Using an instrument to analyse competence-based study programmes; experiences of teachers in Dutch vocational education and training

Renate Wesselink, *Wageningen University*

Agaath Dekker-Groen, *Utrecht University*

Harm J.A. Biemans, *Wageningen University*

Martin Mulder, *Wageningen University*

Corresponding author: Renate Wesselink; Email: renate.wesselink@wur.nl

Abstract

In many different countries competence-based education is becoming increasingly popular. Competencies are used more and more as the starting point for designing curricula and instruction methods, especially in vocational education and training to realise authentic and self-steering study programmes. Despite its popularity in both research and educational settings, there is still no shared understanding of what competence-based education should look like. Therefore, Dutch researchers constructed a model for competence-based education based on a thorough desk research, a focus group discussion and a Delphi study with experts in the field of vocational education (Wesselink *et al.* 2007). This effort resulted in a model that outlines eight features that are important for competence-based education. Next, these features were described in four phases that illustrate the extent to which study programmes can be characterised as competence based. This article presents the results of a study designed to determine the extent to which the model for competence-based education can be understood and perceived as useful by teachers in vocational education and training in the Netherlands. The target group was teachers who work for institutions of secondary vocational education and training who could use the instrument to analyse the extent to which the study programmes they are responsible for could be characterised as competence based. The study included twelve teams of teachers in the process of designing or redesigning their study programmes to be more competence based. The analysis of their experiences showed that some parts of the instrument need adjustment. Nevertheless, the instrument was considered to be both useable and useful. Teachers reported that the instrument helped them understand the state of affairs of their study programmes, and empowered them to make adequate decisions about the extent to which they want to make these programmes more competence based in the future. Furthermore, the instrument helped the teachers set priorities for the near future.

Introduction

Current society is changing at an incredible pace. Today's employees have to be able to operate in increasingly complex environments, characterised by ill-defined problems, contradictory information, informal collaboration, and dynamic, and highly integrated processes (Kirschner *et al.* 1997). Westera (2001) contends that the concept of competence is strongly associated with the ability to perform successfully in these complex situations. Competence-based education (CBE) enables students to prepare themselves to become competent employees (Velde 1999) by means of an authentic and self-steered learning experience (Brown, Collins & Duguid 1989). This is one of the reasons that competencies instead of academic disciplines are increasingly used as starting points for the design of vocational education and training (VET) programmes in the Netherlands. However, developments to make use of competencies in educational settings are not limited to the Dutch context. CBE is also a trend in Australia, the UK, Germany, and France (Velde 1999, Descy and Tessaring 2001, Mulder *et al.* 2007). On the European level a qualification framework (EQF) has been developed based on learning outcomes that are defined in the form of competencies. Furthermore, OECD member countries launched the Programme for International Student Assessment (PISA), with the aim of monitoring the extent to which students near the end of compulsory schooling have acquired key competencies considered essential for full participation in society (Rychen and Salganik 2003). Another EU example of a competence framework construction is the ECVET (European Credit System for VET), whose goal is to achieve enhanced cooperation in vocational education and harmonisation of higher education through the creation of a set of reference levels. Several examples can also be found beyond the EU. The International Labour Organization (ILO) helps vocational training institutions in Latin America modernise their programmes using the competence approach. UNEVOC supports the training of professionals in Africa and Asia through the development of competence-based vocational education (Mulder *et al.* 2007). Although all these countries use the same terminology, they most likely define the concept of competence differently, as it is based on their own institutional structures and labour processes (e.g. Brockman *et al.* 2008). Take for example the UK and France. Because of the holistic nature of the French education system, the focus in this country has been on individual competence, based on the integration of different forms of knowledge, as well as social and personal faculties. Whereas competence in the UK's VET system (National Vocational Qualifications) denotes narrower skills, is not underpinned by substantial knowledge and is defined by outputs. NVQs are purely outcome based (Smithers 2002), and that corresponds to a behaviouristic approach to competence (Mulder, Weigel and Collins 2007)

instead of a more social cognitive approach, which is used in France. The activities in all these cases show that CBE is a contemporary theme on both national and international policy level. However, as mentioned before, there can be distinct differences in the application of the concept of competence. The model for competence-based education can be used as a framework to translate the developments on national level to the level of study programmes within educational institutions.

