of tasks (*monitoring of the learning results*). Another strategy is based on how learners focus their attention since they must take distractions in their learning environment into account (Schunk & Zimmerman, 1998). According to Paris and Winograd (2001), for students it is of importance to determine whether or not they are being distracted or interrupted. The ability to recognise when they are being distracted and then drawing on strategies to bring focus back to their immediate learning is an important skill in the performance phase (Paris & Winograd, 2001).

Learners who show a high degree of self-regulation during the performance phase are able to focus their attention on the learning activity in question and are therefore more likely to use systematic techniques and monitor this process (Zimmerman, 1998). For instance, an aspiring beautician looks at her time schedule and calls a local wellness resort to make an appointment with a professional. Her planning tells her exactly what to do and she focusses on her performance. On the contrary, learners who show a low degree of self-regulation phase are simply distracted by internal factors such as their thoughts or external factors such as environmental distractions (Zimmerman, 1998). Moreover, systematic monitoring of the learning process is most of the time not carried out by learners who show a low degree of self-regulation during the performance phase (Zimmerman, 1998).

2.3.3 Reflection phase

The last phase involves reflection after performance (*self-reflection of the learning experience*) (Schunk & Zimmerman, 1998). Within the reflection phase, learners reflect and evaluate their reactions to performance goals compared to the outcomes (*self-evaluation on the learning outcome*). Evaluating their learning process and reflecting on their experience can increase learning from the learning activity in question and this experience can potentially be used in the future (Fowler, 2008). Learners need to ask themselves if they have accomplished what they planned to in the forethought phase, how they handled distractions during the performance phase and evaluate which conditions facilitated their productive work environments (Schunk & Zimmerman, 1998).

According to Jossberger et al. (2010), learners who show a high degree of self-regulation during the refection phase seek opportunities to self-evaluate their learning process and want to enhance their performance. For instance, when time is up, the student looks at the aggregated interview answers. The time schedule aided her a lot in organizing the learning activity and she is convinced that such a planning will be helpful for the next learning activities. In contrast, learners who show a low degree of self-regulation face problems with self-evaluation. Due to a lack of ability, learners avoid changes to self-evaluate their learning process or judge their performance-based choices on normative comparisons instead of evaluating their own learning processes (Schunk & Zimmerman, 1998).

2.3.4 Self-regulation activities in VET

Empirical research has frequently supported the three phases within the Zimmerman cyclical model (Bembenutty, Vélez, & White), although the phases are understudied in on-demand education. Nonetheless, there are some studies who used the cyclical as a point of departure to explore concrete learning strategies. For instance, in the study of Zimmerman and Kitsantas (2002) secondary students had to improve their writing skills after observing the forethought, performance and reflection phase.

The control group who did not observe the three phases obtained a lower degree of self-regulation than the group who actually did observe the three phases. Moreover, both the studies of Endedijk et al. (2012) and Aagten (2016) revealed that even when a learning experience is unplanned and without a specific learning goal, the learning experience can still involve SRL strategies. For instance, even when a learning experience occurred *unintentionally* (which corresponds to a low degree of self-regulation), the learner can still have diverse plans to proceed with this learning experience: *just try again, formulate a concrete plan* or *try in another situation* (which corresponds to a low degree of self-regulation) (Endedijk & Bronkhorst, 2014). Furthermore, it appears that certain SRL strategies most often occurs school settings, whilst others more often occur in workplace settings. The learning strategies *planned learning* and *factual knowledge by getting information* were frequently associated with school settings. On the contrary, the learning strategy *unplanned learning of concrete teaching practice by doing* was often associated with workplace settings (Endedijk & Bronkhorst, 2014).

With regard to an on-demand educational program, in-depth and task-specific investigation is applicable to discover detailed insights in multiple learning experiences of VET students, since the self-chosen learning activities can be executed both inside and outside the classroom. VET students can also learn from multiple sources of information to become better beauticians. For instance, watching vlogs, communicating with professionals, an internship for a day, reading blogs, and so forth are all different learning activities executed in different contexts. To measure all those learning experiences from multiple sources and various contexts, an event measuring instrument is suitable to measure all those learning experiences. Endedijk et al. (2016) developed a Structured Learning Report which is an off-line diary log aiming to examine multiple events, called concrete self-regulation activities. According to Endedijk et al. (2016), this multiple-event instrument showed that specific self-regulation activities can be measured in a valid and reliable way.

2.4 Stable part of SRL: learning conceptions

According to Endedijk et al. (2016), the more stable part of self-regulated learning has been studied as conceptions of learning. Learning conceptions include students' conceptions about learning in general, their learning and thinking activities, oneself as a learner and their regulation conceptions (Vermunt, 1996). Säljö (1979) found a hierarchy of the five learning conceptions to describe students' conceptions of learning, namely learning as: 1) increasing one's knowledge, 2) memorizing and reproducing, 3) applying, 4) understanding, 5) seeing something in a different way. The hierarchy was confirmed by Marton, Dall'Abla, and Beaty (1993) who added an additional learning conception: 6) changing as a person. The learning conceptions are divided on a hierarchical continuum as surface versus deep learning conceptions (Boulton-Lewis, Marton, Lewis, & Welss, 2000). According to Purdie and Hattie (2002), surface conceptions related to the first three learning conceptions, correspond with surface knowledge which is the memorisation and tacit acceptance of information as isolated facts. In contrast, deep conceptions related to the last three learning conceptions. Deep learning which implies the analysis of new ideas, linking them to already known concepts and principles (Purdie & Hattie, 2002), which leads to understanding and long-term retention of concepts (Marton et al., 1993; Säljö, 1979).

However, Fuller (1999) suggested that learners do not hold just one fixed learning conception, such as solely seeing learning as *gaining information*, but that they have multiple conceptions, perhaps in different relative strengths. Categorising students as having a single learning conception can involve the loss of potentially important information (Fuller, 1999). Therefore, Purdie and Hattie (2002) classified students as endorsing a conception or not, according to whether they were above or below

the overall mean for one of the learning conceptions in their study. The distinction between learning conceptions has remained a core construct for many years in studies into learners' learning conceptions in various learning contexts (Endedijk et al., 2016). When there are clear goals and freedom in learning assessment methods within the learning environment, it is likely that students will use deep approaches to learning (Boulton-Lewis et al., 2000). These approaches influence learning outcomes and the deeper the approach to learning, the higher and better the outcomes will be (Boulton-Lewis et al., 2000; Marton et al., 1993; Säljö, 1979).

2.4.1 Learning conceptions in VET

Although some studies on students' learning conceptions have been done in education, most of these studies focused on students' learning conceptions in relation to academic achievement. For instance, Purdie and Hattie (2002) believed that when students have deep conceptions of learning, they have a greater academic achievement. Furthermore, Biggs and Moore (1993) referred to studies in which poor academic beliefs were related to surface approaches, while good academic beliefs were linked with deep approaches to learning. In the context of VET, it is not yet known how VET students experience learning and working in an on-demand learning environment and whether this way of learning is compatible to their wishes (Jossberger et al., 2010). It is paramount to have insight into VET students' conceptions of learning in an on-demand environment, because learning conceptions are related to the effectiveness of the learning environment (Cook-Sather, 2006; Jossberger et al., 2010). Prosser, Trigwell, Hazel, and Waterhouse (2000) report that a learning environment that is perceived to comprise adequate teaching and clear goals and that fosters independent learning is correlated positively with deep learning conceptions.

2.5 Relations between learning conceptions and self-regulation activities

Conceptions of learning are considered to influence how students approach self-chosen learning activities in particular contexts (Burnett, Pillay, & Dart, 2003) such as the on-demand learning program. The significant influences of the learning context and personal characteristics of learners on learning have been emphasized in secondary education (Burnett et al., 2003). Pillay, Purdie and Boulton-Lewis (2000) pointed out the massive role of personal characteristics of students, such as their conceptions of learning in influencing their approach to learning. For example, a student engaged in surface learning approaches the learning activity as reproducing without trying to actually understand it. In contrast, deep approaches to learning aim at meaning. Additionally, relations have been found in approaches to learning: self-regulation is frequently related to the deep approach and external regulation to the surface approach (Endedijk et al., 2016; Lonka & Lindblom-Ylänne, 1996). This can be understood, since a deep approach is one in which students seek meaning in order to understand something. The process of seeking for meaning involves controlling and reshaping one's reasoning (Endedijk et al., 2016). This is not the case when reflecting a more surface approach in which they solely attempt to memorize something in order to subsequently reproduce it (Purdie & Hattie, 2002).

The present study builds on the previous research in the learning conceptions area and the self-regulation activities by undertaking an investigation of the relationships between VET students' conceptions of learning and their approaches to learning in an on-demand learning environment. In the present study, it is expected that VET students with a deep conception of learning will show a high degree of self-regulation. These students frequently experience fewer problems with regulating their own learning processes in the on-demand learning environment and choosing learning activities

according to their own learning needs (Kicken et al., 2009). On the contrary, it is expected that VET with a more surface conception of learning will show a low degree of self-regulation. These students frequently experience more problems with regulating their own learning process (Kicken et al., 2009). Finally, it is expected that VET students with a surface learning conception changed their learning conception towards a deeper one after regulating their learning across different learning experiences. When reflecting on learning experiences and using questions according to Zimmerman's (2002) phases, students' beliefs in their ability to control aspects of the learning experience towards a desired result could possibly be reinforced (Kitsantas & Dabbagh, 2010). The change from surface learning to deeper learning is also described as 'conceptual change' (Kember, 1997).

3. The Present study

As discussed previously, it is not clear yet how aspiring beauticians manage to regulate their learning and how their learning conception influences their approach to learning in this new on-demand learning program. Based on the literature regarding SRL including both the more stable as well as the more dynamic part of SRL, the present study explores aspiring beauticians' conceptions of learning before and after reflecting on personal learning experiences obtained by self-chosen learning activities in an on-demand learning environment. How and to what extent students use various SRL strategies can be determined per student in terms of a certain degree of self-regulation, through reflecting on those various learning experiences for a consecutive school week and reporting them. A relative small-scale qualitative and quantitative approach is adopted to study aspiring beauticians' self-regulation activities in multiple learning experiences, both inside and outside the classroom and through multiple sources to learn. To guide this research, the following research questions were posed:

1. What are aspiring beauticians' learning conceptions before and after a week of reflecting on learning experiences in an on-demand learning environment?
2. How do aspiring beauticians regulate their learning across different learning experiences in an on-demand educational program?
3. How are aspiring beauticians' degree of self-regulation and their learning conceptions related?

3.1 Method

3.1.1 Research design

A mixed method design was used to provide a comprehensive view of aspiring beauticians' learning conceptions and their degree of self-regulation in the context of an on-demand educational program. This design provided the researcher with the opportunity to generate new insights about relationships that a single methodological approach might not reveal (Creswell, 2015). Qualitative results are commonly used to validate and interpret the findings of the quantitative study (Creswell, Plano, Clark, Gutmann & Hanson, 2002). As such, this research contains both quantitative and qualitative data. Initially, a quantitative survey was conducted to explore the participants' conceptions of learning and examine the first research question. Subsequently, a both quantitative and qualitative study using a questionnaire was performed to gain insights into participants' learning experiences and examine their degree of self-regulation. The quantitative data is used to gather numerical numbers and values of participants' learning experiences in the form of closed-ended items. For instance, the closed-ended question *Did you intend or plan to learn this?* can be answered with the following set of possible

answers: 'Yes, I planned to learn this', 'Not specifically for this moment, but I had an intention', and 'No, it just happened to me'. However, the aim for research in this study did additionally require gathering qualitative data in the form of open-ended questions to collect non-numerical information with a focus on experiences and feelings. For instance, the broad open-ended question: *What have you learned during this learning experience?* In case this question was closed-ended, misinterpretation of the question could be unnoticed, respondents could be frustrated because their desired answer was not a choice or they could suggest ideas that the participant would not otherwise have (Williams, 2003). In sum, the both quantitative and qualitative obtained results were both wide-reaching and deep which made this design suitable for answering the research questions.

3.1.2 Educational setting

The study took place on the ROC of Twente, a regional training centre for VET and adult education, located in the eastern part of the Netherlands. VET is provided in about 20 different branches from Level 1 up to Level 4 of the European Qualifications Framework (EQF), covering different vocational areas such as care and welfare. The present study was conducted at the area Service and Hospitality for the programs 'Beautician' and 'All-round Beautician'. The standard degree program 'Beautician' is taught on Level 3 (EQF) and takes two years of full-time studying. The standard degree program 'All-round Beautician' is taught on Level 4 (EQF) and takes three years of full-time studying. Additionally, the accelerated degree program 'All-round Beautician' offers the possibility to cut the time it takes to earn a Level 4 degree in half. Aspiring beauticians on both levels follow the on-demand educational program. The difference between students of Level 3 and Level 4 regards the Dutch language proficiency level and mathematics. Additionally, Level 4 students have the opportunity to carry out an internship abroad for four months and have to complete an English exam.

3.1.3 Participants

65 aspiring beauticians from the first till the third grade following the standard degree program 'Beautician' and the standard or accelerated degree program 'All-round Beautician' volunteered to participate in the present study. To achieve an as equal distribution as possible, participants from various levels, grades and ages were approached. In agreement with both the educational advisor and the team manager of ROC, aspiring beauticians were recruited to participate in this study. participants were willing to participate after personal contact with the researcher of this study during class. Every aspiring beautician of the programs was asked to volunteer. Thereupon, participants (N = 65) were chosen by convenience sampling. This is a non-probability sampling technique where participants are selected because of their convenient accessibility and proximity to the researcher (Saumure & Given, 2008). Ultimately, it has been taken into account that all participants were aged 16 years or over.

According to the data provided from the General background questionnaire, the final set of participants consisted of 65 female aspiring beauticians with a mean age of 19.2 (*SD* = 1.5). The majority of the sample were first graders (43.1%), followed by third graders (32.3%) and second graders (24.6%). Moreover, most participants followed a Level 4 program (63.1%), and the remaining participants followed a Level 3 program (36.9%). Concerning their highest achieved degree program, for 41 participants it was Pre-vocational secondary education, in Dutch terms Vmbo (63.1%), for 14 participants it was VET Level 3, in Dutch terms Mbo niveau 3 (21.5%), for four students it was Senior general secondary education, in Dutch terms Havo (6.2%). Three students accomplished VET Level 4 (4.6%), two students followed Senior general secondary education but did not graduate (3.1%) and

just one student accomplished a VET Level 2 program (1.5%). Lastly, 57 students followed a standard Degree program (87.7%) and eight students followed an Accelerated degree program (12.3%). An overview of participants' background in can be found in Table 1.

