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Student teachers' views of competence goals in vocational teacher education

Competence-based education (CBE) is an international educational trend and a core issue in developing Finnish vocational upper secondary and higher education. The theory and practice of the competence-based approach should preferably be included in vocational teacher studies. Yet, there are still relatively few organisations implementing competence-based vocational teacher education in Finland. This article examines the realisation of competence-based vocational teacher education. The small-scale mixed-method case study explains the student teachers' conceptions of the competence goals in their studies. The competence goals describe the competencies to be achieved as a result of training. According to the research findings, competence goals clarify the student teachers' understanding of the demands of a teacher's work, facilitate students to reflect on their competences and help in preparing individual study plans and promoting their studies. However, the student teachers need university teachers' guidance to get their studies started and to promote the competences flexibly.

Keywords: Learning objectives, learning pathway, student teacher, coaching, student mentoring

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1. Introduction: Competence-based education in Finland

Competence-based education (CBE) has been one of the core issues in school-based vocational education both at the tertiary and secondary levels. In higher education institutions, the structure of education has been adapted to respond to the agenda of the European Bologna Process. In Finland, a two-staged degree structure of bachelor's and master's degrees as well as the European Credit Transfer and Accumulation System (ECTS) were adopted in 2005 (Arene 2007; Niemi and Jakku-Sihvonen 2011). At the same time, practices were renewed to promote competence-based approaches in higher education. One remarkable issue was the national recommendation regarding the competence areas of higher education qualifications (the National Qualifications Framework or NQF) according to the European Qualifications Framework (EQF) (Arene 2007; OSPE 2014). In secondary vocational education, competence-based practices were adopted in 2015. The present vocational education reform is based on strengthening both learning in workplaces and a student-centred approach by making students the subjects of learning and assessment processes. According to the Finnish National Board of Education (FNBE 2015), vocational skill requirements are defined as competence goals (aka learning objectives) that materialise during occupational activities.

CBE is not only a Finnish phenomenon; it has become international (Baartman et al. 2006; Biemans et al. 2009; De Bruijn and Leeman 2011; Struyven and De Meyst 2010; Wesselink et al. 2010). In CBE, the competence goals are clearly defined in order to form the basis of continuous learning and assessment. Learning activities take place in different authentic situations, where a student's self-responsibility and self-reflection are stimulated by teachers on the one hand, and by professionals in work life on the other. As an overarching CBE theme, an attitude of lifelong learning is instilled in the students (Wesselink et al. 2007; cf. De Bruijn 2012). The definition above is in line with the educational political emphases of the European Union, stressing that education is based on the recognition of competence according to the competence goals, individual learning pathways and the support of lifelong learning (European Commission 2010; also, Andersson, Fejes, and Sandberg 2013).

In several research reports (Bowden and Marton 1998; Colman 2009; Ellström 1994, 1998; Farrugia 2001; Mulder and Winterton 2017; Struyven and De Meyst 2010; Weinert 2001), competence has been defined as the ability to perform a task, process, or action in a proper way in specific contexts. From the competence point of view, what is essential is the student's personal attitude, ability to solve problems and ability to reflect on his/her skills and development in relation to competence goals (de Bruijn and Leeman 2011; Korthagen and Vasalos 2005; Portillo Vidiella and Cano Garcia 2016; Struyven and De Meyst 2010).

From the perspective of this study, the significance of competence goals is substantial. As early as in the 1990s, educationalists recognised that role-relevant competencies – including the respective standards – had to be identified and defined in CBE (Jessup 1991; Watson 1991). Respectively, the creation of learning objectives has been stressed as a prerequisite of any educational endeavour (Lum 1999). Subsequently, competence goals have been described as the basis of study programmes (Wesselink, de Jong, and Biemans 2010) and as course setters for educational programmes (Mulder 2017a).