Two questions are relevant with respect to the development of competence. First *what* competencies are necessary to function in society or in a job (content of the curriculum) and second *how* should these competencies be developed (instruction)? Several studies on the content of the curriculum are available; e.g. critical thinking competence for citizenship (Ten Dam and Volman 2004), problem-solving competence for eight-graders (Perels *et al.* 2005), and in-service competence for teachers (Brouwer and Korthagen 2005). Concerning the instruction issue a set of educational innovations like the introduction of self-managed learning, the integration of theory and practice, the validation of prior learning, and new theories of learning, such as authentic learning and social constructivism (Mulder, Weigel and Collins 2007) appear to intermingle with CBE. CBE is a complex development that integrates many issues in contemporary education, and studies that integrate all relevant aspects are scarce (De Bruijn *et al.* 2005). However, there are examples of scholars who study aspects of the competence-development process; Perels *et al.* (2005), for example, conclude in their study that the combination of self-regulatory and problem-solving strategies leads to the best effects for the improvement of self-regulatory competencies. Studies on authentic assessments demonstrate that when students perceive an assessment as something that resembles their future professional practice (i.e. as authentic), they are stimulated to study more extensively and they develop more generic skills (Gulikers 2007). Finally, electronic learning environments can stimulate competence development; students are enabled to work together and the teachers are enabled to actually act as coaches, because they are able to closely follow the (on line administered) learning process of the students (Bastiaens and Martens 2003). Each study covers a particular aspect of how to optimise competence development.

Wesselink *et al.* (2007) constructed a model that integrates both the curriculum and instruction method aspects of CBE. The model sketches the distinct features of competence-based education and can be applied on all levels of vocational education, i.e. preparatory vocational education, secondary vocational education and higher vocational education. The model might be useful for both teachers and educational

designers as an instrument that enables them to study the state of affairs of a study programme that is or will be developed towards CBE. Therefore, the aim of the current study was to see to what extent the model for CBE can be a useable and useful instrument in the process of developing study programmes in the contemporary framework of CBE. This evaluation study concentrated only on institutions for secondary vocational education in life sciences, because the study was commissioned by the Dutch Ministry of Agriculture, Nature and Food Quality. This article first presents the theoretical background of CBE and the model for CBE, followed by a description of the study methods and finally the results and conclusions.

Competence-based education

The origin of working with competencies in educational contexts lies in the USA. In the 1960s it was labelled as performance-based teacher education and was characterised by its detailed analyses of the behavioural aspects of professional tasks (Olesen 1979). Barnett (1994) concluded that competencies described in this more behaviouristic way cannot provide guidelines for a curriculum because of the level of detail. In the USA CBE did not become a success because of this emphasis on detail. Nowadays, in Europe, a more holistic approach to competence is being used (Eraut 1994, Biemans *et al.* 2004). A holistic approach means that a competence is always seen in the context in which it will be used, including a functional component, personal or behavioural component, cognitive component and ethical component (Cheetham and Chivers 1996). Therefore competence is defined as an integration of knowledge, skills and attitudes that enables a person to perform a certain task in ill-defined and unique environments. Or, according to Mulder (2001: 76), '…competence is the integrated performance-oriented capability of a person or an organisation to reach specific achievements'.

Biemans *et al.* (2004) identified several advantages of CBE. It is expected to place emphasis on the developmental side of learning in contrast to more traditional learning that aims merely at knowledge deficits. In the VET policy arena CBE has gained much popularity because of the expectation that problems concerning the transition from school to work will decrease. However, some scholars have demonstrated convincing results on aspects of CBE that take competencies as starting point for the development of study programmes.

