Competence-based VET as seen by Dutch researchers

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SUMMARY

The concept of competence is increasingly the basis for (re)designing VET. In competence-based VET academic disciplines are no longer starting points for curriculum development. Competence needed for working in practice, however, is. Competence-based learning is a dominant trend in VET in several countries because of fewer expected problems in the transition from school to work. In this study, by means of a focus group session and a Delphi study, a model for competence-based VET is developed. It has been constructed by Dutch researchers and can help VET institutions develop competence-based learning.

Introduction

Competence-based learning is able to help learning in an economy characterised by rapid changes and complexity (Velde, 1999). Therefore, competence-based learning is a dominant trend in VET in Australia, the

United Kingdom, the United States, Germany and the Netherlands (Velde, 1999; Mulder, 2003; Descy and Tessaring, 2001). Competence-based learning is also a trend, because of fewer expected problems in the transition from school to work (Biemans et al., 2004). Many countries are currently experiencing problems with the transition of graduates to the labour market. Students still have a lot to learn before they can perform as expected as employees. In competence-based VET academic disciplines are no longer the starting point for curriculum development. Competencies needed for working in practice, however, are. So there is an expectation that students, because they are prepared for the labour market based on the competencies needed for the labour market, can perform better from the beginning of their working careers.

In the Netherlands there is lively discussion about the 'usefulness and uselessness' of competence-based learning (Korthagen, 2004; Tillema, 2004). Biemans et al. (2004) describe, besides its added value, several possible pitfalls in applying competence-based learning. One concerns the definition of the concept of competence. According to Nijhof (2003, in Mulder et al., 2003), designing competence-based curricula, learning processes and assessment procedures can only be done when the concept of competence is defined as unambiguously as possible. Another significant pitfall is assessment which can be seen as the Achilles heel of competence-based learning. According to Biemans et al. (2004), assessment of competencies is time-consuming and labour intensive. Moreover developing and using valid and reliable assessment is crucial, but difficult. Despite these pitfalls and some valid criticism, the concept of competence-based learning is popular in VET. Several authors made a start at defining

Figure 1: Educational system of the Netherlands
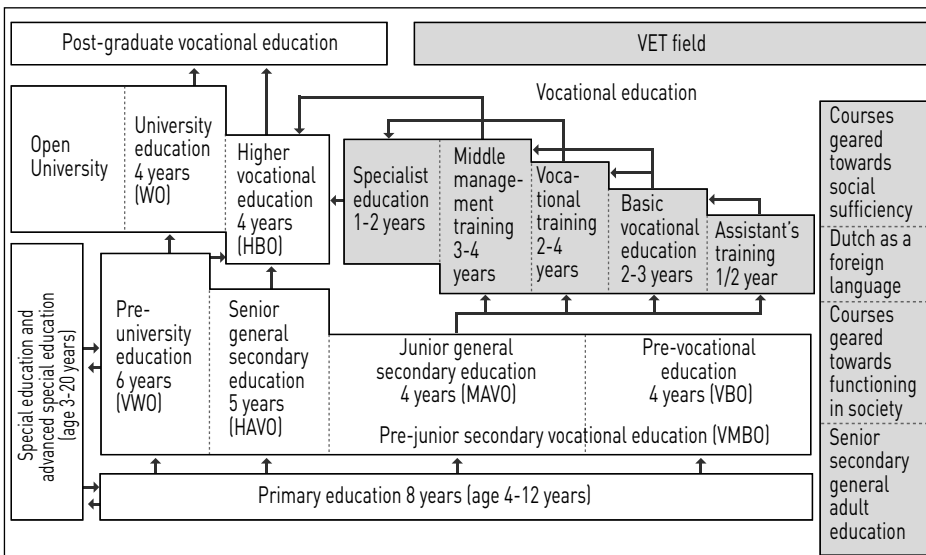
competence-based learning (Klarus, 2004; Mulder, 2004; Onstenk, De Bruijn and Van den Berg, 2004), but there is still a need for a thorough study to reach consensus on a model. This is the objective of this study. Consensus and clarity are especially necessary as from August 2006, Dutch VET institutions for senior secondary education will start working with competence-based profiles as the starting point for their curriculum. Although politicians are in favour of competence-based learning, it is for researchers to reflect critically on these developments. Before describing the study a short explanation of the Dutch educational system is provided.