1.1 Competence-based vocational teacher education

The competence-based approach has affected vocational teachers' work both in Finland and internationally. Instead of concentrating on mere knowledge transmission, the teacher is a versatile coach of student learning, which demands strong pedagogical competence (Biemans et al. 2009; de Bruijn and Leeman 2011; Misbah et al. 2015). In CBE, the student prepares an individual study plan according to the competence goals defined for the qualification by the curriculum (FNBE 2015). The student proceeds in his/her studies by developing competence in relation to the competence goals. The competence acquired should be demonstrated in authentic practical work tasks that will be assessed (FNBE 2015; Mulder 2012a; Wesselink et al. 2007). To acquire the best learning outcome, coaching by teachers is essential in all phases of the learning process (Wesselink et al. 2010).

The principle is clear, yet many teachers still agonise over realising competence-based teaching in their work (Wijnia et al. 2016). One of the background factors that affects their work may be related to the situation in Finnish teacher education: Competence-based approaches have been one of the themes of studies in vocational teacher education for years, but their actual realisation in practice has not found its proper place. Education has been academic, and even though the teacher may be aware of competence-based programmes, he/she has no practical experience of them (Ministry of Education 2006).

Efforts have been made to solve the problem in different countries. For instance, in Britain, there was a heated discussion at the beginning of the 1990s on the relative emphases placed during teacher education on the so-called apprentice model and the academic model, based on educational theories. The question arose regarding the possibility of establishing teacher education based on a system such as the National Vocational Qualifications (NVQs), in which teacher competence is described in detail through competence goals as practical work (Hodkinson and Harvard 1994). Correspondingly, in the

USA, as early as in the 1970s, the concept of competency-based teacher education was introduced, in which the study aim was to achieve the level of competence defined via learning objectives. A key feature was to demonstrate competence by modelling and imitating the defined competence (McDonald 1974). This kind of representative action was criticised as behaviouristic, aiming at mechanical didactic working methods without sufficient self-reflection (Hodkinson and Harvard 1994; also, Biemans et al. 2004).

The critical views concerning competence-based learning are connected to the view of mechanistic action in that this type of learning appears to oppose man's free will. For instance, Willbergh (2015) criticises competence-based approaches for being based on acquiring certain strictly defined skills and making them visible through achievements. By exercising mechanistic skills, you cannot attain the complex metacognitive skills that are required in today's information society and that enable the autonomy and freedom of individuals. Lozano, Boni, Peris and Hueso (2012: also, Wheelahan 2015) add that in CBE, the individual's competence is examined as an activity guided from the outside, which neither necessarily promotes the birth of intrinsic motivation nor active agency in society.

From the viewpoint of this study, it is significant that later studies on teacher education have emphasised the positive role of student teachers' (i.e. pre-service teachers') critical thinking and self-assessment in learning (Brooks et al. 2014; Korthagen and Vasalos 2005). In a similar vein, Wesselink et al. (2007; also, Misbah et al. 2015; van den Berg and De Bruijn 2009; Wesselink et al. 2010) presented how, for CBE, the competence goals aimed at versatile self-reflection should play key role.

Understanding competence goals is the basis of self-assessment and lifelong learning, which are an educated expert's core competencies (Day 2017; Evers and van der Heijden 2017). During their pedagogical studies, the students reflect on and assesses learning in relation to the competence goals. The student gradually modifies his or her own mechanisms while performing training-related tasks that provide feedback on performance as well as opportunities for repetition and gradual refinement (Feltovich, Prietula, and Ericsson 2018). Therefore, in the light of this study, an interesting question is how student teachers understand the importance of competence goals in their pedagogical studies.

1.2 Research context

In Finland, a competent vocational teacher¹ is both an expert in his or her field and a specialist in pedagogical matters (Niemi and Jakku-Sihvonen 2011). Prospective teachers have to carry out pedagogical studies amounting to sixty ECTS credits. Before their studies, vocational teachers are required to have an academic degree in their specific field and at least three years' work experience. However, most vocational student teachers are considerably more experienced than this. For this reason, the average age of vocational teachers (forty-two years) is generally higher than that of university students.

In the Finnish educational system, the training of vocational teachers is part of the work carried out in the universities of applied sciences. In these applied science universities, the curricula for the vocational teacher education units can be designed autonomously but must follow the Ministry of Education's decree that the studies must contain vocational pedagogy, teaching practice, educational science and optional studies (Ministry of Education 2006).