Gonzáles and Wagenaar (2005) argue that focussing on competencies, as the outcomes of curricula, allows for flexibility and autonomy because only the competencies are determined and not the

route to developing these competencies. The route can be determined on individual level; students can design their own curricula to develop certain competencies. At the same time, competencies provide a common language for school and practice to describe what a curriculum is actually aiming at. Concerning the social dimension, Billett (2003) states that all knowledge that has to be learnt should be socially sourced. The social aspect of practice needs to be understood and aligned with the key concepts and practices that are guiding vocational education.

Another important argument in favour of CBE is the need for the integration of learning and work practices. Griffiths and Guile (2003) state that if students must understand (and be able to handle) the limitations they encounter when working in practice, they must have the opportunity to experience different contexts in order to create new knowledge and practices, and furthermore to reflect on their experiences. Collin and Tynjälä (2003) state that the most fruitful models for learning are the ones in which theory and practice alternate and in which they are connected with the help of unifying learning tasks. Ellström (1997) points out the importance of allowing the student a certain freedom with respect to task definition, the choice of methods/means for solving tasks and evaluating results. Allowing a certain level of freedom is beneficial to competence development. Finally, Attwell (1997) states that the new extended role for VET (and HRD professionals) is in creating learning conditions, in structuring learning, in providing guidance and monitoring for learners, in planning learning objectives and activities with an emphasis on the provision of situational learning, in encouraging learning by doing and in guiding and facilitating the process of reflection. For the best learning result it is recommended that students steer their own learning process and that the teachers coach the students. The above-mentioned aspects of CBE have a demonstrated added value for learning results (see also the results of Gulikers, 2007; Perels *et al.* 2005; Bastiaens and Martens 2003). The effects of CBE in which several of these aspects are integrated has not been studied hitherto (Bruijn *et al.* 2005).

The discussion about the effectiveness of CBE (see Biemans *et al.* 2004, Mulder *et al.* 2007) is ongoing at both national and international levels. There are hardly any results available which systematically prove the effects of CBE in job performance in the longer term (De Bruijn and Van den Berg, in press). Furthermore, important criticism concerning the realisation of CBE has been voiced in England, France, Germany and the Netherlands and this can be summarised as follows: there is no shared definition of competence; realising a good competence-based assessment is rather complex if not impossible; and

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some practical problems have been experienced in implementing CBE in VET. Concerning the definition of competence, Westera (2001: 75) points out that '…the concept of competence is used in many different ways and it seems that its current meaning is based on common sense and ordinary language use rather than on an agreed definition – and this all too easily creates confusion of thought'. The problems related to assessment stem in part from the difficulty of defining the ideal picture of assessment; an ideal assessment of competence must include the issue of transfer and requires therefore a number of environments (Westera 2001) and assessors. However, in reality teachers have limited resources and time and therefore cannot provide the quality they would like to. Finally, implementation problems are encountered because the new way of providing education within CBE has to be developed and tested alongside the predominant, traditional system wherein teachers have to provide students with lectures. In the new system teachers work in multidisciplinary teams and in a more traditional system teachers work independently in their own disciplines. This duality in responsibilities can understandably cause several problems.

Despite concerns about CBE and the lack of empirical evidence of its effectiveness, CBE is increasingly popular. Based on experiences with CBE in practice, the Dutch government has stimulated institutions of vocational education to work with competencies. A national competence-based exam has been developed for preparatory vocational education and integrated thematic learning domains will soon be introduced. In secondary vocational education, a national competence-based qualification structure is being implemented that is guiding the design of competence-based learning activities and assessment procedures. Institutions of higher (vocational) education are also shifting their educational concepts towards competence-based education. Taking the international developments into account, governmental initiatives like those in the Netherlands will likely be seen in more and more countries.

Model for competence-based education

Wesselink *et al.* (2007a) developed a model that presents eight principles for CBE. These principles concern 1) the curriculum and specification of the study programme; 2) the way instruction should take place and the role of the teacher, or what is called the pedagogical or didactical practice; 3) the assessment procedure and 4) the career competencies of the student. According to Bruijn *et al.* (2005) these four components (curriculum, pedagogy, assessment and career competencies) together form an infrastructure for powerful learning environments. Applied to educational practice, the model can be used

as a heuristic guideline that enables and empowers teams of teachers to interpret and translate developments on national and international level into aspects of their study programmes. The principles are listed in textbox 1 and Annex 1 presents the whole model. The words written in bold type in Textbox 1 are used in the remainder of this article to refer to the corresponding principles.