Table 1
Overview Descriptive Statistics of Participants' Background by Frequencies, Percentages, Means (M) and Standard Deviations (SD)

Variable	Categories	Frequency	Percentage	*M*	*SD*
Age				19.2	1.5
Gender	Male	0	0.0%		
	Female	65	100%		
	Other	0	0.0%		
Grade degree program	1	28	43.1%		
	2	16	24.6%		
	3	21	32.3%		
Educational level	3	24	36.9%		
	4	41	63.1%		
Highest achieved degree program	Pre-vocational secondary education	41	63.1%		
	Senior general secondary education	4	6.2%		
	VET Level 2	1	1.5%		
	VET Level 3	14	21.5%		
	VET Level 4	3	4.6%		
	Senior general secondary education not graduated	2	3.1%		
Form of degree program	Standard degree program	57	87.7%		
	Accelerated degree program	8	12.3%		

Note. VET indicates Vocational Education and Training.

3.1.4 Instrumentation

The data were gathered by using a triangulation of questionnaires in order to explore the relation between aspiring beauticians' conceptions of learning and their approaches to learning. The General background Questionnaire and first COLI were offered on participants' mobile phones using the relevant link. Subsequently, the Learning Moments questionnaire and second COLI were offered in a mobile application: The Incredible Invention Machine developed by the University of Twente.

General background questionnaire

By using this questionnaire, data concerning participants' personal background were collected. The questionnaire had several functions, because the questionnaire started with a page where the participants were given information on their informed consent. When participants did not agree with the purpose of the study and pressed the button 'I don't agree' they would be directly rejected to participate. Thereafter, six general background questions were asked about participants' age, gender, grade, level and the form of degree program. An overview of the items entailed in this questionnaire is displayed in Appendix A. Nevertheless, this data was not taken into account for answering the research questions but did provide deep insights into certain learning conceptions participants had and the drop-out rate during the investigation which could possibly be explained by the background

information. For analysing the data, descriptive statistics were used like percentages, frequencies, means and standard deviations. The questionnaire is displayed in Table 1.

Conceptions of Learning Inventory

To investigate participants' conceptions about learning, the COLI questionnaire was used. The COLI was specifically developed for students in secondary education and consisted of grammatically easy statements. The quantitative closed-item questionnaire deals with 32 items reflecting six learning conceptions: 1) *gaining information*, 2) *remembering, using and understanding information*, 3) *duty*, 4) *personal change,* 5) *process not bound by time or place*, and 6) *development of social competence*. Participants were given statements on a 6-point Likert scale ranging from 'I totally disagree' to 'I totally agree'. All six learning conceptions revealed a reasonable reliability ranging from .65 to .83 (Purdie & Hattie, 2002). An overview of the items entailed in this questionnaire can be seen in Appendix B. Since the items of Purdie and Hattie (2002) were used in another context and country, the back-translation method was utilized to ensure cross-cultural conceptual equivalence (Brislin, 1986). Two English-Dutch experts of the University of Twente were involved, and back translation was compared until a consistent meaning of the items was reached. Appendix C shows this translation.

Learning Moments questionnaire

The Learning Moments questionnaire (Endedijk et al., 2016) was used to investigate participants' self-regulation on self-chosen learning activities. Based on Zimmerman's (2002) phases, Endedijk et al. (2016) developed an off-line, open question log called the Structured Learning Report. This instrument is a structured diary log aiming to examine concrete SRL activities on the micro-level, independent and after the learning performance (Endedijk et al., 2016). This multiple-event instrument showed that concrete SRL activities can be measured in a valid way. Aagten (2016) and Petli (2016) adapted the items of Endedijk's et al. (2016) Structured Learning report. According to Aagten (2016) the original questionnaire could be shorter and less time consuming depending on the participants' answers. Aagten (2016) included the variables: strategic *planning, goal orientation, strategy choice, learning strategy control, monitoring, reflection on the learning outcome, evaluation* and *future planning*.

In the present study, Endedijk's et al. (2016) questionnaire adapted by Aagten (2016) is further adjusted. First, since not much differentiation has been found between the variables *monitoring* and *learning strategy control* in self-report instruments (Pintrich, 2000), the variable *monitoring* was left out in the present study. Second, Aagten's (2016) adapted questionnaire consisted of 19 questions which is reduced to 11 questions. Some questions are left out in case there was no added value. For instance, the question *Are you completely satisfied with your learning experience?* corresponding to *evaluation* is excluded in the adapted questionnaire since Aagten (2016) mentioned that approximately 80% of the answers were in one category. Third, the order of the questions has been changed. The question *What did you learn?* corresponding to *reflection on the learning outcome* is one of the first questions in the adapted questionnaire since all follow-up questions reflect on what has been learned. Fourth, the variable *seeking social assistance* with the corresponding questions *Where other people be involved in this activity?* and *What other people were involved in this activity?* has been added to the adapted questionnaire since Newman (2008) state that seeking help is an important topic related to SRL and social motivation. Finally, some questions are simplified and asked differently because the Structured Learning Report of Endedijk et al. (2016) was initially developed for student teachers. For instance, the question *Why did you learn it in this way?* possibly is too abstract for VET

students and therefore the question was changed into *What was the most important reason to learn this?* The adapted questionnaire can be found in Appendix D.

Taken together, the items offered the opportunity to measure participants' self-regulation activities once a day for five consecutive days in an on-demand learning environment. When a participant obtained no learning experience that day, there was another answer route, which existed of just two closed-ended questions. After the first question, examples were given of learning experiences and the aspiring beauticians was asked again whether she had learning anything (question 2). Beforehand, a pilot study was conducted to ensure the questionnaire would give valid results. A class with 20 Level 3 aspiring beauticians in the first grade were asked to fill in the printed version the questionnaire and were asked to offer feedback. During the pilot study, the researcher found out that the questions were understandable to these VET students and that no adjustments had to be made.

3.2 Procedure

Before distributing the questionnaires, both the University of Twente and ROC of Twente have assessed and approved the ethical aspects of this research project. The participants participated consciously and were thoroughly informed of its purpose, design and terms of participation. Additionally, they were informed about their ability to drop out, at any point and for any reason. The various questionnaires distributed by means a link and the application, called The Incredible Invention Machine, was explained. Participants were as well informed about the number of items that they would have to fill in as well as when they would receive them and how much time this would take every day. Lastly, they were also informed about the fact that results will be treated anonymously and presented in an open access presentation.

To attract a minimum of 50 participants, information about this research and opportunities for participation was provided through personal contact during an oral presentation in the participants' classroom. The researcher of the study has informed aspiring beauticians from every grade during class to persuade them to participate in the present study. In advance, appointments were scheduled with teachers for offering this presentation during their class. After the presentation, participants that confirmed their participation were asked to fill in the General background questionnaire and the first COLI individually by means of the enrolment link on their mobile phone in the classroom. Thereafter, the participants were assisted by the researcher in downloading the application on their mobile phone and the usability of it was explained. To maintain the confidentiality of and to avoid researcher influence on the participants, the teacher was not involved in gathering or handling of the data.

The study followed three phases: In the first phase, participants were asked to complete the General background questionnaire and the first COLI by means of the link on their mobile phone within the classroom. It took the participants approximately 15 minutes to complete both questionnaires and download the application. In the second phase, which included a duration of five days, participants received one Learning Moments questionnaire one time per day by the end of a school day at 17.00 in the application. After three hours of sending this questionnaire, a popup reminder was sent to participants who did not complete the questionnaire yet. Through mobile popup reminders, the chance of participants not filling in the questionnaire and resulting in a low response rate was minimized. It took the participant about five minutes to fill in the questionnaire every day, depending on their learning experience that day. During the last phase, participants were asked to fill in the second COLI in the application. It took the participants approximately 10 minutes to fill in the second

COLI. On Friday night, an email was sent to each participant who downloaded the application to express appreciation and gratitude for the work they had done.

3.3 Data analysis

Initially, descriptive statistics were calculated to provide insight into the composition of the sample. Information on the Cronbach's alpha, mean, standard deviation and range are presented. Thereafter, the Pearson product-moment correlation coefficient was conducted as a first indication of the strength of association between self-regulation and the independent variables. Concretely, the relationships between the following variables were explored: participants' background variables, the mean degree of self-regulation per participant who reported two or more learning experiences (N = 42), the number of Learning Moments questionnaires per participant who as well reported a least two learning experiences (N = 42) and participants' mean distance of the learning conceptions: 1) *remembering, using and understanding information*, 2) *duty*, 3) *personal change,* 4) *process not bound by time or place* and 5) *development of social competence*. This correlational method is a measure of the strength of a both positive and negative relationship between two variables (Bruton, Conway, & Holdate, 2000).

3.3.1 Learning conceptions

To answer the first research question, which was to examine aspiring beauticians' learning conceptions before and after a week of reflecting on learning experiences, two COLI questionnaires were conducted. Ideally, an exploratory factor analysis would have been conducted to determine the factor loadings for each item to empirically determine items in each learning conception. Nonetheless, given the small sample size of the present study, an exploratory factor analysis could not reliably be used (Faber & Benson, 2017). As such, learning conceptions used in the present study were determined based on Purdie and Hattie's (2002) and Pillay's et al. (2000) work. To help establish the reliability and validity of the COLI's for the participants, the internal consistency reliability and convergent validity of the learning conceptions were assessed and described below.

Internal consistency reliability

The Cronbach's alpha was calculated for each of the six learning conceptions from both COLI's to assess the internal consistency reliability of the items. According to the rule of thumb, constructs with an alpha value of 0.7 or above are considered acceptable (Nunnally & Bernstein, 1994). However, Van Griethuijsen et al. (2014) reported a cross-national study looking at student interests in science where "several of the values calculated for Cronbach's alpha are below the acceptable values of .70 or .60" (p. 588). Following Griethuijsen et al. (2014), learning conceptions with a mean alpha below 0.6 for both COLI's and with an alpha below 0.5 for one of the two COLI's were excluded from further analyses in the present study. The Cronbach's alpha of the six learning conceptions is calculated for both COLI's, respectively. The learning conception *gaining information*, Cronbach's α = .57 and .59 (an average of .58) had a Cronbach's alpha value below the .60 on average rule of thumb and were not used in further analysis. The Cronbach's alpha values for the other five learning conceptions were determined to suggest acceptable internal consistency reliability and were used in later analysis. The following five learning conceptions had acceptable Cronbach's alpha values on average*: remembering, using and understanding information*, Cronbach's α = .79; *duty*, Cronbach's α = .66; *personal change*, Cronbach's α = .92; *process not bound by time or place*, Cronbach's α = .70; and *development of social competence*, Cronbach's α = .86. An overview of the Cronbach's alpha (α) values regarding the six learning

conceptions can be found in Table 2. Subsequently, a paired samples t-test was conducted to determine if there was a significant difference between the means of the five learning conceptions.

Table 2
Number of Items and Cronbach's Alpha (α) Value of Items in each Learning conception on both COLI's

		Cronbach's α for each COLI	
Learning conception	Items	COLI 1	COLI 2
Gaining information	5	.57	.59
Remembering, using and understanding information	9	.74	.84
Duty	3	.73	.59
Personal change	8	.91	.92
Process not bound by time or place	3	.55	.84
Development of social competence	4	.83	.88

Note. The conception *gaining information* was not included in further analysis due to low internal consistency reliability as indicated by Cronbach's α values below the 0.6 on average rule of thumb.

Thereafter, a K-Means Cluster Analysis of these acceptable learning conceptions was executed to identify homogenous groups, called clusters, based on aspiring beauticians' learning conceptions. This analysis seeks to minimalize the variance in a cluster group while maximizing the variance between clusters (Faber & Benson, 2017). Prior, the Two-Step Cluster Analysis was executed to automatically select the proper number of clusters since the proper number of clusters within the data must be defined in advance when using the K-Means Cluster Analysis. This analysis is designed to reveal natural clusters that would otherwise not be apparent. The optimal number of clusters of cluster *k* is the one that maximize the average silhouette over a range of possible values for *k* (Kaufman & Rousseeuw, 1990), which is used for the K-Means Cluster Analysis. In addition, the mean of each learning conception was compared among the clusters using an ANOVA at which statistical significance was assessed for $p < .05$. Each participant was categorised into a cluster according to their mean scores on every learning conception for both COLI's to investigate which learning conception a participant had before and after a week of reflecting on learning experiences.

Finally, the relation between the categorisation of participants' learning conceptions for the COLI's were analysed with the chi-square analysis. These analyses were supplemented with post-hoc adjusted residuals (*AR*) analysis, to reveal cells which show deviation from the expected frequency (Haberman, 1973). An adjusted residual that more than 1.96 standard deviations indicates that the number of cases in that cell is significantly larger than would be expected. In contrast, less than -1.96 shows that the number of cases is significantly smaller than would be expected (Haberman, 1973).

3.3.2 Regulation of learning

To answer the second research question, which was to examine how aspiring beauticians do regulate their learning across different learning experiences, the Learning Moments questionnaire was conducted. Initially, the variable *reflection on the learning outcome* was asked by the open-ended question *What have you learned during this experience?* and supported by several suggestions for on-demand learning experiences to become a better beautician. The classification of participants' learning outcomes was based on the following 10 competency standards the ROC of Twente uses for students to become a beautician: 1) manage a salon, 2) maintain health and hygiene, 3) maintain skin and beauty care, 4) perform massage therapy, 5) perform basic and treatment facial, 6) perform manicure and pedicure, 7) perform makeup, 8) perform hair care and designing, 9) develop professionalism, and

10) entrepreneurship development (Branchekwalificatiedossier Schoonheids-verzorging, 2016; Competency Standards for Beauty Therapy, 2014). The researcher kept the option open to insert a new category when answers structural differed from the existing categories. Nevertheless, this was not the case. Participants who described a learning activity instead of a learning experience were not included in the coding process to prevent bias. Concerning the inter-rater reliability, a second researcher coded individually approximately 20% of the data to gain a reliable interpretation of Cohen's κ. After a small adaptation of the codes *develop professionalism* and *manage salon*, an overall Cohen's Kappa of .85 was researched. The coding scheme is shown in Appendix E.