In the vocational teacher education of Oulu University of Applied Sciences, the aim has been to develop competence-based teacher education. In addition to the theoretical approach to competence-based models, studies are organised in a competence-based manner. The idea is to give future teachers

¹ A vocational teacher in this context is a person who teaches in the upper secondary or tertiary education sectors.

a broad learning experience of competence-based ways in which to teach and learn that will be applicable in their future work as teachers (Wijnia et al. 2016).

The researcher of the present study works as a principal lecturer in the teacher education unit concerned. At the beginning of the research project, the researcher familiarised himself with the competences of vocational teachers by reading the relevant research literature (e.g. Brodie and Sanni 2014; Grossman 1990; Hashweh 2005; Nissilä et al. 2015; Paaso and Korento 2010; Roelofs and Sanders 2007) and by examining good CBE practices (e.g. Arene 2007; FNBE 2015; OAMK 2019; OSPE 2014; Wesselink et al. 2010). Thereafter, the researcher participated in an expert group to plan the competence goals for the teacher education programme in question.

Regarding the content for the competence goals, attention was paid to directing student teachers towards extensively observing the development of their teacher identities. The learning process for the teaching profession stressed the perspectives of self-reflection, collaboration and the contextuality of learning and personal growth. The procedure tried to avoid the pitfalls of competence-based learning; that is, the description and observation only of the student teachers' external actions (James 2005; O'Brien and Brancaleone 2010).

The drafts of the competence goals devised by the team were examined by five vocational teachers representing different trades or fields. Individual feedback discussions with these teachers were arranged to find out and list student teachers' competence goals and the core competences of teachers (see Mulder 2012a; also, Wesselink et al. 2010). The process resulted in the description of the teacher's competence goals (38 in total) in competence-based pedagogical studies involving 60 ECTS credits (cf. Mulder 2012b; Wijnia et al. 2016). Following competence goal examples, a student's competence in the area of carrying out teaching and guiding was described as follows:

- The Student is able to use teaching and guiding methods in a pedagogically-justified manner.
- The Student is able to teach and guide using current, versatile and logical pedagogical methods.
- The Student is able to justify his/her pedagogical choices by referring to relevant research.

In CBE, the studies start with the student teacher's careful self-assessment based on competence goals (FNBE 2015). It is the starting point for continuous reflection on competences during his or her upcoming studies (van Diggelen, den Brok, and Beijaard 2013). Special attention is paid to the student's ability to understand what s/he already knows and what kind of competence is still needed (Boud 1995; Boud and Molloy 2012; Mulder 2012b). Reaching this target is supported by helping the student to reflect on his/her competences in relation to the competence goals in versatile ways, both autonomously and collaboratively in peer groups in all phases of his or her vocational teacher studies (Ross and Bruce 2007; Wesselink et al. 2007).

The actual teacher studies proceeded according to each student teacher's individual study plan and developmental needs in authentic learning environments, both in practice-based tutorial sessions and during teaching practice (see Wijnia et al. 2016; also, Misbah et al. 2015; Wesselink et al. 2010). A core aspect of the student teachers' studies was the continuous documentation of their competence development in comprehensive ways in their ePortfolios (see Portillo Vidiella and Cano Garcia 2016; also, Killeavy and Moloney 2010; Korthagen and Vasalos 2005).

This study will examine the realisation of competence-based vocational teacher education based on student experiences. The starting point in specifying the research task was the key role of competence goals in goal-oriented education according to earlier research (e.g. Billett 2001; Boud and Molloy 2012; de Bruijn and Leeman 2011; Portillo Vidiella and Cano Garcia 2016; Struyven and De Meyst 2010; Wesselink et al. 2007, 2010; Wijnia et al. 2016). The researcher defined the research task so that it would target the competence goals by asking the following research question: What significance do the competence goals have in competence-based vocational teacher education as assessed by student teachers?

2. Methodology

The purpose of this small-scale mixed-method research is to increase the understanding of how to carry out competence-based vocational teacher education. The methodology of the research task follows the strategy that is typical of case studies. It describes and evaluates a defined case; that is, a certain competence-based educational programme and its influence on student teachers' conceptions of the significance of competence goals (Stake 2006; Yin 2013). The case defines the framework of the research within which the outcomes connected with the case are then examined. Swanborn (2010) describes a case framework that makes it possible for the researcher to deal with the theoretical conceptions and results of the empirical findings, as connected to the case. The research process typically focuses on the experiences of the participants and their descriptions.