Insert textbox 1 about here.

For each principle two to four variables were defined, and on the basis of these variables different phases of realising CBE were defined. The first phase is called 'not competence based' because competencies do not yet play a role. Learning processes in this phase are mainly characterised by their knowledge perspective and knowledge transfer is a central issue. In the second phase, which is called 'starting to be competence based', knowledge transfer is still a central issue, but it is accompanied by examples or cases from professional practice. In the third phase, 'partially competence based', the disciplinary approach to learning processes is replaced by an approach in which relevant tasks and examples from practice play a dominant role. In the fourth and final phase, learning processes are completely designed around competencies and vocational core problems. This is the 'completely competence-based' phase.

CBE cannot be realised by developing these eight principles separately. All of the principles contribute in their distinct way to the infrastructure, and they must all be aligned (Biggs 1999). Therefore, the principles have to be seen as a coherent and comprehensive set that together determines the extent to which an educational programme can be characterised as competence based.

Research objectives

As mentioned before, the model for CBE is largely the result of a focus group discussion and a Delphi study. According to the results of a first pilot study, the instrument can be useful for teachers in determining the extent to which a study programme can be characterised as competence based, i.e. which phase of the model it corresponds to. Furthermore the model appeared to be useful for aligning the expectations of team members when it comes to the aspects of CBE that should be developed further or should be improved (Wesselink *et al.* 2007).

Apart from this first pilot study, the CBE instrument has not yet been tested in practice. Therefore the current study was initiated to fulfil two objectives. The first is to evaluate teachers' comprehension of the instrument. Comprehension was measured by analysing whether the teachers understood the content of the CBE instrument and to what extent the teams of teachers were able to reach a consensus about their own programmes while working with the instrument. The second objective is to evaluate teachers' perceptions about the usefulness of the instrument by asking them whether they will use it in the future. These objectives can be summarised in the following research question: 'Do teachers experience the CBE model as a useable and useful instrument to analyse the extent to which their study programmes can be characterised as competence based?'

Methods

Procedure

In this study a combination of qualitative research methods was used to evaluate teachers' comprehension and perceptions of the usefulness of the CBE instrument; observations and interview questions were used to collect data. The mix of qualitative methods was chosen because this is an explorative study to evaluate what teachers think about the instrument.

In current study programmes teams of teachers are held responsible for the whole programme. This is in contrast to traditional programmes in which a teacher is responsible for teaching one discipline. Although there is some cooperation, teachers are not held collectively responsible. In competence-based study programmes the professional core problems from practice are used as the starting point and the teachers are collectively responsible for enabling the students to solve these professional core problems. Therefore, teams of teachers were approached to participate in this study. Twelve teams of teachers agreed to use the CBE instrument to analyse their development process towards CBE. The teachers did not receive any training on how to work with the CBE instrument. The teams were asked to analyse the study programme for which they were responsible. For each principle of the CBE instrument they had to define whether their curricular activities correspond to phase 1 (not competence based), 2 (starting to be competence based), 3 (partially competence based), or 4 (completely competence based). In addition, the teams were asked to determine, again for each principle, which of the phases they would like to reach with their study programme over the next five years.

Participants

In 2007, more than 70,000 students were enrolled in educational programmes in life sciences in the Netherlands. Educational programmes in life sciences are offered at all levels of vocational education: preparatory vocational education, secondary vocational education, and higher vocational education (including university level). Institutions offering secondary vocational education in the Netherlands are currently in the process of redesigning their curricula, because by August 2010 they all have to be designed on the basis of competencies. The institution chosen for this study started already more than five years ago with preparations for CBE and eventually developed a system of CBE activities which has been adopted by most of the other VET institutions in the Netherlands. This institution is further distinguished by the innovative way in which it designs study programmes.