The responses on the closed-ended questions were used to examine how and to what extent the participants have learned. Three questions were classified in a certain degree of self-regulation according to their behaviour and were conducted with SPSS 25. Categories are presented for each answer options according to the corresponding item that belongs to one of the variables. The classification of self-regulation was taken from Aagten (2016) who based the classification on literature revealing that SRL can be demonstrated in different degrees (Endedijk, Vermunt, Verloop, & Brekelmans, 2012; Schunk & Zimmerman, 1998). The items which belong to the variables strategic *planning* and *learning goal orientation* were merged into one variable, since according to Aagten (2016), both variables covered the similar concept, namely the learning intention. For the answer options of the variables *learning strategy control, future planning,* and *learning intention* (strategic planning and learning goal orientation merged), a distinction is made between a full degree of self-regulation which is mostly characterized by self-initiation (1.0 point); a half degree of self-regulation which is often characterized by external stimulation or by not choosing consciously (0.5 points); and no degree of self-regulation (0.0 points). In total, participants could gain three points per day through answering the items. The average of the degree of self-regulation during the week was measured per participant. Otherwise, when a participant was not able to fill in one of the questionnaires during the week it would affect the degree of self-regulation negatively, which does not contribute to obtaining reliable results. The total number of points were divided by the number of completed Learning Moments questionnaires to obtain participants' mean degree of self-regulation across different learning experiences which gave the possibility to answer the second research question. Furthermore, it should be noted that participants who solely completed one questionnaire were not categorised into a certain mean degree of self-regulation, because it would not represent a reliable average.

Additionally, in the questionnaire two closed-ended question concerning participants' strategy choice and whether they sought for social assistance were inserted. When analysing the data and developing a ranking method, a distinction was made between substantive questions and questions regarding regulation activities. The items regarding the variables: *reflection on learning outcome, strategy choice,* and *seeking social assistance* were excluded from this ranking method, since they did not provide insight into strategies participants use to learn, regulated by metacognitive strategies. These questions were solely offered for substantive information regarding what was learned. For instance, the item *What have you learned during this experience?* corresponding with the variable *reflection on learning outcome* offers merely substantive information about the learning experience. Despite the fact that the items regarding these variables were unanalysed, they were present in the questionnaire because the items provided a logical sequence to the items that were analysed (showed in Table 3) and offered substantive information concerning the learning experience.

Table 3
The Degree of self-regulation to which Students use various SRL Strategies

Variable	Answer options	Degree of self-regulation	Value
Learning intention	Unplanned goal	No	0.0
	Emergent goal, stimulated by others	No	0.0
	Emergent goal, necessary from teacher	No	0.0
	Emergent goal, curiosity	Half	0.5
	Emergent goal, personal development	Half	0.5
	Emergent goal, preparing for future situations	Half	0.5
	Predetermined goal, stimulated by others	Half	0.5
	Predetermined goal, necessary from teacher	Half	0.5
	Predetermined goal, curiosity	High	1.0
	Predetermined goal, personal development	High	1.0
	Predetermined goal, preparing for future situations	High	1.0
Learning strategy control	No conscious choice	No	0.0
	Conscious choice, but don't know how	Half	0.5
	Conscious choice, commissioned by another person	Half	0.5
	Conscious choice, there is no other way	High	1.0
	Conscious choice, this is the quickest and easiest way	High	1.0
	Conscious choice, this manner of learning works for me	High	1.0
Future planning	No new plans	No	0.0
	Try another time	Half	0.5
	Continue exactly in line with what I learned	Half	0.5
	Apply the learning content in practice	Half	0.5
	Improve what is learned	High	1.0
	New learning goal	High	1.0

Examples for clarifying the degree of self-regulation

As shown in Table 3, the point system offers an indication of the degree of self-regulation (no, a half or a high degree of self-regulation). Although the variables *reflection on learning outcome, strategy choice,* and *seeking social assistance* were excluded from this ranking method, they do provide deep insights into strategies participants use to learn. As demonstrated in Figure 2, four examples of how participants did regulate their learning across a learning experience with various SRL scores are offered to provide the degree of self-regulation to varying extents more meaning. To begin with, an example of a participant who showed no degree of self-regulation during reporting the learning activity and scored zero points will be given. During a theory lesson, this participant learned that exfoliation of the clay mask dries out the skin, which is a contraindication for a sensitive skin. This learning experience is related to the competency skin and beauty care and happened to her since the learning goal was unplanned. Her strategy was to get something explained in class. Nonetheless, it was not a conscious choice and she had also no new plans regarding to her reported learning experience. On the contrary, the participant who obtained three points showed her marketing plan to a national bank and requested a new loan for her beauty salon and learned from this experience. This learning experience was related to the company entrepreneurship development. She showed a high degree of self-regulation, since it was a predetermined goal in which she wanted to develop herself by means of searching for information. It was also a conscious choice, because the learning manner worked for her and she wanted to improve what was learned. Finally, the reason behind displaying two examples of

participants with common gained points concerned their completely different learning experiences. Regardless the same number of gained points, for the first participant the learning experience was related to the performance of a treatment. In contrast, for the second the learning experience was related to managing a salon.

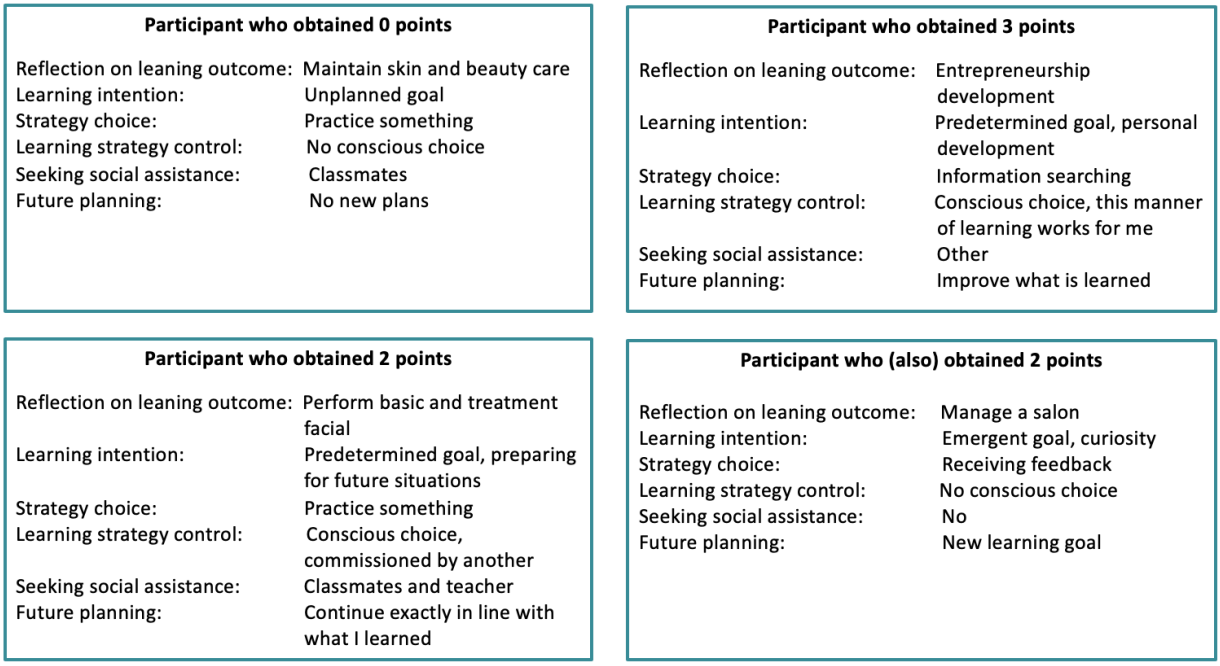

Figure 2. Four examples of participants with various SRL scores and learning experiences.

3.3.3 Relation between the degree of self-regulation and learning conceptions

To answer the third research question, which was to explore a potential relation between aspiring beauticians' degree of self-regulation and their learning conceptions, the one-way analysis of variance (ANOVA) was used to determine any statistically significant differences between participants' mean SRL score and their conception of learning. In other words, participants' mean scores of the SRL variables *learning intention, learning strategy control* and *future planning* and their total mean degree of self-regulation were compared with participants' conception of learning. Additionally, a multiple bar graph was displayed to visualise the categories of learning conceptions participants had with their corresponding mean scores of the SRL variables *learning intention, learning strategy control* and *future planning* and their total mean degree of self-regulation.

4. Results

4.1 Data exploration

As a first indication of the results, this chapter starts with descriptive statistics of the 42 participants who completed the background questionnaire, both COLI's and reported at least two learning experiences in the Learning Moments questionnaire. As shown in Table 4, most variables showed a relatively low standard deviation, below one standard deviation, which indicates low variation in answers. Nonetheless, the variable *age* (M = 18,52, SD = 1.44) shows a relatively high standard deviation, above one standard deviation, which indicates a high variation in age. The variable *highest achieved degree program* (M = 2,45, SD = 1.67) also shows a relatively high standard deviation which

means that the participants have a high variation in their educational qualifications. Investing the *mean SRL scores* revealed that the average participant who reported at least two learning experiences had a total score of 1.65 out of the 3 points. This total SRL score was not predominantly gained by the one of the three variables: *learning intention* (*M* = .48), *learning strategy control* (*M* = .51) and *future planning* (*M* = .66). The average participant scored around the 0.5 points on the three variables which is equal to a half degree of self-regulation. The average scores on the learning conceptions in both COLI's indicate that most participants mainly (slightly) agreed on the statements concerning the conceptions of learning. The average participant saw learning particularly as a *duty* in the first (*M* = 4,94, *SD* = 0.79) and second (5,11, *SD* = 0.51) COLI which is a more surface conception of learning. In contrast, the average participant saw learning to a lesser extent as a *personal change* in the first (*M* = 4,36, *SD* = 0.93) and second (*M* = 4,60, *SD* = 0.87) compared to the other learning conceptions.

Table 4
Cronbach's Alpha's (α), Means (M), Standard Deviations (SD) and Range of Scale variables (N = 42)

Category	Variable	Cronbach's α	*M*	*SD*	Range
Self-regulation	Learning intention		0.48	.026	0-1
	Learning strategy control		0.51	.026	0-1
	Future planning		0.66	0.21	0-1
	Total SRL score		1.65	0.49	1-3*
	Number of Learning Moments		3.76	0.98	2-5
Background information	Age		18.52	1.44	16-22 years
	Grade degree program		2.12	0.83	1-3
	Educational level		3.60	0.50	Level 3 or 4
	Highest achieved degree program		2.45	1.67	1-6**
	Form of degree program		1.14	0.35	1 (standard) or 2 (accelerated)
Conceptions of learning (COLI 1)	Remembering, using and understanding information	.74	4.94	0.43	4.11-6.00***
	Duty	.78	4.94	0.79	2.33-6.00***
	Personal change	.92	4.36	0.93	2.38-6.00***
	Process not bound by time or place	.58	4.83	0.78	3.00-6.00***
	Development of social competence	.82	4.57	0.87	2.50-6.00***
Conceptions of learning (COLI 2)	Remembering, using and understanding information	.84	4.97	0.54	3.56-6.00***
	Duty	.59	5.11	0.51	3.67-6.00***
	Personal change	.92	4.60	0.87	2.50-6.00***
	Process not bound by time or place	.70	5.00	0.75	3.00-6.00***
	Development of social competence	.87	4.67	0.81	2.25-6.00***

Note. * point out the sum of the variables learning intention, learning strategy control and future planning. ** indicates the different achieved degrees: 1 = Pre-vocational secondary education, 2 = Senior general secondary education, 3 = VET Level 2, 4 = VET Level 3, 5 = VET Level 4, and 6 = Senior general secondary education not graduated. *** means that the variable is measured on a 6-point Likert scale ranging from 'I totally disagree' to 'I totally agree'.

4.1.1 Coherence and strength

To explore the coherence and strength of the relationships between participants' background variables, the mean degree of self-regulation per participant who reported two or more learning experiences; the number of learning moments per participant who as well reported two or more learning experiences and participants' mean distance of the five learning conceptions, the Pearson product-moment correlation was conducted and displayed in a correlation matrix (see Table 5). Over the whole group of participants, different significant correlations (p set at .05) were found between the various variables. Based on the results of the study, participants' degree of self-regulation was negatively correlated with learning conception *development of social competence* of COLI 1 (r = -.32, p = .04). Nevertheless, this significant relationship was no longer present after reflecting on multiple learning experiences (r = .24, p > .05). On the other hand, no significant relations were found between participants' degree of self-regulation and one of the learning conceptions (p > .05). In addition, the individual SRL variables learning intention, learning strategy control and future planning were also not strongly related to participants' mean score on the five learning conceptions (p > .05). On the contrary, the number of Learning Moments per participant was positively correlated with the learning conception *duty* of COLI 1 (r = .32, p = .04). This result indicates that seeing learning as a *duty* is strongly related with the number of reports on learning experiences.

Concerning participants' mean scores on the five learning conceptions on both COLI's, various learning conceptions correlated significantly with each other. For instance, the learning conception *remembering, using and understanding information* in COLI 1 was related to their own learning conception in COLI 2 (r = .57, p < 0.01), *personal change* in COLI 1 (r = .48, p < 0.01) and *development of social competence* in COLI 1 (r = .46, p < 0.01), *duty* in COLI 1 (r = .36, p = 0.02), *development of social competence* in COLI 2 (r = .34, p = 0.03) and *process not bound by time or place* in COLI 1 (r = .33, p = 0.03). It is noticeable that some of the learning conceptions in COLI 1 correlated higher with another learning conception than with their own learning conception in the second COLI. For example, the learning conception *process not bound by time or place* was related to their own learning conception in the second COLI (r = .35, p = 0.03), but correlated also even higher with *development of social competence* (r = .47, p < 0.01) and *personal change in COLI 2* (r = .37, p = 0.02). The learning conception *development of social competence* correlated most frequently with other learning conceptions, namely 10 times in COLI 1 and 2. In contrast, the learning conception *duty* correlated the least with other learning conceptions, namely six times. Although no significant relations were found between participants' degree of self-regulation and one of the learning conceptions, all variables will be used for further analysis to explore what kind of learners the participants are before and after a week of reflecting on learning experience. For instance, a deep or surface learning. The variables with also contribute to the understanding how participants regulate their learning across different learning experiences in an on-demand educational program.