In this research the method follows Johnson and Onwuegbuzie's (2004; also, Creswell 2014) 'QUAN + QUAL' action method included in a mixed-method model in which quantitative and qualitative data are considered equal. If only one set of data had been used, the research would not have yielded these kinds of varied student teacher viewpoints of competence-based teacher education, which also has implications for the reliability of the research. Mixed methods have thus been recommended in studies which aim at a broader understanding of a specific action and its impact (Denscombe 2010; Yoshikawa et al. 2008). This research integrates quantitative and qualitative research approaches, where the results of the quantitative survey directed the qualitative content analysis. The research can thus be seen as layered: The upper layer is represented by the examination of the student teachers' responses to propositions and the next layer by reflections in their open answers.

2.1 Participants and data

The participants of the research from 2015–2018 were 117 vocational student teachers aged 42 on average. All student teachers had academic degrees and work experience of at least 3 years in their own fields of science. They were divided into nine different randomly chosen study groups.

In a case study, the research material is collected in various ways to construct a sufficiently strict analytical understanding of the case (Berg and Lune 2012; Creswell 2014). In this research, the data was collected through an anonymous online survey that was sent to 166 student teachers. The response rate was 70.5% (117/166). The survey included both structured questions (propositions) and open questions. The propositions were based on CBE key features as categorised by Wesselink et al. (2007; also, De Bruijn 2012) and, before being sent to students, they were reviewed in a teacher education expert group where the propositions took their final form. The experts reviewed the content, wording, structure and the order of the propositions (Groves et al. 2004). The propositions and open questions were tailored to serve this particular research – to increase the understanding of the significance of competence goals in vocational teacher education (Check and Schutt 2012).

First the student teachers responded to the propositions about the significance of the competence goals using a 5-point Likert scale by selecting from the following choices: Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, or Strongly Agree. From the quantitative data, the distribution of responses, the mode values, the weighted averages and the standard deviations were examined (Creswell 2014; Groves et al. 2004).

To enrich the research results, student teachers were given a free voice as an opportunity to assess their learning during their teacher studies. The aim was to find out whether their answers could possibly be related to competence-based learning and teaching. The student teachers answered three literal open questions: 1) Which factors promoted your learning? 2) Which factors slowed or even prevented your learning? 3) Which factors motivated your learning? The question regarding their motivation was considered important because it is the starting point and the prerequisite for learning (e.g. Deci and Ryan 2014).

2.2 Analysis

Within a mixed-method model, either quantitative or qualitative data can be used as a means of moving the analysis forward, with one type of data being used to direct the other (Denscombe 2010; Fitzpatrick 2016). In this study, quantitative data directs the analysis of qualitative data within the framework of the research question. The quantitative data of the students' answers were analysed by using univariate methods. The following values were examined: distribution of responses, mode value, weighted average, and standard deviation.

Open answers were analysed through a data-driven content analysis, availing of the NVivo computer program. The purpose was to construct a clear description and interpretation based on the text written by the respondents (Schreier 2012; also, Berg and Lune 2012). The content analysis was started by gaining familiarity with the student teachers' texts. Based on the research questions, the data was studied focusing on student teachers' expressions on the importance of competence goals for their learning. The analysis units varied from individual words to sentences and parts of sentences (Patton 2002). Next, the expressions studied were simplified, which led to 13 subcategories, nine main categories and then, as the core category of the research, the student teachers' conceptions of the significance of the competence goals in competence-based vocational teacher education (Krippendorff 2013).

3. Results and discussion

The competence goals that are defined by the learning objectives of vocational teacher education are of utmost importance in CBE. They direct the students' attention to essential features in the development of their learning and serve as a basis for planning an individual learning pathway (e.g. Boud and Molloy 2012; de Bruijn and Leeman 2011; Rust, Price, and O'Donovan 2003; Wesselink et al. 2007).