Education in life sciences consists of traditional domains like dairy farming and pot plant production, but also newly emerging domains such as food technology and recreation and wellness. The twelve teams of teachers in this study are responsible for diverse programmes spread across these various domains. Each team consisted of about four members. The group of participants (N=54) had the following characteristics: 75% of the teachers were aged between 40 and 59 years. Their general teaching experience varied, but almost 40% had zero to ten years of experience and the majority (almost 55%) had more than 20 years of experience. Almost 50% of all the teachers had over two years of teaching experience in CBE.

Observation

Observation was chosen as the research method to discover the extent to which the CBE instrument is comprehensible. It was expected that through observations it would become clear to what extent the teams understood the content of the CBE instrument and to what extent they reached consensus. Based on earlier experience of applying the CBE instrument in the pilot study, an observation protocol was developed to standardise the observations. This protocol stipulated that the observer had to record general information about the teams (number of teachers, disciplines, etc.); whether or not consensus was reached with respect to each principle of the model; and whether this consensus was preceded by a discussion about a programme's current and future phase of development. Additionally, the observer had to determine whether

the text of each principle and the description of the phases were in any way unclear. The results of the observations were registered per principle. The observer was an independent researcher and therefore not involved in the team's discussions. Three observers participated in the study and were instructed in advance on how to use the protocol.

At the end of each team session the observer asked the team some questions about the perceived usefulness of the CBE instrument and to what extent they thought they would use it in the future. The results are summarised in the following section.

Results

Comprehension

The first results presented are about the clarity of the content of the CBE instrument. After each discussion about the current or future development phase of a study programme in relation to a certain principle, the observer recorded whether the participants had found it difficult at any point to fully understand the texts. If they felt a word or concept was vague, the observer registered in which part of the model it was found (in which principle or phase). Table 1 shows how many teams reported vagueness in any part of the texts.

Insert table 1 about here.

In almost 50% of the observations no vagueness was reported. Furthermore the confusion that was reported mostly had to do with the phases. Most of the teams felt that principles 4 to 8 (authenticity, integration, self-responsibility, coach and expert and lifelong learning) as well as the accompanying phases of these principles were relatively clear. Only a few specific words led to some confusion. The principles 1 to 3 (competencies, vocational core problems and assessment) including the accompanying phases led to more questions.

The most important sources of confusion per principle were as follows. Principle 1 (competencies) is concerned in part with whether a job competence profile is constructed with input from the vocational practice and in the completely competence-based phase this profile is frequently synchronised with regional and local enterprises. Not all of the teams had a clear picture of what was meant by '*the* vocational practice'. Moreover, it was not clear to some teams whether the contacts involved in synchronising the

profiles had to be formal or informal. The meaning of 'organising unit' in principle 2 (vocational core problems) was not clear to one team. These teachers therefore suggested that it be changed to 'starting point'. Most reports of vagueness had to do with principle 3 (assessment) because the distinction between 'formal assessment' and 'development of the learner' was not clear.

The other factor used to measure comprehension was the extent to which teams reached consensus on which phase their current study programme is in and up to which phase they wanted to develop their programme in the future. The observer registered whether consensus was reached and, if so, whether a discussion had taken place in order to reach consensus. Table 2 presents the number of teams that reached consensus per principle (with or without discussion) on their current situation (c) and their future situation (f).

Insert table 2 about here.

Table 2 shows that about the same percentage of teams (40 to 43%) realised consensus with or without discussion. To realise consensus about the current situation more discussion was needed than to realise consensus about the future situation. The discussions were mainly about how to interpret each principle and accompanying phases and what that interpretation meant for their situation. Additionally, most teams realised consensus about their future situation without discussion, because both the principles and the phases were clear by then.