Figure 1 shows the Dutch educational system. Two routes can be distinguished that lead either to university or a job; one is via general education and the other is via vocational education. With the latter route a student can end up at university, but mostly this route leads to a qualification for a professional job. The model constructed in this study can be applied at two levels of vocational education: secondary vocational education and higher vocational education. Next, figures (www.bveraad.nl) illustrate the importance of the vocational education route in the Netherlands. In 2003 about 625 000 students aged 12 to about 18 participated in secondary vocational education and 375 000 students aged 18 to 22 participated in higher vocational education. In the secondary education sector, vocational education has the most students.

Theoretical framework

Competency-based education is a concept that has existed for several decades and has its origin in the US. In the 1960s it was labelled performance-based teacher education (Olesen, 1979). During these years competency-based education was characterised by its detailed analyses of behavioural aspects of professional tasks. Competency is defined as an underlying characteristic of an individual, which is causally related to effective or superior performance in a job (Boyatzis, 1982). Tasks of professionals were described in detailed lists of fragments and assessable elements. Barnett (1994) says that competencies described in this more behaviouristic way cannot provide guidelines for an educational curriculum because of the detailed level of description. The concept Grant et al. (1979) studied in the 1960s and 1970s is different from the current leading approach to competence in Europe. In Europe a more holistic approach of competence is being used (Eraut, 1994; Biemans et al., 2004). In this approach competence is defined as follows: 'competence is the integrated performance-oriented capability of a person or an organisation to reach specific achievements' (Mulder, 2001, p. 76). Competency focuses on an aspect of behaviour, competence focuses on the integrated capability of a person and leads to an authorisation to do certain tasks. Competent means that a person has a certain proficiency. When a person has developed all the competen-

cies necessary for a certain job, he or she gets a qualification. In this description of competence the focus is on the main and leading approaches. This description does not suggest there is no room for other approaches. In both the US and in Europe holistic behavioural approaches can be recognised.

In the holistic approach to competence, learning is seen from a social constructivist perspective. The basic assumption for this originally social psychological approach is that humans construct their (social) reality by interacting with others (Simons, 2000). Constructivism arose from dissatisfaction with the theories of knowledge in the tradition of Western philosophy. The central assumption in constructivism is that knowledge and skills are not products that can be transferred from one person to another. Knowledge and skills are results of learning activities of learners (Glaser, 1991). Constructivism knows different approaches; from a radical individualistic approach to a more social constructivist approach. The social constructivist approach in particular influences thoughts about competence-based learning. In a more (social) constructivist view of learning individuals construct their own truth and knowledge. Knowledge construction mostly takes place in a social setting; so a group of persons construct their own truth or social reality. Therefore learning should no longer be seen as a stimulus-response phenomenon. Learning requires self-regulation and the building of conceptual structures through reflection and abstraction (Von Glasersfeld, 1995).

The holistic and social constructivist view of learning has been of major influence on the approach to competence-based learning used in this study. Besides these major influences, other theoretical insights contributed to defining the concept of competence-based learning. The most important theoretical concepts are described briefly in a first set of 10 principles for competence-based learning (Mulder, 2004), which was the starting point for the focus group meeting and the Delphi study.

Based on experiences in the US, where competence-based education did not become a success because of its detailed character, there was increasing demand to use larger and useful units as starting points for developing curricula in the Netherlands. This resulted in more interest in vocational core problems, job competence profiles and job pictures which brought about principle 1: 'Verify in which jobs and roles students end up after completing their studies and determine which vocational core problems are critical in those jobs and roles'.

The fragmentation in education mentioned before has a distinct influence on curricula. It leads to demand for curriculum integration (Tanner and Tanner, 1995) and fewer pure disciplinary approaches. It was believed that theory and practice should be more aligned with each other and that parts of professional practice should be used as the focus in curriculum planning. This brought about principle 2: 'Identify vocational core problems which lead to curriculum development'.

Already in the 1970s, McClelland (1998) argued that recognition of de-

velopment should be organised by transparent and criterion-based assessments. Competence development should be measured before, during and after the learning trajectory. These developments resulted in two principles: principle 3 'rewarding competence developments should be done through assessment by different assessors'. Principle 4 concentrates on the following: 'before the learning trajectory the competencies already developed have to be assessed'.