3.1 Quantitative data results

In this research, the student teachers were given propositions connected to the competence goals of their studies. The answers show that the competence goals gave an informative conception of the competence demanded. Aided by them, the student teachers ($n = 117$) felt that they could construct a view of the level of their competences (see Table 1).

Table 1. The results of the propositions concerning the competence goals: Distribution of responses, mode values (bolded), weighted averages and standard deviation of the answers.

Proposition	5 Strongly Agree	4 Agree	3 Neither Agree Nor Disagree	2 Disagree	1 Strongly Disagree	Weighted average of the answers ($n = 117$)	Standard deviation of the answers ($n = 117$)
1) The competence goals of teacher education give a conception of the competence demanded.	17	70	25	5	0	3.8	0.7
2) Through the competence goals of teacher education, I know what kind of competence I have.	16	56	33	11	1	3.6	0.9
3) Through the competence goals of teacher education, I know what kind of competence I still must gain.	33	47	24	11	2	3.8	1.0
4) The tutor's (university teacher's) mentoring in	83	29	4	1	0	4.7	0.6

teacher education is needed to understand the competence goals.							
5) Familiarisation with the competence goals of teacher education is an important part of the teacher studies.	65	44	4	3	1	4.4	0.8

Considering proposition 1, the student teachers thought that *the competence goals describe the demanded competence* (the weighted average of the answers was 3.8 and the standard deviation 0.7). They seemed to understand one of the core ideas of CBE – the significance of the competence goals in their studies (e.g. FNBE 2015; Mulder 2012b; van Diggelen, den Brok, and Beijaard 2013). A wider deviation was found in the answers concerning the student teachers’ self-assessment of *the competence they have* (proposition 2, deviation 0.9) and *the competence they still must gain* (proposition 3, deviation 1.0). Especially the number of ‘neither agree nor disagree’ and ‘disagree’ answers increased. The number of ‘agree’ answers was still significant, but slightly smaller than in proposition 1.

The clearest consensus (with a weighted average of 4.7 and a standard deviation of 0.6) was observed in the responses to proposition 4: a tutor’s mentoring is needed for students to understand the competence goals. Students also showed relatively high unanimity in the fifth proposition, familiarisation with the competence goals of teacher education being an important part of teacher studies (with a weighted average of 4.4 and a standard deviation of 0.8).

3.2 Qualitative data results

Correspondingly, in the responses to open questions, the student teachers stated that the competence goals had directed their self-assessment. The level of one’s competence became clarified, which promoted learning. A positive effect on motivation was the fact that the student teachers could construct their own learning paths and felt that their competences developed (see Table 2).

Table 2. The categorisation of the open-question answers and their frequencies in the data-driven content analysis.

Open question	Expressions in total (f / 349)	Subcategories	Main categories	Core category
Which factors promoted your learning?	28	The competence goals describe the demanded competence and guide self-assessment	Significance of the competence goals	Students’ views of the competence goals in competence-based vocational teacher education
	34	I know the level of my competence		
	41	The tutor’s help is needed to proceed in studies	Mentoring	
	43	Sharing competences and experiences	Collaboration	
Which factors motivated your learning?	24	My own learning path	Motive	Students’ views of the competence goals in competence-based vocational teacher education
	19	Feeling of being competent	Mentoring	
	26	Tutor’s encouragement	Collaboration	
	38	Team spirit		
Which factors slowed or even prevented your learning?	21	I did not understand the idea of competence-based studies	Clarity of the competence goals	
	8	What and how should I know?		
	21	More tutor support	Mentoring	

36	Work commitments, family duties	Extracurricular factors
10	No slowing or preventing factors	

3.2.1 Results related to propositions 1-3

The competence goals made up the basis of self-assessment and made the student teachers aware of the comprehensiveness of a teacher's work, its content and the level of their own competence. According to the student teachers, determining one's competence was possible when an individual competence was not only noticed, but also assessed diversely.