Table 5

Pearson Correlations between Mean Scores of SRL Variables, Participants' Background variables and Learning Conceptions (N = 42)

		2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
1. Learning intention		.35*	.34*	.84**	-.33*	.17	.28	.23	.10	.07	.03	.03	.12	.03	-.23	.06	.30	.26	.08	.29
2. Learning strategy control			-.10	.66**	-.05	-.07	-.10	.10	.05	.01	-.06	-.02	.01	-.15	-.21	.13	.11	.03	-.01	.20
3. Future planning				.54**	.09	.23	.49**	.25	.11	.32*	-.29	-.03	-.05	.09	-.23	-.19	.01	.05	.20	-.04
4. Total SRL score					-.16	.14	.30	.27	.12	.18	-.14	-.01	.05	-.03	-.32*	.02	.21	.17	.12	.24
5. Learning moments						.11	.15	-.05	.08	.17	-.09	.32*	.13	.10	.20	.16	.15	.15	.27	.08
6. Age							.62**	-.17	.57**	.28	-.01	.00	.11	-.12	.05	-.12	.06	.11	-.10	-.07
7. Grade								.24	.49**	.44**	-.04	-.01	.03	.14	-.10	-.10	.20	.12	.18	.09
8. Educational level									-.13	.20	.15	-.09	.12	.35*	.01	.07	.15	.04	.28	.10
9. Achieved degree										.14	.06	.06	.06	-.01	.03	.06	-.15	-.01	-.09	-.10
10. Form of program											.13	.09	.17	.18	.05	.15	.09	.07	.18	.17
COLI 1	11. RUU											.36*	.48**	.33*	.46**	.57**	.22	.28	.25	.34*
	12. DUTY												.27	.03	.04	.36*	.52**	.12	.23	.19
	13. PERS													.66**	.62**	.28	.13	.61**	.30	.38*
	14. PROC														.47**	.17	-.09	.37*	.35*	.26
	15. SOC															.05	-.12	.47**	.25	.43**
COLI 2	16. RUU																.36*	.30	.39*	.36*
	17. DUTY																	.23	.38*	.42**
	18. PERS																		.43**	.60**
	19. PROC																			.51**
	20. SOC																			

Note. SRL indicates self-regulated learning. *$p < .05$, **$p < .01$. RUU = remembering, using and understanding information; PERS = personal change; PROC = process not bound by time or place; SOC = development of social competence.

4.2 Aspiring beauticians' learning conceptions

The initial set of data consisted of 65 participants who completed the first COLI before they started with reporting self-regulation activities. However, 20 of them (30.8%) did not complete the second COLI. The reasons participants gave for stopping before completing the investigation were primarily illness or lack of time. The 17-year-olds had the highest drop-out rate (30.0%) and 14 of the participants who dropped out were primarily first graders (70.0%). Additionally, three participants (4.6%) did complete the second COLI. However, they solely reflected on one learning experience during the week and therefore it was impossible to gain a reliable mean degree of self-regulation. In total, 42 participants (64.6%) completed both COLI's successfully and reflected for a week on multiple learning experiences in an on-demand learning environment. Below, results regarding participants' learning conceptions are given. Initially, an overview will be provided of how participants overall scored on the learning conceptions in COLI 1 and 2. Second, according to respondents' responses on the items in COLI 1 and 2 clusters will be formed and described. Lastly, the first research question will be answered.

4.2.1 Mean scores on the learning conceptions

For an impression of how the participants scored on the COLI's, a paired-samples t-test was conducted to compare participants' mean scores on the learning conceptions before (COLI 1) and after (COLI 2). reflecting on learning experiences. A 6-point Likert scale ranging from 'I totally disagree' to 'I totally agree' was used to measure participants' opinions about learning. As shown in Table 6, participants scored on average between 4 (slightly agree) and 5 (agree) points on most learning conceptions in COLI 1 and 2. The two exceptions concerned the learning conception *duty* in COLI 2 (M = 5.13, SD = .51) and *process not bound by time or place* (M = 5.01, SD = .77) and on those learning conceptions participants scored higher than 5 (agree) points on average. The participants also scored higher on all learning conceptions in the second COLI and for the learning conception *personal chang*e there was even a significant difference in the scores for COLI 1 (M = 4.31, SD = .96) and COLI 2 (M = 4.58, SD = .92) conditions; $t(44)$= -2.22, p = .03. On average, participants scored 0.27 points lower on the learning conception *personal change* in the first COLI than in the second COLI (95% CI [-.52, -.02]).

Nevertheless, no significant differences were found between the other four learning conceptions in COLI 1 and 2. Initially, concerning the learning conception *remembering, using and understanding information,* there was no significant difference in the scores for COLI 1 (M = 4.93, SD = .43) and COLI 2 (M = 4.99, SD = .53) conditions; $t(44)$= -.84, p = .41. On average, participants scored in the first COLI 0.06 points lower than in the second COLI (95% CI [-.19, .08]). For *duty,* there was also no significant difference between the scores for COLI 1 (M = 4.96, SD = .79) and COLI 2 (M = 5.13, SD = .51) conditions; $t(44)$= -1.68, p = .10. On average, participants scored on the learning conception *duty* in the first COLI 0.17 points lower than in the second COLI (95% CI [-.37, .03]). For the learning conception *process not bound by time or place* there was no significant difference between scores in COLI 1 (M = 4.84, SD = .79) and COLI 2 (M = 5.01, SD = .77) conditions; $t(44)$= -1.41, p = .17. On average, participants scored in the first COLI 0.18 points lower than in the second COLI (95% CI [-43, .08]). Lastly, concerning *development of social competence* there was also not a significant difference in COLI 1 (M = 4.52, SD = .90) and COLI 2 (M = 4.66, SD = .86) conditions; $t(44)$= -1.41, p = .32. On average, participants scored in the first COLI 0.13 points lower than in the second COLI (95% CI [-.40, .13]).

In addition, the effect size of the five learning conceptions, *remembering, using and understanding information* (d = .12); *duty* (d = .25); *personal change* (d = .29); *process not bound by time or place* (d = .22); and *development of social competence* (d = .16), were found not to exceed

Cohen's (1988) convention for a medium (*d* = .50) or large effect (*d* = .80). In other words, the results of the effect sizes show that the differences between learning conceptions in COLI 1 and 2 are not important since solely a small effect size indicate that the difference is unimportant (Cohen, 1988).

Table 6
Contrast of COLI 1 and 2 on Participants' Learning Conceptions who Completed both COLI's (N = 45)

	COLI 1		COLI 2				95% CI		
Learning conception	*M*	*SD*	*M*	*SD*	*t*(44)	*p*	LL	UL	Cohen's *d*
Remembering, using and understanding information	4.93	.43	4.99	.53	-.84	.41	-.19	.08	.12
Duty	4.96	.79	5.13	.51	-1.68	.10	-.37	.03	.25
Personal change	4.31	.96	4.58	.92	-2.22	.03*	-.52	-.02	.29
Process not bound by time or place	4.84	.79	5.01	.77	-1.41	.17	-.43	.08	.22
Development of social competence	4.52	.90	4.66	.86	-1.01	.32	-.40	.13	.16

Note. *p < .05. CI = confidence interval, LL = lower limit, UL = upper limit.

4.2.2 Cluster description

Based on participants' scores on the five learning conceptions in both COLI's (see Table 6), two homogenous clusters of learners were identified using the Two-Step Cluster Analysis. The output from the Two-Step Cluster Analysis represents the cluster quality in SPSS, which is a silhouette measure of cohesion and separation, to determine if two clusters are a good solution (Kodinariya & Makwana, 2013). The cluster quality indicated that the set of five learning conceptions were 'fair' indicators for clustering (silhouette coefficient = 0.4). The proper number of clusters (*k* = 2) within the data is used for the K-Means Cluster Analysis since this analysis required knowing the number of clusters in advance. The output from the *k*-means represents the iteration history in SPSS, which shows the progress of the clustering process at each step. Although the cluster centres shift slightly during the first four iterations, by the fifth iteration the cluster centres have settled down and convergence is achieved due to no change in centres after the fourth iteration. This indicates that this clustering model is stable and that all participants are successfully assigned to one of the clusters (*k* = 2) before the maximum number of iterations (10 by default) is reached (Kodinariya & Makwana, 2013).

An ANOVA was conducted to analyse the differences among cluster means for the learning conceptions *remembering, using and understanding information, duty, personal change, process not bound by time or place* and *development of social competence* to find out if the learning conceptions are statistically significant. The results were also part of the output from the K-Means Cluster Analysis. As displayed in Table 7, participants categorised in Cluster 2 reported higher scores on all five learning conceptions than the participants in Cluster 1. On every learning conception there was a significant difference between the clusters (p = < 0.05). The analysis of variance showed that the effect of the learning conception *remembering, using and understanding information* was significant: $F(1, 44) = 5.77$, $p = .02$. Additionally, the other learning conceptions were also significant: *duty*, $F(1, 44) = 3.99$, $p = .05$); *personal change*, $F(1, 44) = 156.66$, p = < .01; *process not bound by time or place*, $F(1, 44) = 79.17$, p = < .01; and *development of social competence*, $F(1, 44) = 90.46$, p = < .01. In addition, the effect size of *personal change* (d = 2.43), *process not bound by time or place* (d = 1.72) and *development of social competence* (d = 1.84) were found to exceed Cohen's (1988) convention for a large effect (d = .80). This means that especially the last three learning conceptions (*personal change, process not*

bound by time or place and *development of social competence*) determined the clusters. In short, participants who scored higher than the mean on the learning conceptions were categorised in Cluster 2 and called deep learners. Participants who scored lower than the mean were called surface learners.

Table 7
Means (M), Standard Deviations (SD), F-ratio's (F), p-values (p) and effect sizes (Cohen's d) for the Clusters on the Conceptions of Learning (N = 45)

	Cluster 1 Surface		Cluster 2 Deep				
Learning conception	*M*	*SD*	*M*	*SD*	*F*	*p*	Cohen's *d*
Remembering, using and understanding information	4.80	.42	5.03	.47	5.77	.02*	0.52
Duty	4.88	.73	5.13	.54	3.99	.05*	0.39
Personal change	3.37	.71	4.89	.53	156.66	.00**	2.43
Process not bound by time or place	4.12	.73	5.21	.52	79.17	.00**	1.72
Development of social competence	3.68	.78	4.93	.56	90.46	.00**	1.84

Note. *$p < .05$, **$p < .01$.

4.2.3 Learning conceptions

The chi-square analysis is used to examine how many participants were classified into one of the two clusters in both COLI's. As shown in the crosstabulation table (displayed in Table 8), 23 participants initially showed a surface conception of learning and 42 participants a deep conception of learning in COLI 1 (N = 65). Out of the 23 participants with a surface learning conception in COLI 1, 10 participants remained having a surface learning conception (43.5%), seven participants changed their surface conception of learning towards a deep conception of learning (30.4%) and six participants with initially a surface conception of learning dropped out (26.1%). Out of the 42 participants with initially a deep learning conception, 27 participants remained having a deep learning conception (64.3%), one participant (2.4%) changed her deep learning conception towards a surface conception of learning and 14 participants dropped out or did not report a learning experience at least twice (33.3%).

The chi-square analysis is also used to explore relationships between the participants with deep or surface conceptions of learning before (COLI 1) and after (COLI 2) a week of reflecting on a learning experience. This was indeed the case and a significant relation was found ($X^2(1) = 17.48$, $p < .01$). The post-hoc analyses showed that in on-demand education, significantly more often participants remained showing surface conceptions of learning after a week of reflecting on multiple learning experiences (*AR* = 4.2). As shown in the crosstabulation table, the number of cases, which are the participants who showed two times a deep conception of learning, in that cell (N = 10) is larger than expected in the analysis (N = 4). Additionally, the post-hoc analyses showed that significantly more often participants remained showing deep conceptions of learning after a week of reflecting on multiple learning experiences (*AR* = 4.2). As shown in Table 8, the number of cases in that cell (N = 27) is larger than was expected in the analysis (N = 21).

On the contrary, the post-hoc analyses showed that significantly less often participants changed their surface conception of learning towards a deeper conception of learning after a week of reflecting on multiple learning experiences (*AR* = -4.2). The number of cases in that cell (N = 7) is smaller than expected in the analysis (N = 13). Finally, and in line with the previous finding, the results show that significantly less often participants changed their deep conception of learning towards a surface conception of learning after a week of reflecting on multiple learning experiences (*AR* = -4.2). The

number of cases in that cell (N = 1) is smaller than expected in the analysis (N = 7). In other words, something is going on in the four cells in that there are fewer or more cases, which are the participants with the same combination of learning conceptions, than would be expected in the analysis.

Table 8
Participants' Learning Conceptions in COLI 1 (N = 65) in Relation to COLI 2 (N = 42)

			COLI 2			
	Categories		Surface	Deep	Missing	Total
COLI 1	Surface	Count	10	7	6	23
		Expected count	4	13		23
		Adjusted residual	4.2*	-4.2*		
	Deep	Count	1	27	14	42
		Expected count	7	21		42
		Adjusted residual	-4.2*	4.2*		
	Total	Count	11	34	20	65
		Expected count	11	34	20	65

Note. *Significant deviations of the observed frequency from the expected frequency.

4.3 Aspiring beauticians' regulation of learning across different learning experiences

The initial set of data consisted of a total of 65 participants who agreed to volunteer. From the 244 completed Learning Moments questionnaires, 175 times a participant actually learned something and reported a learning experience. 69 times a participant could not come up with a learning experience (28.3%). Moreover, not every participant came up with a learning experience during the week. 56 participants reported at least one learning experience which implies an average of 3.1 completed questionnaires (*SD* = 1.4) from participants who reported at least one learning experience. This result indicates that nine participants (31.8%) who completed the background questionnaire and COLI 1 dropped out before reporting a learning experience. In addition, 45 participants completed the questionnaire twice which reveals that 11 of them filled in the questionnaire merely once (16.9%).