An essential characteristic of competence is integrating knowledge, skills, and attitudes. In learning trajectories this integration has to be realised to ensure a practical assignment can be carried out successfully. It is important students are able to make representations of practice (Eraut, 1994). It is also important for students to situate their (learning) experiences in practice, so they understand which learning activities contribute to their successful performance. Critical reflection on the diversity of tasks and problem situations a student meets in practice (Schön, 1983) is essential for competence development. Critical reflection causes an expansion and deepening of learning experiences and these processes are responsible for competence-development. These theories resulted in three more principles. Principle 5 states learning has to be situated in recognisable and meaningful contexts. Principle 6 states connecting theory and practice is necessary. Let students acquire experience and let them reflect on these experiences. Principle 7 states knowledge, skills and attitudes should be integrated into learning trajectories.

During the design of learning trajectories for competence development it is important to support the learning process of students and, depending on their progress, to increase their autonomy (Van Merriënboer, 1997). To give students full opportunity to develop, motivating and inspiring learning environments in which all their developmental possibilities can be stimulated are necessary. This led to principle 8: 'Make it possible for students to be both increasingly responsible for their own learning processes and steering them.'

In a learning environment based on competencies, the student is part of a community of practice (Wenger, 1998). Students are seen as junior colleagues instead of students or trainees. Teachers are coaches and experts taking part in the knowledge construction of students through respectful dialogue. These theories led to principle 9: 'Teachers have to be stimulated to fulfil their role as coaches'.

Competence-development can be realised for each individual through personal development plans and portfolios in which competence-development can be recorded. According to Onstenk (1997) it is important to pay attention not just to competencies important for performing a job; competencies in communication, learning or designing are also important for surviving in current society. Competence-based curricula have to prepare students for lifelong learning. This concept led to the final principle, principle 10: 'in a curriculum a basis must be formed to develop competencies for the future career, with specific attention on learning to learn competencies'.

The theories mentioned above pay attention to separate aspects of (developing) education. However, developing competence-based education requires all aspects of education be reconsidered. The different theories mentioned individually above are not exclusive for competence-based learning, but all principles together comprise a unique framework for developing competence-based learning. As yet there is no consensus on a set of principles. It remains a collection of different theories. In the following part of this article, a process is described on how to reach consensus on the set of principles for competence-based education.

Method

The starting point is the list of 10 principles for competence-based learning (Mulder, 2004). Researchers transposed these principles into a model. The European Foundation of Quality Management (EFQM) model provides the basis for this model. EFQM is a business improvement model which consists of nine items which are applied in phases. The basis for the model of this study are the principles. Each principle is applied by means of variables and these variables are the basis for describing four phases. The four phases can be characterised as follows: not competence-based, starting to be competence-based, partially competence-based and completely competence-based. Not competence-based education can be defined as traditional education. Knowledge transfer is a central issue in this phase. The second phase can also mainly be defined as knowledge transfer, although this transfer is accompanied by examples or case studies from practice. The third phase, partial competence-based, means that to some extent the disciplinary approach to education is replaced by an approach in which practice plays an important role. In the fourth and final phase, education is completely designed based on competencies and vocational core problems.

This model was the starting point for a mixed method study. Both a focus group session and a Delphi study were conducted. A focus group session is one in which participants discuss a specific topic, aiming at reaching common understanding and a shared picture of it in a relatively short period of time. A Delphi study seeks to get an accurate shared result through a set of sequential questionnaires interspersed with summarised information and feedback from opinions derived from earlier responses (Delbecq et al., 1975). This study opted for both a focus group and a Delphi study.

Some 30 experts were asked if they were able and willing to participate in the focus groups and subsequently the Delphi study. They were selected according to their (research) expertise in competence-based learning and articles published. A group of 15 experts reacted positively. Almost all of the other 15 reacted positively and emphasised the need for this re-

search, but were unable to attend, mainly because of time restrictions. The 15 that agreed to take part came from eight different (research) institutes in the Netherlands.

The study consisted of three rounds. The first round was a focus group session, during which the first set of 10 principles were discussed and the results processed in the framework. Then the Delphi study took place. Participants were asked to complete two questionnaires, marking to what extent they agreed with the changed principles, variables and phases. They could score from 1 'I fully agree' to 5 'I don't agree at all' and they also could include comments. In the first questionnaire, participants could respond to each aspect of the principles, both with scores and comments. In the second, while it was decided to still give respondents the opportunity to respond with a mark for each aspect, they could only comment on the principle as a whole. This choice was made to get a better idea of the principles as a whole, because in the first questionnaire some respondents' comments were inconsistent. Participants' scores and comments were processed. The scores were mainly used to see the overall opinion on a principle and its application. When a principle had a mean score between '1' and '2' hardly any changes were considered. For mean scores between '2' and '3' a change was thoroughly considered. For scores higher than '3' changes were almost always made. The comments were used to change the principles. For the final decision on changes, three researchers always had to agree on the proposed changes. The Delphi study was finished when the overall score of each principle was satisfactory (mean score between '1' and '2') and participants had no further proposals.