Reflecting on one's competence through pedagogical competence goals concretised the whole of the teacher's work well. I experienced the most insights for the connection between assessment and interaction competences. (A8)

[Based on my self-assessment I noticed that] I was not only studying new theories, teaching methods or tricks, but reflecting and developing, in a controlled way, what I already knew. I have never reflected on my competence in teaching equally deeply, much, or from different points of view. (A6)

My studies have been most strongly promoted by clear outcomes. (...) Through self-assessment, I have understood my strengths and areas to be developed, which I have then developed in different ways. (A4)

At first, the overall picture of a teacher's work and the competence goals were not very well organised among the student teachers. Self-assessment in all phases of the studies helped them to understand competences in relation to the requirements of a teacher's work and made designing and updating their individual study plans easier. The individual path to the development of one's competence became clarified and it motivated the student teacher to work on (see Table 2).

My vocational pedagogical thinking was organised and concretised into different conceptions. I perceived a picture of a teacher's professional competence in reality and what it includes. At the beginning of [teacher] education, my conception was much narrower, mainly concerning the art of making a slide presentation and what other teaching methods I could possibly use. (...) I had, in fact, never before thought of the different things that belong to a teacher's profession. (A10)

Now that self-assessment has been done, competence and development tasks noticed, and competence demonstrations given, I feel that I am always finding out something 'new'. (...) The teacher's work is made up of many things in addition to teaching: skills to teach mean both education and guiding. The teacher must also develop him/herself: in guiding, assessing and in mastering his/her professional substance. (A12)

3.2.2 Results related to propositions 4-5

Well-defined competence goals that are planned autonomously are not, however, sufficient. The student teachers' strong consensus concerning proposition 4 is observable (average 4.7, standard deviation 0.6): The tutor's (university teacher's) mentoring is needed to understand the competence goals. The answers to open questions support this conception significantly. Competence-based action can, especially at the beginning of studies, influence learning by slowing it down or even preventing it if the competence goals are not understood. In the main categories of the open question as to which

factors slowed or even prevented their learning, the student teachers' answers describe how challenging and emotional their competence assessment could be.

The beginning was tough. (...) The outcomes and requirements remained unclear and I got a feeling that they would be much more demanding than they were. (C14)

Even at the beginning I got thoroughly irritated since I didn't understand the concepts of competence and couldn't access their contents and meaning by myself. I hope that the following student teacher groups are given PLENTY OF TIME to understand the meaning of the competence goals at the beginning. (A9)

The importance of guidance is also underlined by the fact that the student teachers mentioned that the university tutor's support – that is, personal discussions and other kinds of mentoring – belonged to the important factors in promoting and motivating learning (cf. de Bruijn and Leeman 2011). The significance of mentoring is emphasised especially at the beginning of studies.

In terms of special support, I have the experience that I have received through XX's [the tutor's name] mentoring. Often, I have had questions and knots in my mind that have been clarified in the mentoring discussions, which have given me a feeling of relief. (A4)

My learning was promoted by a good tutor who advised and guided me in many ways during my studies. (B4)

[I was motivated by] the tutor's ability to take e.g. the timing of studies etc. into account individually. Individual mentoring on the side of teamwork. (B11)

Familiarisation with the competence goals of teacher studies (proposition 5) is, according to the student teachers, an important part of their studies (average 4.4, standard deviation 0.8). They reflected on the competence and tried to understand its level and the need to develop it. A tutor was required to help the student teachers recognise the contexts of their competences and their relevance in relation to their competence goals. Guided self-assessment processes seemed to influence the student teachers' ability to reflect on their actions and understand the meaning of reflection in learning.

Absolutely the most important issue in the development of my competence – i.e. I will simplify that as learning – has taken place in my skills of self-assessment and analysing my competence. (...) During my teacher studies, the assessment of my own activities and competence has become a daily activity, which has also developed my self-knowledge. (A5)

I think that I have at last internalised the meaning of 'reflection'. I have never thought that I reflected on the things that I learnt, but still, my learning has been based on it. For instance, when building houses, I try, during the process, to develop and find new ways of carrying out various work phases. (...) Recognising my own competence in competence-based studies will help me in the future to guide my students to recognise their competences. (A2)

In addition to the tutor's support, working in teams promoted learning and motivation significantly. The student teachers noted that collaborative learning had given them the chance for peer support; that is, for sharing the team's experiences and competences to benefit them all.