The aspiring beauticians showed considerable variation in their regulating of learning across different learning experiences during the week. In order to explain participants' regulation while learning in an on-demand learning environment in more detail, participants' answers on the following variables will be described in chronological structure of a SRL process: 1) *reflection on the learning outcome,* 2) *learning intention*, 3) *strategy choice,* 4) *learning strategy control,* 5) *seeking social assistance* and 6) *future planning*. Subsequently, according to the answers concerning the variables, each participant receives a certain mean degree of self-regulation which creates the possibility to examine how aspiring beauticians regulate their learning across different learning experiences.

4.3.1 Reflection on learning outcome

As shown in Table 9, the most frequently used competencies were *professionalism* (18.3%), *manage salon* (17.1%), *massage therapy* (14.9%) and *skin and beauty care* (13.1%). On the contrary, the competence *hair care* was mentioned least frequently with merely used four times (3.2%), followed by the competence *manicure and pedicure* (4.0%) who was mentioned seven times.

Table 9
Frequency table of Reflection on Learning Outcome Combined with Another common Answers

Competence	Frequency	Percentage
Develop professionalism	32	18.3
Manage a salon	30	17.1
Perform massage therapy	26	14.9
Maintain skin and beauty care	23	13.1
Entrepreneurship development	17	9.7
Perform makeup	16	9.1
Maintain health and hygiene	10	5.7
Perform basic and treatment facial	10	5.7
Manicure and pedicure	7	4.0
Perform hair care and designing	4	2.3
Total	175	100.0

4.3.2 Learning intention

Table 10 represents aspiring beauticians' strategic planning merged with the learning goal orientation of their learning experiences in an on-demand learning environment. From the 175 reported learning experiences, the data shows that 45.1% of the participants showed no degree of self-regulation in strategic planning. 17.7% of the participants showed a half degree of self-regulation in strategic planning and 37.2% of the participants planned their learning consciously and on their own initiative before the performance started. 95.1% of the time when there was no degree of self-regulation in strategic planning which indicates that the learning goal was unplanned. Most of the participants who showed a half degree of self-regulation in strategic planning did so because it was an emergent goal in which they had the purpose to develop themselves (32.2%). Most of the participants who showed a high degree of self-regulation wished to prepare themselves for future situations with the planned learning activity (59.9%).

Table 10
Frequency table of Learning Intention

Multiple choice options for planning	Multiple choice options for Learning goal orientation	Degree of self-regulation	Frequency	Percentage
Unplanned goal		No	75	42.9
Emergent goal	Stimulated by others	No	2	1.1
Emergent goal	Necessary from teacher	No	2	1.1
Emergent goal	Personal development	Half	10	5.7
Emergent goal	Curiosity	Half	7	4.0
Emergent goal	Preparing for future situations	Half	7	4.0
Predetermined goal	Stimulated by others	Half	4	2.3
Predetermined goal	Necessary from teacher	Half	3	1.7
Predetermined goal	Curiosity	High	9	5.1
Predetermined goal	Personal development	High	17	9.7
Predetermined goal	Preparing for future situations	High	39	22.3
Total			175	100.0

Note. SRL indicates self-regulated learning.

4.3.3 Strategy choice

Table 11 shows aspiring beauticians' strategy choices during their learning experience in an on-demand learning environment. From the 175 reported strategy choices, the data shows that practice something (29.1%) occurred most frequently, followed by the strategy choice to have something explained (23.4%). Analysing or thinking of a specific situation (3.4%) was the least chosen strategy choice. Observing how someone else does something (6.3%), receiving feedback (4.0%) and talk to others (5.7%) were as well not frequently chosen strategy choices, but correspond to each other since the three options concerns social learning strategies. When the three social learning strategies are merged together, the frequency changes to 27 times (16.0%).

Table 11
Frequency Table of Strategy Choices

Multiple choice options	Frequency	Percentage
Practice something	51	29.1
Get something explained	41	23.4
Experiencing during work or internship	25	14.3
Information searching	17	9.7
Observing how someone else does something	11	6.3
Talk to others	10	5.7
Receiving feedback	7	4.0
Other	7	4.0
Analysing or thinking of a specific situation	6	3.4
Total	175	100.0

4.3.4 Learning strategy control

Table 12 represents the degree of self-regulation in strategy control. From the 175 reports, 113 times it was a conscious choice (64.5%) to manage the execution of their strategic plan. 44 participants showed a half degree of self-regulation in learning strategy control (25.1%), since it was a conscious choice, but they did not know how (1.7%) or it was commissioned by another person (23.4%). 69 participants showed a high degree of SRL (39.5%), since it was a conscious choice and there was no other way (10.9%), it was the quickest or easiest way (14.9%) or the learning manner just worked for them (13.7%). Nonetheless, for more than a third of the time (62 times) controlling their inner performance and using different strategies was no conscious choice (35.4%). 62 times it was an unconscious choice (35.4%) to manage the execution of their strategic plan which indicates no degree of self-regulation.

Table 12
Frequency table of Learning Strategy Control

Multiple choice options	Degree of self-regulation	Frequency	Percentage
No conscious choice	No	62	35.4
Conscious choice, commissioned by another person	Half	41	23.4
Conscious choice, but do not know how	Half	3	1.7
Conscious choice, this is the quickest or easiest way	High	26	14.9
Conscious choice, this learning manner works for me	High	24	13.7
Conscious choice, there is no other way	High	19	10.9
Total		175	100.0

Note. SRL indicates self-regulated learning.

4.3.5 Seeking social assistance

With a vast majority of 139 times (79.4%), aspiring beauticians sought social assistance during their learning experience in an on-demand learning environment. 80 participants reported both social assistance from classmates and teacher (45.7%). The three options classmates and teacher (45.7%), classmate (7.4%) and teacher (6.9%) correspond with each other since the social assistance takes place within the classroom. When the three options are merged together, the frequency changes to 105 participants (60.0%) who sought social assistance within the classroom. When asking participants about seeking social assistance contributing to becoming a better beautician, family (1.3%) and people at work (2.3%) were the least mentioned. An overview of the options with corresponding frequencies and percentages is displayed in Table 13.

Table 13
Frequency table of Seeking Social Assistance

Multiple choice options	Frequency	Percentage
Classmates and teacher	80	45.7
No social assistance	36	20.6
People at internship	14	8.0
Classmate	13	7.4
Teacher	12	6.9
Model or Customer	7	4.0
Other	6	3.4
People at work	4	2.3
Family	3	1.7
Total	175	100.0

4.3.6 Future planning

Table 14 represents the degree of self-regulation in future planning. In total, from the 175 reported questionnaires, 125 times a participant had new plans regarding to their reported learning experience (77.1%) and 40 times a participant had no new plans (22.9%). A vast majority of time (76 times), participants wanted to improve what was learned (43.4%). Participants with no new plans regarding what was learned showed no degree of self-regulation. From the 47 times a half degree of self-regulation was showed, participants wanted to continue in line with what is learned (63.8%), they wanted to apply the learning content in practice (34.1%) or they wanted to try the learning experience another time (2.1%). Furthermore, from the 88 times a high degree of self-regulation was showed, participants wanted to improve what is learned (86.4%) or wanted to create a new goal (13.6%).

Table 14
Frequency Table of Future Planning

Multiple choice options	Degree of Self-regulation	Frequency	Percentage
No new plans	No	40	22.9
Continue exactly in line with what I learned	Half	30	17.1
Apply the learning content in practice	Half	16	9.1
Try another time	Half	1	0.6
Improve what is learned	High	76	43.4
New learning goal	High	12	6.9
Total		175	100.0

4.3.7 Degree of self-regulation

As displayed in Table 10, 12 and 14, self-regulation is measured to the different extents no degree (0.0 points), a half degree (0.5 points), and a high degree (1.0 point) regarding the variables *learning intention*, *learning strategy control* and *future planning*. This led to a maximum of three points per day. The number of points were divided by the number of reported learning experiences during the week for a mean degree of self-regulation. However, 11 participants (16.9%) came up with solely one learning experience during the week and could not gain a reliable mean degree of self-regulation consequently. These participants were not included in further analyses. A shown in Figure 3, the number of participants who received a certain degree of self-regulation was the highest on Monday (N = 40). On Wednesday the response rate was the lowest (N = 33). In total, 45 participants received a certain degree of self-regulation who reported at least two learning experiences.

A box plot graph is displayed from these participants to examine their central degree of self-regulation per day and the average degree of self-regulation of participants who reported a learning experience at least twice (see Figure 3). This data creates the possibility to examine how aspiring beauticians regulate their learning across different learning experiences. On Friday, participants had the highest SRL score (Mdn = 2.0) while the central SRL score on the other days was lower (Mdn = 1.5). 50.0% of the participants scored between 1.0 and 2.5 on daily base except for Thursday where 50.0% of the participants scored between 1.5 and 2.5. On Thursday, participants had the lowest IQR while the other days had a higher IQR. Comparing distributions, the total average SRL score of participants who reported at least two learning experiences has a smaller range than the individual days. 50.0% of the participants who reported minimal two learning experience had an average SRL score between 1.4 and 2.0. Over the week, there was solely one outlier who reported at least two learning experiences and had an average SRL score of three points which concerns the maximum number of points.

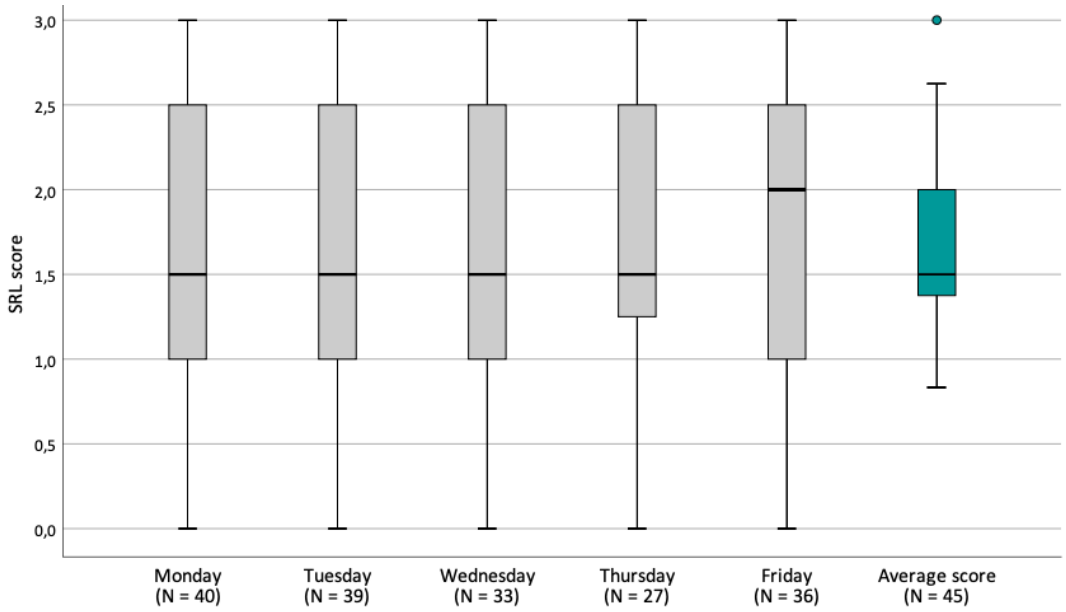

Figure 3. The SRL score over the week and the average score of participants who reported a learning experience minimal twice.

4.4 Relations between SRL scores and learning conceptions

Four categories were identified according to the participants' learning conceptions during the first and second COLI in the chi-square analysis (displayed in Table 8): remaining a surface conception of learning (*N* = 9), remaining a deep conception of learning (*N* = 26), initially a deep learning conception which changed towards a surface conception of learning (*N* = 1) and initially a surface learning conception which changed towards a deep conception of learning (*N* = 6). Nonetheless, the post-hoc analyses showed that the number of participants who changed their surface conception of learning towards a deeper learning conception after a week of reflecting on multiple learning experiences was significantly smaller than would be expected (*AR* = -4.2). In addition, the post-hoc analyses showed that the number of participants who changed their deep conception of learning towards a more surface learning conception after a week of reflecting on multiple learning experiences was also significantly smaller than would be expected (*AR* = -4.2). This did not apply for the deep and surface learners who remained in the same cluster. Based on these findings, an ANOVA was conducted to analyse the differences among the SRL variables means for the participants with initially a deep (*N* = 27) or surface (*N* = 15) conception of learning to find out if the SRL scores are statistically significant. The participants could gain a maximum mean SRL score of one point per variable (learning intention, learning strategy control and future planning) with a maximum total mean SRL score of three points.

As displayed in Table 15, participants categorised as deep learners had exactly the same total SRL score on average (*M* = 1.65, *SD* = .38) compared to surface learners (*M* = 1.65, *SD* = .67). Concerning this score, the only difference is that deep learners overall scored closer around the mean compared to surface learners who are more spread from the mean. Since the mean total SRL score is the same for both deep and surface learners, an analysis of variance showed that the effect of the total mean SRL score was insignificant, $F(1, 40) = 0.00$, $p = .99$. This result points out that the surface and deep learners cannot be distinguished from each other based on their total mean SRL score.

As visualised in Figure 4, deep learners overall scored higher on the SRL variable learning intention (*M* = 0.50, *SD* = .22) than surface learners (*M* = 0.46, *SD* = .32). Please note that for still 50% of the deep learners the learning experience was not a predetermined goal out of curiosity, personal development or to prepare themselves for future situations. An analysis of variance showed that the effect of the SRL variable learning intention was not significant, $F(1, 40) = 0.18$, $p = .67$. Thus, deep learners do not possess a higher degree in planning their learning conscious and on their own initiative before the performance started compared to surface learners in this study.

Furthermore, the surface learners overall had a higher mean score of the SRL variable learning strategy control (*M* = 0.57, *SD* = .32) than deep learners (*M* = 0.48, *SD* = .22). Additionally, for more than half of the learners with a deep conception of learning it was not a conscious choice to learn that way. An analysis of variance showed that the effect of the SRL variable learning strategy control was not significant, $F(1, 40) = 1.25$, $p = .27$. This indicates that despite the fact that surface learners possess a higher degree of controlling a learning strategy than deep learners, the outcomes are not noteworthy since the differences in scores are not large enough to be significant.