All 15 participants joined the first focus group session and in the first round of the Delphi study 9 of 15 participants returned the questionnaire. In the second round of the Delphi study, 7 of the 15 participants returned the questionnaire. A Delphi study requires commitment from its participants for a longer period of time. Unfortunately, not all participants were committed to the end.

Results

Table 1 summarises the mean scores, standard deviations and number of respondents on the different aspects from the conceptual framework from the first and the second rounds of the Delphi study. The final principles and accompanying applications are used in the table.

The results in Table 1 show in the first round 11 of the 21 items (three items per principle) scored between '2' ('I agree to a large extent') and '3' ('I do not have an opinion'). These items have been changed. The 10 items that scored lower than '2' had hardly any changes made. In the second round of the Delphi study only two items scored '2' or higher. This means that participants 'fully agree' or 'agree to a large extent' with almost all these

items in the framework. Except for the items in principle 7, all items scored higher than 2. Based on comments some changes were made. The second round scores were generally lower than in the first round. Table 1 also shows that for some items not all respondents reacted because they did not consider themselves experts in that particular field.

A Delphi study is concluded when a predefined percentage of participants agree with the subject of study. In this study 75 % of participants had to 'fully agree' or 'agree to a large extent'. In the second and last round of the Delphi study for each aspect, five or six of the seven respondents 'fully agreed' or 'agreed to a large extent' with the items of the frame-

Table 1: Scores from the first and second round of the Delphi study with means and SDs.

1 = 'I fully agree', 2 = 'I agree to a large extent', 3 = 'I do not have an opinion', 4 = 'I do not agree', 5 = 'I do not agree at all'

Principle	Results round 1			Results round 2		
	Mean	St. dev.	N	Mean	St. dev	N
1. The competencies that are the basis for the study programme are defined.	1.56	0.527	9	1.43	0.535	7
Content of variables	1.78	0.441	9	1.86	0.690	7
Division and content of phases 1 to 4	2.00	1.00	9	1.86	0.690	7
2. Vocational core problems are the organising unit for (re)designing the curriculum (learning and assessment).	1.67	0.500	9	1.29	0.488	7
Content of variables	1.83	0.612	9	1.71	0.756	7
Division and content of phases 1 to 4	2.11	0.601	9	1.71	0.756	7
3. Competence-development of students is assessed before, during and after the learning process.	2.56	1.130	9	1.00	0.00	6
Content of variables	2.22	0.972	9	1.67	0.816	6
Division and content of phases 1 to 4	2.78	1.202	9	1.86	0.690	7
4. Learning activities take place in different authentic situations.	1.67	1.00	9	1.29	0.488	7
Content of variables	1.89	1.054	9	1.43	0.535	7
Division and content of phases 1 to 4	2.22	1.394	9	1.86	0.900	7
5. In learning and assessment processes, knowledge, skills and attitudes are integrated*.				1.14	0.378	7
Content of variables				1.29	0.488	7
Division and content of phases 1 to 4				1.86	0.690	7
6. Self-responsibility and (self)-reflection of students are stimulated.	1.87	0.354	8	1.29	0.488	7
Content of variables	2.33	0.866	9	1.57	0.535	7
Division and content of phases 1 to 4	2.13	0.835	8	1.86	0.690	7
7. Teachers both in school and practice fulfil their role as coach and expert in balance.	1.89	0.601	9	1.71	0.951	7
Content of variables	2.38	1.061	8	2.29	0.951	7
Division and content of phases 1 to 4	2.63	1.061	8	2.00	1.00	7
8. A basis is realised for a lifelong learning attitude for students.	1.61	0.601	9	1.14	0.378	7
Content of variables	2.14	1.069	7	1.43	0.787	7
Division and content of phases 1 to 4	1.40	0.548	5	1.43	0.787	7

* Principle 5 is added after the second round of the Delphi study.