During the discussions the teams made several remarks. For example, in relation to competencies (principle 1) several teams stated that they consult representatives of local vocational practice merely in an informal way. They questioned whether formal consultation is necessary to achieve synchronicity. They also said that vocational core problems (principle 2) should be formulated by the students themselves to make them more realistic. The assessment discussion (principle 3) focussed on several topics: unfamiliarity with testing for the use of competence development, lack of diagnostic tests, and use of a portfolio and formal assessment. One team thought principles 2 and 4 are entangled because core problems (principle 2) have to be part of authentic settings (principle 4). Principle 5, about integration, raised further questions such as 'What does integrated mean?' and 'Are knowledge tests not allowed anymore?'. Self-responsibility (part of principle 6) is linked with the role of the teacher (principle 7) in stimulating the students to ask learning

questions, supporting them with reflection problems and helping them to identify the differences in and between groups. The teams confirmed principle 6; students should have a certain freedom to make choices. In relation to principle 7 (coach and expert) some teams discussed the independence of students. Do teachers have to wait until students ask for coaching? Finally, some remarks underpinned the importance of still being an expert.

Per principle, one or two teams did not reach consensus. In these cases one or two members of these teams were working with different target groups (school-based programme versus practice-based programme for example). The study programmes were developed together and therefore strongly intertwined; however, in practice the way they educate their students was different. The teachers could not reach consensus, not because they did not understand the model, but because they were talking about different target groups and different ways of educating their students. For some teams the result of the session was unclear because not enough information was available for the observer to make a clear choice or the process was going too quickly to make a clear choice. Therefore they were registered as missing values.

Usefulness

Four questions were asked to indicate teachers' perception of the usefulness of the CBE instrument. Four of the twelve teams did not have enough time for this step because the teachers had other obligations. The first question, whether working with this CBE instrument supported the discussion about CBE, was answered positively by five of the eight teams. The remaining three teams were neutral. Most teams believed that the CBE instrument provided the possibility to align individual perceptions of some key terms and therefore to have a more effective discussion. Furthermore the instrument helped structure the discussion. While a discussion of CBE normally looks at all aspects at once the instrument makes it possible to focus on separate principles. The second question, whether the CBE instrument gives the teams a better overview of the state of affairs of their study programmes in relation to CBE, was answered positively by six of the eight teams (two teams thought that they already had a good overview). These six teams indicated that they used the instrument as a reference model. Five out of eight teams responded positively to the third question (whether the teams will use this CBE instrument more often in the future). Two of these teams

plan to use it every year to monitor their progress, because their current situations do not yet meet up to their ambitions. The other three teams that answered positively could not predict how frequently they will use it in the future. Three of the eight teams did not expect to use the instrument again. One team explained that they thought using the instrument once was enough. The fourth question was whether the CBE instrument could provide support for the determination of priorities in the future. All teams clearly saw opportunities for using the CBE instrument for setting priorities for the future. It helped the teams become aware of different possibilities and they indicated that they can set priorities more deliberately now.

Conclusion and discussion

In the introduction two objectives were formulated for this study. The first objective was to evaluate teachers' comprehension of the CBE instrument. The first question related to this objective was whether the participants in this study understood the content of the model. For several principles a single word or a concept led to confusion. Furthermore, the exact differences between the phases in the model were not always clear to everyone and consequently it took some time to understand the content and to see the exact differences. On the basis of these first results it can be concluded that some adjustments are advisable. For example, the phases have to be made more distinguishable and words that are difficult to understand or can be interpreted in various ways should be replaced. The second question concerning this first objective was whether the participants reached consensus about their study programmes' current phase of development as defined by the CBE instrument. In most cases a discussion was needed to achieve consensus and most of the time these discussions were about how to interpret the content of the CBE instrument. Several teams felt that the step from phase 3 to 4 of some principles was too big. Although most discussions finally ended up in consensus, some parts of the model were not interpreted in the same way by all teams. Teams were able to reach consensus internally, but it is not clear to what extent the interpretations of the different teams are comparable.

To make this instrument useful beyond the team level, the possibility of interpreting some parts of the instrument differently should be reduced to a minimum. Adjustments mentioned before could lead to less misinterpretation and maybe more comprehension. Although some words or parts of sentences were not immediately clear to the teachers, they were able to use the instrument in its intended way. They were

able to have a clear discussion about their study programme and to gain insight into their ambitions for the future.