Finally, deep learners overall scored higher on the SRL variable future planning (*M* = 0.68, *SD* = .18) than surface learners (*M* = 0.62, *SD* = .25). This indicates that, especially for deep learners but in a lesser extent also for surface learners, more than 50% of the time they wanted to improve what was learned. Nevertheless, an analysis of variance showed that the effect of the SRL variable future planning was also not significant, $F(1, 40) = 0.66$, $p = .42$. In sum, not one of the SRL variables was able to show a significant difference between deep learners and surface learners ($p = > 0.05$).

Table 15

Means (M), Standard Deviations (SD), F-ratio's (F) and p-values (p) for Surface and Deep Learners on the SRL variables and the Total SRL Score (N = 42)

	Surface conception of learning		Deep conception of learning			
SRL variable	M	SD	M	SD	*F*	*p*
Learning intention	0.46	.32	0.50	.22	0.18	.67
Learning strategy control	0.57	.32	0.48	.22	1.25	.27
Future planning	0.62	.25	0.68	.18	0.66	.42
Total SRL score	1.65	.67	1.65	.38	0.00	.99

Note. SRL indicates self-regulated learning. *$p < .05$, **$p < .01$.

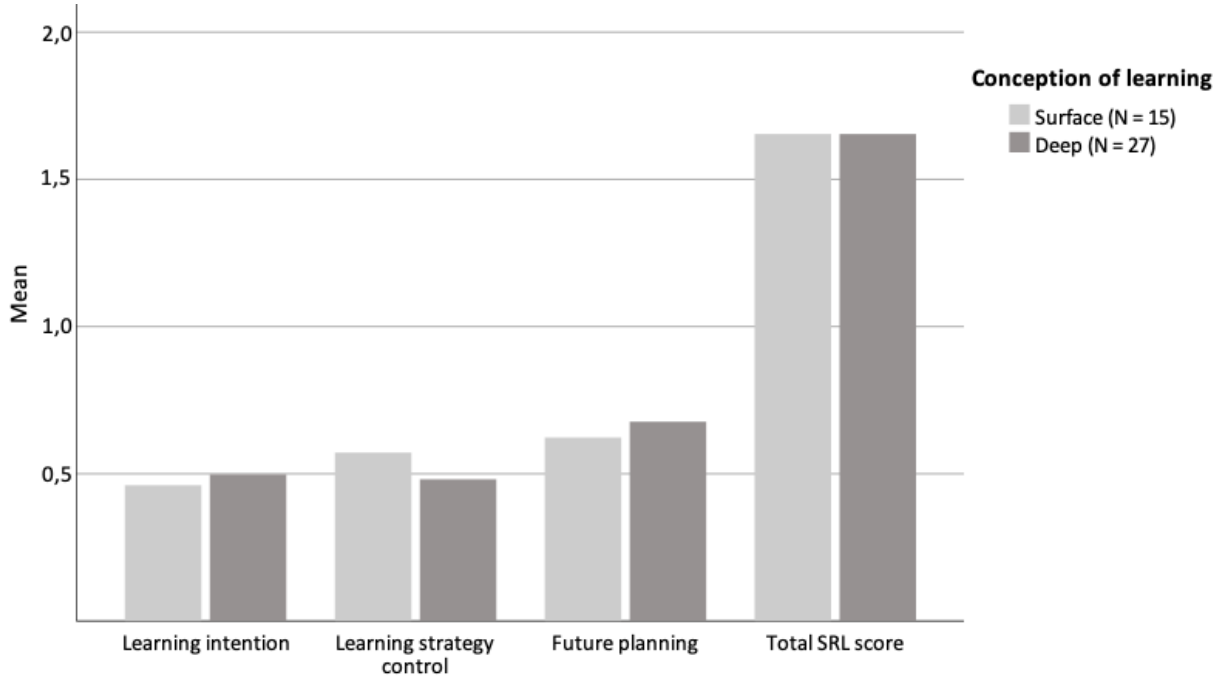

Figure 4. A multiple bar graph of mean score of SRL from surface and deep learners (*N* = 42).

5. Discussion and conclusion

On-demand education offers VET students the opportunity to decide which competences within the curriculum they prefer to develop according to personal needs during class, which demands that students regulate their learning process. Since it is not clear yet what aspiring beauticians are doing (in terms of learning strategies) and why they think they doing it (in terms of learning intentions) when learning in on-demand learning program, the aim of the present study was to increase the understanding of aspiring beauticians' learning approach in an on-demand educational program. Three questions were posed concerning the more stable part of SRL (called learning conceptions), the dynamic part of SRL (called self-regulation activities) and the relationship between them. In this chapter the most important findings, in relation to the three research questions, will be presented. Subsequently, limitations, suggestions for further research and practical implications will be discussed.

5.1 Learning conceptions

To answer the first research question, *What are aspiring beauticians' learning conceptions before and after a week of reflecting on learning experiences in an on-demand learning environment?*, 65 aspiring beauticians' learning conceptions were examined and 45 aspiring beauticians' conceptions after week of reflecting on learning experiences. By not privileging deep or surface conceptions of learning in advance, every aspiring beautician obtained a mean score on each of the learning five conceptions, including 1) *remembering, using and understanding information*, 2) *duty*, 3) *personal change,* 4) *process not bound by time or place* and 5) *development of social competence*. The use of an instrument such as the Conceptions of Learning Inventory (COLI) (Purdie & Hattie, 2002) made it feasible to study the similarities and differences between the students' mean scores on the learning conceptions.

The results show that in an on-demand educational learning environment, the average student scored higher on all five learning conceptions after a week of reflecting on learning experiences in an on-demand learning environment. However, the scores in COLI 2 were not significantly different from the scores in COLI 1. In addition, the average student saw learning particularly as a *duty* before and after a week of reflecting on learning experiences. It is plausible to argue that aspiring beauticians may see learning as an obligation necessary for each student. This could also be the reason why the score on the learning conception *duty* has a positive relationship with the number of completed Learning Moments questionnaires. This finding is congruent with Purdie, Hattie and Douglas' (1996) findings, which showed that students saw learning in several instances as a responsibility, *duty* or obligation that one has to oneself and other people (e.g. teacher or parents). Furthermore, the finding is also consistent with the findings of Cliff (1998), who showed that his group of students demonstrated that learning was a duty to some supreme being. If this is related to 'pleasing the teacher' it demonstrates implications as how the teachers are viewed by the students (Cliff, 1998). Therefore, it could be possible that students saw learning as an obligation that one has to the teacher.

On the contrary, the results show that in an on-demand educational learning environment, the average student saw learning particularly the least as a *personal change* before and after a week of reflecting on learning experiences. This finding is in line with Purdie's et al. (1996) findings, which showed that only small numbers of students indicated that they viewed learning in this way. It may be concluded that statements of this conception what was seen to lead to greater maturity, personal growth or improvements were formulated too abstract for the target group. For example, the description "widening my views about life" or "become a better person" focus on a total change of the person. In contrast, school students predominantly have a narrow and school-based view of learning within the classroom and often lack a much broader perspective of learning (Purdie et al., 1996). Aspiring beauticians may relate learning to what happens at school instead of personal fulfilment.

After a first indication of how aspiring beauticians overall saw learning, each student who scored higher than the mean on all five learning conceptions, including both deep and surface conceptions, were categorised in a separate cluster, called deep learners. Following Fuller (1999), learners do not have just one fixed learning conception, such as solely seeing learning as a *duty*, but they have multiple conceptions, perhaps in different relative strengths. Entwistle and Peterson (2004) also point out that both deep and surface learners may adapt different deep and surface learning conceptions in different situations. An ANOVA analyses revealed that the average deep learner especially scored higher on the learning conceptions *personal change, process not bound by time or place* and *development of social competence* compared to a more surface learner. This finding is congruent with Purdie and Hattie's (2002) findings, which showed that a deep conception involving the construction of meaning and personal change. On the contrary, surface conceptions correspond

more with surface knowledge which is the memorisation and tacit acceptance of information as isolated facts (Marton et al., 1993; Säljö, 1979).

By the use of an analysis such as the chi-square, four categories could be identified according to the conceptions of learning students had during the first and second COLI: remaining a surface, or deep learning conception, initially a deep learning conception which changed towards a surface learning conception and initially a surface learning conception which changed towards a deep learning conception. The post-hoc analyses showed that for every category, significant deviations were found, namely significantly more often students remained showing surface conceptions of learning after a week of reflecting on multiple learning experiences than would be expected. In addition, the post-hoc analyses showed also that the number of students who changed their conception of learning towards a deeper or more surface learning conception after a week of reflecting on multiple learning experiences was significantly smaller than would be expected. The results regarding changed learning conceptions are in contrary to the researcher's expectations, since it was expected that VET students with a surface learning conception changed their learning conception towards a deeper one after regulating their learning across different learning experiences. In retrospect, this might be caused by the fact that students needed more than one five school days to change their conception of learning. Especially the first-year aspiring beauticians were still used to the teacher-directed approach and were not properly prepared for SRL, thus possibly needed more time to change their learning conception. This view is in keeping with Perry (1970) who followed a group of students throughout their whole study and found that their conceptions changed over time. Additionally, Entwistle and Peterson (2004) also point out the fact that learning conceptions are somewhat resistant to change. Once freshmen enter a new learner environment (e.g. on-demand education or higher education), they encounter a range of different teaching methods which will create some conflict with their existing learning conceptions, which lead to some change in time (Entwistle & Peterson, 2004). In other words, students' conceptions of learning can and do change as a consequence of a changing context (Endedijk et al., 2016), such as entering the on-demand learning environment. However, it may be concluded that conceptions of learning will not change within five school days as was researched in this study.

5.2 Self-regulation activities

To answer the second research question, *How do aspiring beauticians regulate their learning across different learning experiences in an on-demand educational program?*, 244 completed Learning Moments questionnaires were obtained and examined in detail. In total, 175 times a student learned something and reported a learning experience. The use of an instrument such as the Structured Learning Report (Endedijk et al., 2016) made it possible to study what the students are doing strategies when learning. By means of this instrument, the researcher could study different learning outcomes (through the competency standards), diversity in learning intention (ranging from an unplanned goal to a predetermined goal), diversity in learning strategy control (ranging from an unconscious choice to a conscious choice), variety in future plans (ranging from no new plans to new plans), variety in learning strategies (e.g. talk to others) and the desire to seek for social assistance.

An elaboration of the outcomes regarding aspiring beauticians' SRL strategies will be displayed, following the phases of self-regulation Pintrich (2000) and Zimmerman (2000) used: forethought, performance and self-reflection phase. Concerning the *forethought phase,* which can be described as the planning beforehand, almost half of the students showed no degree of self-regulation in strategic planning and most of the time the whole learning experience was unplanned when learning

in an on-demand learning environment. This outcome is not surprising since outside the classroom activities are frequently authentic and hands-on which makes them less intentional and planned, but more contextual and collaborative than in traditional educational settings (Endedijk et al., 2016). When aspiring beauticians showed a half degree of self-regulation in planning, it was primarily an emergent goal for personal development. For most aspiring beauticians who showed a high degree of self-regulation in planning it was a predetermined goal in which they prepared themselves for future situations. In all cases this 'future situation' referred to a competency related to become a better beautician. Previous research found that being able to react on and anticipate to future situations is an essential aspect of a self-regulated learner (Raemdonk, 2006).

Concerning the *performance phase* which refers to performance control within the learner and different strategies merged to control their performance, most of the time aspiring beauticians chose strategy choices to practice something. This outcome is in line with previous research of Jossberger et al. (2011), stating that the traditional programs are increasingly replaced by internships and workplace simulations since vocational programs had to be competence-based since August 2010. This offers VET students the opportunity to learn something in practice. In contrast, analysing or thinking of a specific situation was used least frequently as strategy choice. Additionally, for most aspiring beauticians it was an unconscious choice to control their learning strategy which indicates that it was not a conscious choice to learn that way. As Endedijk et al. (2016) points out, learning in informal settings consists of reactive and unconscious learning, which is likely the case for on-demand education since VET students are required to learn both inside and outside the classroom though innovative sources of information and become better beauticians in an authentic way. When aspiring beauticians showed a half degree of self-regulation in controlling their learning strategy, it was frequently a conscious choice which was commissioned by another person. Since a vast majority of aspiring beauticians sought social assistance by asking classmates and a teacher, this person is in all probability one of them. When aspiring beauticians showed a high degree of self-regulation in controlling their learning strategy it was also a conscious choice, but frequently because they thought it was the quickest or easiest way. These students were able to focus their attention on the learning activity in question and are therefore more likely to use systematic techniques and monitor this process (Zimmerman, 1998).

Concerning the *reflection* phase where learners reflect and evaluate their reactions to performance goals compared to the outcomes, aspiring beauticians just learned something related to the competency standards the ROC of Twente uses for students to become a beautician. The most frequently used competencies were *professionalism* and *manage salon* and competence *hair care* was merely used four times. Hair care is an optional part in the curriculum and therefore this competence is presumably not mentioned frequently. In contrast, the competence *professionalism* is likely chosen primary since the body of knowledge within the profession is leading the specification of what is needed in terms of competence of the processional. As such for students it is seen as a set of context-specific performance requirements to complete their study. Furthermore, almost half of the students scored a high degree of self-regulation in future planning because they wanted to improve what was learned. It is striking that although learning most of the time is unintentional or planned, almost half of the students want to become better at it. This is in line with Endedijk et al. (2016) who states that unintentional learning activities can still involve active regulation activities, and that therefore setting goals as planned beforehand is not a prerequisite for active regulation of learning. When students showed a half degree of self-regulation in future planning, they frequently wanted to continue exactly in line with what was learned. Difference was found in Aagten's (2016) study, since most of the healthcare professionals who showed a half degree of self-regulation in future planning had the

purpose to apply the learned content in practice. It could be possible that VET students continuing exactly in line with what is learned because they will presumably pass for a test when they copy the teacher's behaviour or performance. For instance, when a teacher shows how to perform a facial treatment in practice it makes sense that students imitate this performance exactly to practice proper order. This form of imitation is also called 'dramatic imitation' and is availed of in teaching subjects. It can be said, therefore, that imitation is the basis of learning in many school subjects (Wylie, 2012).

5.3 Relation between degree of self-regulation and learning conceptions

To answer the third research question, *How are aspiring beauticians' degree of self-regulation and their learning conceptions related?*, the researcher examined what the 42 students were doing (learning strategies) during a learning experience and why they think they were are doing it (learning intentions) in detail. The students have in common that they reported at least two learning experiences and completed both COLI's. The use of an analysis such as the product-moment correlation coefficient made it possible to study the strength of association between: students' background variables, mean degree of self-regulation, number of Learning Moments questionnaires and students' mean distance of the five learning conceptions. Furthermore, the use of an ANOVA analysis made it feasible to compare students' mean scores of the SRL variables *learning intention, learning strategy control* and *future planning* and their total mean degree of self-regulation with students' conception of learning.