The mixture of different people in the team is like a melting pot, giving one ideas to add to one's skills; it helps one to learn new things about oneself and about new action models that again feed more learning. The issues dealt with in the teams rouse curiosity about new things and I wish to know more. (E11)

I had some earlier experience of a teacher's work, but not of schools. The lack of a clear professional image made me a little startled when we moved rather directly to the teacher's competence goals and to designing our individual learning paths. (...)

The competence goals seem to clarify student teachers' understanding of the demands of a teacher's work and the objectives of vocational teacher education. Understanding the competence goals requires appropriate mentoring.

4. Conclusions

It has been claimed that research on competence-based education (CBE) should be directed from the curricula towards the realisation of the education (Mulder 2017b). This research was conducted in part to address this need. The research environment of this study was vocational teacher education (sixty ECTS credits), which was carried out according to the competence-based model (e.g. Wesselink et al. 2007, 2017; also, Biemans et al. 2009). The chosen research strategy was mixed-method, which proved to be appropriate. The results of the quantitative data helped focus content analysis of the qualitative data on the relevant content. A limitation of this approach can be seen in the small-scale data. Similar surveys collected at the beginning and again at the end of the vocational teacher studies would have enhanced the data and, thus, the reliability of the research results.

The research question of this study was what significance do the competence goals have in competence-based vocational teacher education as assessed by student teachers? According to the results, the competence goals helped students comprehend the diversity of a teacher's work and the level of their own pedagogical competence. Based on this understanding, students were able to build a personal learning path regarding the pedagogical subjects they needed to develop.

This suggests that it is important to increase student teachers' reflections on their individual learning processes. Through these processes, student teachers can determine their personal competences, development needs, and possibilities (e.g. Ross and Bruce 2007). From the viewpoint of learning, it is significant to first construct one's understanding of learning in order to develop one's pedagogical competences (see Biemans et al. 2009; De Bruyckere, Kirschner, and Hulshof 2015; Kirschner and van Merriënboer 2009).

According to the research findings, the core challenge appeared to be understanding the competence goals. The student teachers did not necessarily understand them in their self-assessments. This raised several legitimate questions. Is my competence relevant in relation to the particular competence goal? When is my competence sufficient? How do I develop and demonstrate my competence? These questions appeared in distinct phases of the studies, but especially at the beginning (also Biemans et al. 2009). These aspects are not, however, necessarily a problem from the viewpoint of learning. As a matter of fact, the questions concerning the topic to be learnt tell us about the student teacher's effort to understand and concretise the competence to be attained.

The uncertainty connected to one's assessment of competence may become a problem if the student teacher does not get timely and sufficient mentoring. In such cases, there is a danger that s/he will not be able to assess his/her competence, will get frustrated in difficult situations, that his/her motivation will decrease and that s/he will not proceed in their studies (also van den Boom et al. 2004).

The tutor's/university teacher's support is an important factor in successful CBE, not only in this research, but this was also apparent in other studies (e.g. Misbah et al. 2015; Mulder 2012b). Stimulating student teachers into assessing, developing and demonstrating their competences is a demanding task of mentoring. It requires a role change from a stand-up transmitter of knowledge to a learning coach and expert (also Wesselink et al. 2010). The student teachers' mentoring should be planned and systematic throughout their studies. The mentoring should be carried out in special mentoring sessions and be effective for different daily situations requiring guidance, both orally and literally (e.g. an online learning platform, e-mail, a closed social media group).

CBE can lead to behaviouristic or mechanistic learning which aims only at the right external end-behaviour. In cases like that, learning is the consequence of the change in external conditions and stimuli. Therefore, the person's self-reflection and his or her reflection on actions need to be paid attention to. Based on the outcomes of this research, in the planning, realising and assessing of CBE, the danger of working only towards mechanistic end-behaviours should be avoided. It must be remembered that CBE is always connected to versatile reflections on learning. Thus, attention must be paid to defining competence goals which direct one towards the reflection on one's learning. That is how the vocational student teachers construct a comprehensive understanding of both their learning processes in their teacher studies and in the learning processes of their professional fields in general.

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