The second objective was to discern the usefulness of the CBE instrument. From the results it can be concluded that the CBE instrument can be applied to analyse CBE in particular situations. The CBE instrument provides a good overview of the extent to which a study programme can be characterised as competence based. The teams reported that the instrument provided added value, especially in setting deliberate and shared priorities for future development. Using the CBE instrument empowers them to make clear choices and agreements for the (future) development of their study programme in relation to CBE. The model for CBE can thus be used as an instrument to develop and analyse CBE within teams.

The teams of teachers who used the model did not make any remarks that would suggest that the current combination of principles is inaccurate or difficult to understand. Furthermore they did not indicate that any principles were missing in the model. It can thus be concluded that the model as a whole works well, but that it needs minor adjustment within the identified principles and phases.

As pointed out in the introduction, the concept of competence is used in many countries, but does not mean the same thing in all of them. This ambiguity offers teachers and designers the space to replace existing labels (e.g. knowledge and skills) with more contemporary labels, such as competence, while hardly changing anything in educational practice. This gives rise to the question of whether CBE is actually being realised and to what extent the practice in schools really is changing. For this reason, the CBE instrument contains principles for both content of curriculum and didactics. Principles 3, 4, 5, 6, and 7 have clear implications for the way instruction should take place (assessment, role of students, role of teachers). Using the model gives practitioners insight into the content of the curriculum (competencies) but also the way the curriculum is being taught. It therefore makes teachers aware of the aspects of their teaching-learning process that have to change in order for their study programme to be characterised as competence based. To prepare themselves for these CBE practices, teachers should develop their own competencies in coaching and assessing students. Institutions for vocational education and the educational institutions that operate on national or even international level should realise that the current population of teachers enjoyed a different kind of education and, if they want CBE to become a success, the teachers involved will have to be properly trained.

This article is based on the feedback of a small number of users, so more research at national and international levels is needed to concretely determine the added value of the model - and perhaps more importantly to determine the added value of CBE. A first step is to adjust the model and use it again in educational contexts. For the time being this article indicates that the model for CBE should be seen as a heuristic guideline that empowers teams of teachers to develop CBE according to the national qualification frameworks in Dutch VET.

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Annex 1 Model for CBE in VET

	Principle	Not competence-based	Starting to be competence-based	Partially competence-based	Completely competence-based
1	The competencies that are the basis for the study programme are defined.	There is no job competence profile (JCP).	There is a JPC, but it was constructed without input from the vocational practice. This JPC was used during the (re)design of the study programme.	A JPC was constructed with input from the vocational practice and this profile is fixed for a longer period of time. The JPC was used during the (re)design of the study programme.	A JPC was constructed with input from the vocational practice and this profile is synchronised frequently with the regional and local vocational practice including the major trends. This JPC was used during the (re)design of the study programme.
2	Vocational core problems are the organising unit for (re)designing the study programme (learning and assessment).	There are no vocational core problems (VCP) specified.	VCPs are specified and used as examples in the (re)design of the study programme.	VCPs are specified and are the basis for the (re)design of some parts of the study programme.	VCPs are specified and these are leading factors in the (re)design of the whole study programme.
3	Competence development of students is assessed before, during and after the learning process.	Assessment is the final stage of a learning process and takes place at a fixed moment.	Assessments take place at several moments, is used for formal assessment and does not play any role in the learning process of students.	Assessments take place before, during and after the learning process and is used for both formal assessment and competence development of students.	Assessment takes place before, during and after the learning process and is used both for formal assessment and competence development of students. Students determine the moment and format of assessment themselves.
4	Learning activities take place in different authentic situations.	Learning in practice is of subordinate importance and there is no relation with learning in school.	Learning in school is leading. Sometimes, by means of cases a link is made to learning in practice or experiences from practice.	Learning activities take place to a large extent in authentic settings, but the relationship with learning in school is insufficient.	Learning activities take place to a large extent in a diversity of authentic settings and are clearly related with the learning activities in practice.