The results show that in an on-demand educational program, deep learners had exactly the same total SRL score on average compared to surface learners. An average surface learner even scored slightly higher on controlling their learning strategy compared to an average deep learner. On the contrary, deep learners scored on average a bit higher on having a learning intention and make future plans. To summarise, the deep approach to learning did not positively relate to a high degree of self-regulation. The results regarding aspiring beauticians' degree of self-regulation and their learning conceptions are in contrary to the researcher's expectations, since it was expected that VET students with a deep conception of learning will show a high degree of self-regulation. It was also expected that VET students with a more surface conception will showed a lower degree of self-regulation. The results, however, did not show that this relation was profitable. The results were in line some other studies in which deep learners did not report greater use of deep learning strategies or did not correlate with study success and the achievement of high grades (Baeten, Dochy, & Struyven, 2008; Gijbels & Dochy, 2006). According to Kember et al. (1995) the use of a deep approach to learning would only positively correlate with study success, if the students worked hard enough. Conceivably, students' motivation should also be taken into consideration when finding a positive relationship between a high degree of self-regulation and deep learning conceptions. A possible explanation for these outcomes is discussed through the results of the product-moment correlation coefficient.

The results show that in an on-demand learning program, students' total SRL score was negatively correlated with the learning conception *development of social competence*. In other words, before reflecting on multiple learning experiences, a negative relationship was found between students who saw learning as the development of social competence, which refers to a deep learning approach, and their degree of self-regulation. This relationship was no longer present after reflecting on multiple learning experiences. Previously, the results showed that the average student saw learning particularly as a *duty* before and after a week of reflecting on learning experiences. Additionally, the results showed a positive relationship between the number of completed Learning Moments questionnaires and the mean score on the learning conception *duty.* It is plausible to argue that the

average aspiring beautician sees learning just an obligation necessary for each student within the classroom instead of an interactive process that occurs between people. This finding is congruent with Thomson's (2017) findings, which showed that university students also rated *developing social competence* as one of the less applicable when asked to rank the conceptions. In Thomson's (2017) study, students were asked to rank Purdie and Hattie's (2002) learning conceptions into which were most pertinent for them. The learning conceptions that was most relevant to their experience and awareness of the term 'learning' was *increasing knowledge*. This result corresponds with the finding of the present study in which the average student saw learning particularly the second to last as the *developing social competence* before and after a week of reflecting on learning experiences. Subsequently, in Thomson's (2017) study, students were asked about the meaning of the term 'learning'. However, there was no clear answer to the question. For instance, one student responded with the question "What you mean for learning on our program, our learning activities, or for learning in general?" (p. 111). This example question highlights the argument that the term 'learning' is not static for university students in Thomson's (2017) study. In the present study, this could also be the case since the study was conducted within a Vocational Education and Training school. Due to the fact that there was possibly an unclear or understandable meaning of the term 'learning', it may be the case that especially surface learners scored high on this learning conception. It is conceivable that the students who are particularly focused on out-of-school personal relationships and socialization instead of on school achievement are scored high on the statements of the learning conception *developing social competence* in the COLI, such as on the description *learning is developing good relationships*. Biggs and Moore (1993) referred to studies in which poor academic beliefs were related to surface approaches. Conceivably, students' meaning about learning should be taken into consideration when finding a positive relationship between a high degree of self-regulation and deep learning conceptions.

5.4 Limitations and suggestions for further research

Although the present study offers striking findings concerning the concept self-regulation, it also reflects a number of limitations. First, the extent to which the results can be generalised for the VET students in similar on-demand educational contexts is unclear. The relatively limited match (N = 42) of aspiring beauticians who have completed both COLI 1, COLI 2 and who reflected at least on two learning experiences could be problematic. In addition, the study was restricted to one on-demand educational program which could be a limitation for the external validity. A generalisation should depend on additional research in other VET and on-demand contexts. Furthermore, no control group was implemented. Subsequent research should benefit from the use of a control group to investigate whether the results of COLI 2 were really due to the experience with reflecting on learning experiences and not to other events students experienced between COLI 1 and 2. For instance, Gijbels and Dochy (2006) wanted to probe the relations between students' approaches to learning and hands-on experiences and used a control group to rule out alternative explanations of the results.

Another limitation concerns the duration of the Learning Moments questionnaire. The routine questions were limited to five constructive days, which represent the length of one school week. However, the first-year aspiring beauticians were still used to the teacher-directed approach and were not properly prepared for SRL. It might take longer for these students to develop appreciation of on-demand education and a deeper conception of learning subsequently. This suggestion is in line with Petli (2016), who suggests increasing the period of data collection since more reported learning experiences could be expected to be gathered. Longitudinal research is needed to offer freshmen better opportunities to become acquainted with on-demand education and to reach a more proper

understanding of the developmental processes of SRL skills. Furthermore, longitudinal research is needed because it was difficult to determine if aspiring beauticians changed their conception of learning towards a deeper or more surface conception of learning after a week of reflecting.

Fourth, the Learning Moments questionnaire used an off-line method that was administered after task performance based on the learner's experiences in the past (Veenman, 2011). However, a serious validity problem pertains to the off-line nature of self-reports since the learners have to consult their memory to reconstruct prior performance. This reconstruction process might suffer from memory failure and distortions since the majority of learning takes place unconsciously (Tynjälä, 2008). Thinking out loud, eye movement registration and logfile registrations of students' activities on the computer of telephone are all examples of on-line methods taken concurrent to task performance whereby memory failure can be prevented (Veenman, 2011). Future research can adapt the Learning Moments questionnaire by the use of on-line methods during reading and text studying.

Fifth, it is recommended to critically consider the classification of the degree of self-regulation based on the answers in the Learning Moments questionnaire. The study of Aagten (2016) was the point of reference used for the classification in the present study. However, according to Aagten (2016) it was challenging to make a distinction between a high degree of self-regulation which is mostly characterized by self-initiation (1.0 point); a half degree of self-regulation which is often characterized by external stimulation or by not choosing consciously (0.5 points); and no degree of self-regulation (0.0 points). For instance, a student can choose between six number of choices when answering the question corresponding to the variable *future planning*. Merely one answer option reflected no degree of self-regulation in future planning, three answer options reflected a half degree of self-regulation in future planning and two answer options reflected a high degree of self-regulation in future planning. Therefore, there was no equal division of the extent to which someone showed self-regulation.

Lastly, and in line with the previous recommendation, it is recommended to be careful when interpreting the degree of self-regulation based on the point system in the Learning Moments questionnaire. The SRL scores offer an indication of the degree of self-regulation (e.g. no degree of self-regulation). However, solely a score from one to three does not offer insights in the learning experience itself. This means that an aspiring beautician with a higher degree of self-regulation did not learn more from a learning experience than an aspiring beautician with a lower degree of self-regulation. This finding was also highlighted in Figure 2 where examples were given of students' learning experiences with both a gained SRL score of two points. When observing the point system of the Learning Moments questionnaire, these students seems identical to each other because the number of gained points. However, what they actually learned differed completely from each other. In sum, the use of the point system limited deeply insights about the learning experience itself.

In sum, in spite of its limitations and although previous studies into learning conceptions and learning approaches were conducted in secondary education, the examination of concrete SRL activities on the micro-level in an on-demand educational environment (Learning Moments) combined with the classification of surface and deep learners (COLI's) before and after reflecting on learning experiences was never conducted before in this area. However, more studies using this mixed method design are necessary to examine if the combination of the two measurements is reliable to measure a possible relationship between the more stable part of SRL (learning conceptions) and the more dynamic part of SRL (self-regulation activities). Follow-up research will contribute to the understanding of the concept self-regulation in a relatively new context on-demand education which is needed since SRL is an essential skill for learning in an on-demand educational program.

5.5 Practical implications

The Monday after the data was gathered, the researcher went to the classes where the aspiring beauticians were at that moment and demonstrated the appreciation of their contribution by thanking them in person. Various aspiring beauticians expressed their unsolicited feedback about the triangulation of questionnaires that were offered on their mobile phones. They gave the most accurate perception of the present research because they experienced the research first-hand. The comments from the students indicated that their participation aided them to be more aware of their experiences in the past and how they actually learn. It is also of note that students were happy to complete procedures such as consent and data collection by mobile phone and that the mobile phone should be used in a multitude of ways from an educational perspective. Therefore, a practical implication for the ROC of Twente could be to offer students more opportunities to become aware of what they actually learned during (on-line) or after (off-line) the performance of a self-chosen learning activity. When observing aspiring beauticians' *strategy choice* during their learning experience in an on-demand learning environment, just 3.4% learned by analysing or thinking of a specific situation. This result indicates that reflecting on everything, including the process, the choices and discoveries that are made within the on-demand environments requires more attention. For instance, students can be inspired to think deeply about their learning journeys by asking the proper self-reflection questions. It is shown that adding additional 'why' and 'how' questions is an effective approach to prompt students to diagnose their past performance and plan future learning (Kicken, 2008).

Moreover, this study showed that most students had a deep conception about learning. In addition, no evidence was found that students with deep learning conceptions showed a higher degree of self-regulation than students with surface learning conceptions. For the ROC of Twente who introduced an on-demand educational program for aspiring beauticians it means that 64.6% of their students already were identified as having deep conceptions of learning before reflecting on learning experiences. These students do not see learning as the memorisation and tacit acceptance of information as isolated facts but linked what is learned to already known concepts and principles, therefore leading to a deep understanding and long-term retention of concepts (Marton et al., 1993; Säljö, 1979). Unfortunately, it seems insufficient to ensure that those students regulate their actual behaviour in their learning process in the on-demand educational environment. However, being a self-regulated learner is a prerequisite to function effectively in an on-demand learning environment (Kicken, 2008). For that reason, it is recommended for the ROC of Twente to support the development of these SRL skills with tools such as reflection reports and (digital) portfolios to support and enhance the development of SRL skills of students in on-demand education. For instance, Kicken et al. (2009) developed A Structured Task Evaluation and Planning Portfolio (STEPP) to help aspiring hairdressers developing basic SRL skills. Both the supervisor and aspiring hairdressers who frequently used STEPP perceived its use as a positive contribution to the development of SRL skills. In regard to the outcomes of the present study, it is advised to put emphasis on the SRL variables in which the students scored low instead of on the basic SRL skills used in STEPP. This will support the development of students' degree of SRL and help students engage more in meaning-oriented learning activities. Engaging more in meaning-oriented learning activities (which refers to a deep approach to learning) can also be encouraged by promoting self-consciousness among students about how they learn (Jackson, 1995). For instance, they can be fostered by using reflection, peer grading or teamwork. Jackson (1995) State stat recognition is the start of understanding students' approach to learning.

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Appendix A: General background questionnaire

Introduction on website

Welcome, you made it to the website of this study. Thank you in advance for helping me with my research. By answering the following questions about your background and learning conceptions, I will learn more about who you are and what you think about learning. It takes approximately 15 minutes to compete the two questionnaires. On the last page of the second questionnaire, you can download the Incredible Invention Machine application by means of a link for both IOS and Android. After you have downloaded the application, login with your mail address and password. Do not forget to turn on the pop-up text notification of the application for a daily reminder. Moreover, make sure you remember the password with the corresponding mail address you must enter on the next page.

Information application

Within the downloaded application you will receive a few questions about what you have learned during the day, called 'Learning Moments'. What you have learned must contribute to the development of becoming a beautician. The five questionnaires within the application will be sent from the following Monday till Friday every evening at five o'clock. Till 12 o'clock you have the possibility to complete the questionnaire for that day. Filling in the questionnaire in the application takes approximately five minutes, depending on the learning experience you had that day. It may be possible that you do not have time to register your learning moment or did not learn anything that day. If that is the case, simply open the application and press on the button that you did not learn anything, and it will close automatically. After the last questionnaire has been completed on Friday night, you will receive the final survey about your learning conceptions within the application. The last questionnaire can be completed in approximately 10 minutes. Make sure that you answer all questions because otherwise your answers will not be saved.

Everyone who completes the following two questionnaires and uses the application from Monday for five days will receive a small present. If you have any questions with regard to the study or if you need technical assistance or help, please WhatsApp, call or mail me (*work phone number and work mail address*).

Informed consent

As explained in class, this study is intended to find out more about how you learn as an aspiring beautician and how this can be improved. To participate in this study, permission is required on the following six statements:

1. I have heard the information in class and viewed the PowerPoint about the research. I could ask additional questions and my questions have been answered satisfactorily. There was enough time to decide whether I would like to participate;
2. I know that participating is completely voluntary. I am aware that I can decide at any time not to participate. I do not have to give a reason for that;
3. I know some people can see my data. I have the right to see how my data is stored;
4. I give permission to use my data for this study. If there is reason to use the data for another research purpose, permission will be requested again;
5. I know that any conversation in WhatsApp or by mail will be destroyed after the study is completed;

6. I am aware that the obtained data will be stored anonymously for 10 years after the end of this study for further analysis in the context of this research.

Press on the button 'I agree' when you agree to the terms and conditions on this page. When you do not agree to the terms and conditions, press the button 'I do not agree'. In that case you cannot continue to the next page and the website will close automatically.

Background questions

In this first questionnaire I want to find out a few things about you through the following seven questions. Please answer the questions honestly and press on the corresponding buttons.

What is your age?

1. 16
2. 17
3. 18
4. 19
5. 20
6. 21
7. 22
8. 23
9. 24
10. 25
11. Older than 25

What is your gender?

1. Man
2. Female
3. Prefer not to say

What grade are you in?

1. 1
2. 2
3. 3

On which level of education do you follow the on-demand educational program?

1. Level 3
2. Level 4

What is your highest level of education?

1. Pre-vocational secondary education
2. Senior general secondary education
3. VET Level 2
4. VET Level 3
5. VET Level 4
6. Senior general secondary education not graduated

What form of degree program are you in?

1. Standard degree program
2. Accelerated degree program

Appendix B: Conceptions of Learning Inventory

In this second questionnaire I want to learn about your conceptions of learning. In the following 32 statements something is said about what learning means. Please indicate to what extent the statements below fit you. There are no wrong or right answers, so give your honest opinion. Please read each statement and decide on a 6-point scale how much you agree or disagree. 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree and 6 = strongly agree. After the last statement, you can download the application on your mobile phone and login.

Learning as gaining information (INFO)

1. Learning is when I am taught something that I did not know about before.
2. Learning is taking in as many facts as possible.
3. When someone gives me new information, I feel that I am learning.
4. Learning helps me to become clever.
5. Learning means I can talk about something in different ways.

Learning as remembering, using and understanding information (RUU)

6. When something stays in my head, I know I have really learned it.
7. If I have learned something it means that I can remember that information whenever I want to.
8. I should be able to remember what I have learned at a later date.
9. I have really learned something when I can remember it later.
10. When I have learned something, I know how to use it in other situations.
11. If I know something will I can use the information if the need arises.
12. Learning is making sense out of new information and ways of doing things.
13. I know I have learned something when I can explain it to someone else.
14. Learning is finding out what things really mean.

Learning as a duty (DUTY)

15. Learning is difficult but important.
16. Even when a learning task is difficult, I must concentrate and keep trying.
17. Learning and studying must be done whether I like it or not.

Learning as personal change (PERS)

18. Learned has helped me to widen my views about life.
19. Learning changes my way of thinking.
20. By learning, I look at life in new ways.
21. Learning means I have found new ways to look at things.
22. Increased knowledge helps me become a better person.
23. I use learning to develop myself as a person.
24. When I learn, I think I change as a person.
25. Learning is necessary to help me improve as a person.

Learning as a process not bound by time or place (PROC)

26. I do not think that I will ever stop learning.
27. I learn a lot from talking to other people.
28. Learning is gaining knowledge through daily experiences.

Learning as the development of social competence (SOC)

29. Learning is knowing how to get on with different kinds of people.
30. Learning is not only studying at school but knowing how to be considerate to others.
31. Learning is the development of common sense in order to become a member of society.
32. Learning is developing good relationships.

Appendix C: Dutch translation of Conceptions of Learning Inventory

Leren als het verkrijgen van informatie (INFO)

1. Leren betekent: wanneer mij iets verteld wordt dat ik eerder nog niet wist.
2. Leren betekent: het opnemen van zoveel mogelijk feiten.
3. Wanneer iemand mij nieuwe informatie geeft, heb ik het gevoel dat ik leer.
4. Leren helpt me om slimmer te worden.
5. Leren betekent dat ik op meerdere manieren over een onderwerp kan praten.

Leren als het onthouden, gebruiken en begrijpen van informatie (RUU)

6. Als er iets in mijn hoofd blijft hangen, weet ik zeker dat ik iets geleerd heb.
7. Als ik iets heb geleerd, betekent dat ik me deze informatie kan herinneren wanneer ik dit wil.
8. Als ik iets heb geleerd, moet ik me dat op een later moment kunnen herinneren.
9. Ik heb echt iets geleerd als ik het me later kan herinneren.
10. Wanneer ik iets heb geleerd, weet ik hoe ik het moet gebruiken in andere situaties.
11. Als ik iets goed weet, dat kan ik de informatie gebruiken als dat nodig is.
12. Leren betekent: het betekenis geven aan nieuwe informatie en manieren om dingen te doen.
13. Ik weet dat ik iets geleerd heb, als ik het aan een ander kan uitleggen.
14. Leren betekent: uitzoeken wat iets echt betekent.

Leren als een plicht (DUTY)

15. Leren is moeilijk, maar belangrijk.
16. Ik moet me concentreren en het blijven proberen zelfs als leren moeilijk is.
17. Leren moet gebeuren, of ik het nu leuk vind of niet.

Leren als persoonlijke verandering (PERS)

18. Leren heeft mij geholpen om mijn blik op het leven te verruimen.
19. Leren verandert mijn manier van denken.
20. Door te leren, kijk ik op nieuwe manieren naar het leven.
21. Leren betekent dat ik nieuwe manieren heb gevonden om naar dingen te kijken.
22. Leren helpt me om een beter persoon te worden.
23. Ik gebruik leerervaringen om mijzelf als person te ontwikkelen.
24. Als ik leer, dan heb ik het gevoel dat ik als persoon verander.
25. Leren is nodig om mijzelf als persoon te ontwikkelen.

Leren als een proces dat niet gebonden is aan tijd of plaats (PROC)

26. Ik denk niet dat ik ooit zal stoppen met leren.
27. Ik leer veel door te praten met anderen.
28. Leren is het krijgen van kennis en inzichten door dagelijkse ervaringen.

Leren als de ontwikkeling van sociale competentie (SOC)

29. Leren betekent: weten hoe je met verschillende soorten mensen kunt omgaan.
30. Leren betekent niet alleen lessen volgen, maar weten hoe je rekening kunt houden met anderen.
31. Leren betekent: de ontwikkeling van gezond verstand om een onderdeel te kunnen zijn van de samenleving.
32. Leren betekent: het ontwikkelen van goede relaties.

Appendix D: Learning Moments questionnaire

Title page application

Welcome aspiring beautician in the Incredible Invention Machine application! You will receive a questionnaire within this application from the following Monday to Friday at five o'clock every evening. You have the possibility to complete the questionnaire until 12 o'clock the same evening. To remind you of completing the questionnaire, this application will send you a pop-up notification every evening at five o'clock. When the pop-up notification is ignored and the application is not opened, a repeated pop-up notification will be sent at eight o'clock.

Explanation application

Let's start! I am going to tell you why I asked you to use this application for one week. I want to know if you have learned anything on a specific day, and if so, what. It must contribute to becoming a better beautician. You do not need to have learned this within the classroom, but you could as well learn something by:

- Watching vlogs on YouTube (e.g. applying makeup) in your leisure time;
- Hearing something from a friend or parents that you did not know (e.g. information about a new beauty salon in Amsterdam);
- Learning at work or internship (e.g. learning how to make a gift voucher for customers);
- Seeing something on Instagram you did not know before (e.g. taking beautiful promotion photos for a beauty salon).

Frequently, learning is seen as something that solely happens at school. However, learning happens all around us, including at work, at home, on holiday and in many different ways. For instance, "Today I have learned from a vlog how to apply makeup in a new way." For a week, after every school day you will be asked about what and how you have learned through a questionnaire. This will take approximately five minutes. Be aware that the answers will not be saved if you close the application halfway while filling it in. When you have answered the last question in the questionnaire, remember to press the button 'OK!'

Learning Moments questionnaire

Phase	Variable		Item with corresponding categories	Next item
		1.	Hello aspiring beautician! Did you learn anything today?	
			Yes	3
			I am not sure, give me a hint	2
			No	2
		2.	Learning does not solely take place at school to become a better beautician. Perhaps you have something learned from: - A vlog (e.g. explanation about beauty products) - Netflix (e.g. learning how people treat each other) - Search for something (e.g. searching on Google) - Collaboration (e.g. learning to listen to other students) - Internship or work (e.g. learning to explain treatments) - Homework (e.g. learning to make business cards)	
			Yes, I know now	
			No, still nothing	3

				12
Self-reflection	Reflection on learning outcome	3.	What have you learned during this experience? *Participant input*	4
Fore-thought	Strategic planning	4.	Did you intend or plan to learn this? Yes, I planned to learn this	5
			Not specifically for this moment, but I had an intention	5
			No, it just happened to me	6
	Learning goal orientation	5.	What was the most important reason to learn this? Out of curiosity	6
			I wanted to develop myself	6
			Prepare myself for future situations	6
			I was stimulated by others to develop myself in this	6
			My teacher thought it was necessary	6
Perfor-mance	Strategy choice	6.	How did you learn this? Practice something (e.g. during practice)	7
			Get something explained (e.g. during theory)	7
			Experiencing during work or internship	7
			Looking at how someone else does something	7
			Information searching (e.g. in a magazine or online)	7
			Receiving feedback on something I had done	7
			Analysing or think carefully of the specific situation	7
			Talk or explain with others (e.g. classmates)	7
			Other	7
		7.	Did you plan in advance to learn it in this way? Yes	8
			No	9
	Learning strategy control	8.	What was the most important reason to learn this? There is no other way	9
			This is the quickest and easiest way	9
			This manner of learning works for me	9
			Suggestion from someone else to learn it this way	9
			I do not know	9
	Seeking social assistance	9.	Were other people involved in this activity? Yes	10
			No	11
	Seeking social assistance	10.	What other people were involved in this activity? Classmate	11
			Teacher	11
			People on internship	11
			People at work	11
			Model or customer	11
			Family	11
			Student and teacher	11
			Otherwise	11
Self-reflection	Future planning	11.	How will you proceed with this learning experience? No new plans	13
			Try another time	13
			Continue exactly in line with what I learned	13
			Improve what is learned	13
			Apply the learning content in practice	13
			New learning goal	13
		12.	Wait! Press the button 'OK!' before you close the application. Thank you very much for filling in this questionnaire. You can complete the following Learning Moments questionnaire tomorrow after five o'clock!	

Appendix E: Coding Scheme

In the Learning Moments questionnaire, the third question, *What have you learned during this experience?*, was open-ended and required a coding scheme. The participants' answers are categorised in order to establish a framework of thematic ideas about it. The codes are based on 10 competencies the ROC of Twente utilizes. The competencies cover the following 10 key functions to become a beautician : 1) manage a salon, 2) maintain health and hygiene, 3) maintain skin and beauty care, 4) perform massage therapy, 5) perform basic and treatment facial, 6) perform manicure and pedicure, 7) perform makeup, 8) perform hair care and designing, 9) develop professionalism, and 10) entrepreneurship development. Skills and knowledge are both important for the development of the competencies. For instance, demonstrating various massage strokes is a skill for maintaining massage therapy. In addition, learning about the importance of pressure points is important knowledge for maintaining massage therapy. All learning experiences that the participants reported contribute to becoming a better beautician.

Open Question Codes, Definitions and Examples

Code	Description	Examples
Manage a salon	Be able to manage salon well lit, ventilated, infection free, hygienic, clean and skilfully: - Manage time effectively - Communicate effectively in a workplace - Work in a team - Procure salon furniture, tools, equipment and products - Make appointments and promote products and services - Maintain client's records - Maintain workplace security - Maintain revenue and expenses of salon - Prepare workstation - Reorganize workstation	- I applied the communication skills learned in school to my internship - I have learned that it is important to keep a cool head when a client becomes aggressive. I communicated with this problematic client calmly and professionally.
Maintain health and hygiene	To maintain workplace hygiene and is designed to ensure keeping the work area clean and safe: - Maintain personal hygiene - Maintain workplace hygiene - Sanitize tools and equipment - Dispose cosmetic waste, tool and equipment - Follow professional health and safety	- During Biology I have learned that working hygienically reduces the number of bacteria
Maintain skin and beauty care	Introduce aspiring beauticians to the knowledge and understanding required to carry out basic beauty care skills and routines like skin care or facials: - Perform skin analysis - Perform skin cleansing - Apply face polishing - Perform exfoliation - Apply wax for facial hair removal - Apply face mask - Select suitable products according to the skin	- I noticed that my model had active acne which is a contraindication for giving a treatment - I communicated with the client about applying wax on her eyebrows on a professional manner

Perform massage therapy	Aspiring beauticians will be able to perform massage therapy of different body parts for relaxation of muscles: - Massage techniques and strokes - Select suitable massage oils according to the skin type - Perform face, head, body, aroma, additional, Thai or Swedish massage	- I explained the procedure of the massage to the client for the first time - I understood the client's needs and wishes for the massage type choice
Perform basic and treatment facial	Aspiring beauticians will study the theory of all facial contraindications and recognition of skin diseases and all of which are an important part of the training: - Perform basic facial - Perform facial for sensitive skin conditions - Perform facial treatment for combination skin condition - Perform pigmentation treatment - Perform acne treatment - Perform aging or wrinkled skin treatment - Treat sun burned tanned skin	- Today I have learned about the importance of steaming the face when having an acne skin type - I have learned from monitoring the duration of time in the facial treatment
Perform manicure and pedicure	For manicure and pedicure and the selection of the products which are used, to obtain skill and knowledge required for providing nail and cleansing services and selection of products: - Prepare the client for manicure or pedicure - Identify the nail/skin disorder and diseases - Select the suitable equipment and cosmetics for the treatment of manicure or pedicure - Provide manicure or pedicure - Perform nail art	- I performed a manicure treatment for the first time on a model
Perform makeup	Introduces aspiring beauticians to basic makeup skills such as party and bridal makeup: - Prepare the client for makeup services - Identity the skin disorder and diseases - Select suitable products and implements for makeup - Perform basic makeup procedure - Perform party, casual, model, fantasy, permanent or bridal makeup - Perform body art	- I have learned to make pre makeup arrangements to prevent disagreement later on - I have learned to use different eye products for extreme effects
Perform hair care and designing	Introduces aspiring beauticians to basic hair care skills such as shampooing, conditioning, hair colouring, cutting, and styling and blow-drying: - Analyse hair - Perform shampoo and conditioning - Perform blow drying - Make hair styles - Perform hair colouring - Perform hair cutting	- During biology I have learned that hair textures can be very different per person - I have learned that there are different face shapes such as oval and pointed
Develop professionalism	Train aspiring beauticians in workshops, skin cosmetic companies, interact with other salons,	- I have learned to behave in a manner which

	colleagues consult with experts participate in skill competitions intern with skin therapist: - Attend workshops on latest beauty therapy techniques - Interact with another salon - Participate in trainings - Consult with experts - Market salon services, product and prices - Attend seminars - Greet and receive clients and guests	contributes to becoming a professional beautician - I have learned from an interaction with a professional in the same field
Entrepreneurship development	Knowledge, skills and attitudes in entrepreneurship skills training in the vocational and technical education that will best meet the economy of the country. This competency also develops positive attitude towards self-employment: - General concept of Entrepreneurship - Define an Entrepreneur - Knowledge of employment - Recognize the small business characteristics - Explain the business environment - Identification of legal forms of business ownership - Creativity and business opportunity identification - Prepare marketing plan - Maintain stock record - Prepare business plan - Financial management	- Today we made a business plan at school and now I know how to start my own beauty salon - During the class Economics I have learned how I can improve my business' financial position which can be very useful