5	Knowledge, skills and attitudes are integrated in learning and assessment processes.	Knowledge, skills and attitudes (K,S and A) are separately developed and assessed.	K,S and A are sometimes integrated in the learning process. K,S and A are assessed separately.	K,S and A are integrated in the learning process or in the assessment procedure.	Integration of K,S and A is the starting point for both learning and assessment processes and therefore operationalised.
6	Students are stimulated to take responsibility for and reflect on their own learning.	Learning activities are characterised by external steering: students carry out assignments by means of elaborated instructions. There is no self reflection.	In a limited part of the learning activities, students determine for themselves the way they learn. There is hardly any reflection on the learning process and functioning in vocational settings.	Students themselves determine the way they learn, and the time and place of learning, based on reflection on the learning process and functioning in vocational settings.	Students are after all responsible for their own learning processes based on their learning needs.
7	Teachers both in school and practice fulfil their role as both coaches and experts.	Knowledge transfer is central to the learning process.	To a limited extent the responsibility for the learning processes is handed to the students. Teachers support through guidance.	Students enjoy a certain level of autonomy in determining their own ways of learning. Teachers observe when students need support and offer it.	Teachers stimulate students to formulate learning needs and based on self reflection to determine their own learning processes.
8	A basis for a lifelong learning attitude for students is realised.	In the study programme no attention is paid to competencies that are related to learning or (labour) identity development.	In the study programme attention is paid to competencies that are related to learning and (labour) identity development, but these competencies are not integrated in the learning process.	In the study programme competencies related to learning and (labour) identity development are clearly related to vocational core problems and attention is paid to those competencies to a large extent.	In the study programme competencies related to learning and (labour) identity development are integrated and reflection on the future career of students takes place.

1. The **competencies** that are the basis for the study programme are defined.

2. **Vocational core problems** are the organising unit for (re)designing the study programme (learning and assessment).

3. Competence development of students is **assessed** before, during and after the learning process.

4. Learning activities take place in different **authentic** situations.

5. Knowledge, skills and attitudes are **integrated i**n learning and assessment processes.

6. Students are stimulated to **take responsibility** for and **reflect** on their own learning.

7. Teachers, both in school and practice, fulfil their role as both **coaches and experts**.

8. A basis for students to achieve a **lifelong learning** attitude is realised.

Textbox 1 Principles for CBE

Table 1 Number of teams that reported vagueness in a principle and/or phase of the CBE model

Incidences of vagueness	Competencies	Vocational core problems	Assessment	Authenticity	Integration	Self responsibility	Coach and expert	Lifelong learning	Total
No vagueness at all	4	4	4	7	8	8	9	6	50
Vagueness with respect to a principle	2	2	1		1	2			8
Vagueness with respect to a phase	4	4	7	3	3	1	2	4	28
Missing values	2	2		2		1	1	2	10
Total	12	12	12	12	12	12	12	12	96

Table 2 Number of teams that reached consensus per principle (for **c**urrent and **f**uture situations and with or without discussion)

Principle / Consensus	Competencies		Vocational core problems		Assessment		Authenticity		Integration		Self responsibility		Coach and expert		Lifelong learning		Total
	c	**f**	**c**	**f**	**c**	**f**	**c**	**f**	**c**	**f**	**c**	**f**	**c**	**f**	**c**	**f**	
Consensus without discussion	1	8	2	6	1	8	4	9	8	8	2	7	5	7	5	8	81
Consensus after discussion	9	3	6	4	9	2	5	2	1	1	8	4	4	5	4	1	78
No consensus	1		2		2	2	1		1	1	1	1	2		1	1	17
Missing values	1	1	2	2			2	1	2	2	1		1		2	2	16
Total	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	192

Authors:

Renate Wesselink, assistant professor; Education and Competence Studies, Wageningen University and Research Centre, the Netherlands.

Agaath Dekker Groen, PhD researcher; Educational Sciences, University of Utrecht.

Harm J.A. Biemans, associate professor; Education and Competence Studies, Wageningen University and Research Centre, the Netherlands

Martin Mulder, professor; Education and Competence Studies, Wageningen University and Research Centre, the Netherlands