Box 1: Model for competence-based learning in VET

	Principle	Variables	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.	Putting together a job competence profile. Using a job competence profile. Interaction between education and vocational practice.	There is no job competence profile put together.	There is a job competence profile without participation of the vocational practice. This (vocational) competence profile has been used during the (re)design of the curriculum.	There is a job competence profile with participation of the vocational practice and this profile is fixed for a longer period of time. This job competence profile has been used during the (re)design of the curriculum.	There is a job competence profile with participation of the vocational practice and this profile is tuned frequently with the regional and local vocational practice including the major trends. This job competence profile has been used during the (re)design of the curriculum.
2	Vocational core problems are the organising unit for (re)designing the curriculum (learning and assessment).	The extent to which the vocational core problems determine the curriculum.	There are no vocational core problems specified.	There are vocational core problems specified, which are used as examples in the (re)designing of the curriculum.	There are vocational core problems specified. These core problems are the basis for the (re)design of some parts of the curriculum.	There are vocational core problems specified and these lead to the (re)design of the whole curriculum.
3	Competence-development of students is assessed before, during and after the learning process.	Recognising earlier developed competencies. Formal assessment. Formulating feedback. Flexibility in format and timing of assessment.	Assessment is the final stage of a learning process and takes place at a fixed moment.	Assessment takes place at several moments. Assessment is used for formal assessment and does not play a role in the learning process of students.	Assessment takes place before, during and after the learning process. Assessment is used for both formal assessment and competence development of students.	Assessment takes place before, during and after the learning process. Assessment 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.	Authenticity. Diversity. Relation with learning at school and learning in practice.	Learning in practice is of subordinate importance and there is no relation with learning at school.	Learning at school is in the lead. Sometimes, In some cases a relation is set up with learning in practice or experiences from practice.	Learning activities to a large extent take place in authentic settings, but the relation with learning at school is insufficient.	Learning activities to a large extent take place in diverse authentic settings and learning activities are clearly related to the learning activities in practice.

	Principle	Variables	Not competence-based	Starting to be competence-based	Partially competence-based	Completely competence-based
5	In learning and assessment processes, knowledge, skills and attitudes are integrated.	Integration of knowledge, skills and attitudes.	Knowledge, skills and attitudes are separately developed and acknowledged.	Knowledge, skills and attitudes are sometimes integrated in the learning process. Knowledge, skills and attitudes are assessed separately.	Knowledge, skills and attitudes are integrated in the learning process or in the assessment procedure, not in both processes at the same time.	Integration of knowledge, skills and attitudes is for both learning and assessment processes the starting point and therefore applied.
6	Self-responsibility and (self-) reflection of students are stimulated.	Self-responsibility. Self-reflection. Reflection on functioning in the vocational setting. Learning needs of the student.	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 determined the way of learning themselves. There is hardly any reflection on the learning process and functioning in vocational settings.	Students themselves determined the way of learning, and 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 at school and practice fulfil their roles as coaches and experts in balance.	Way of supporting the learning process. Support in the knowledge acquisition process.	There is no question of support. Knowledge transfer is central to the learning process.	To a limited extent responsibility for the learning processes is handed to 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 determine their own learning process.
8	A basis is established for a lifelong learning attitude for students.	(Labour) identity development. Development of learning competencies. Focus on future career.	There is no attention paid to competencies that are related to learning or (labour) identity development.	In the curriculum there is attention paid to competencies that are related to learning and (labour) identity, but these competencies are not integrated in the learning process.	During learning trajectories 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.	During learning trajectories competencies related to learning and (labour) identity development are integrated and reflection on the future careers of students has taken place.

work. Consequently, one can conclude that respondents came to a consensus on the model. Box 1 shows the final results.

The result of the Delphi study is a model for competence-based learning. The study started with a list of 10 principles; the renewed list consists of eight principles. Some major changes have been made to the first set of 10 principles. First, in the former set of principles 'assessment' and 'accreditation of earlier developed competencies' were separate principles. Because these principles are both closely related to assessment,

they are combined as one principle in the renewed set of principles. Second, the role of students has changed. In the former set of principles self-steering of students was mentioned. In the renewed set, self-steering is changed to (self)-reflection, because (self)-reflection indicates better the (complex) role of the student. To develop competencies it is necessary for students to gain experience and practice the competencies in several authentic situations. In the former set of principles nothing was mentioned about practising in several authentic contexts. So, this was added. Next, in the first set of principles the role of the teacher was described as only being a coach. During this study it appeared that the teacher is not only a coach, but also an expert. Besides in the former set of principles only the role of the teacher (in the institution) is mentioned. In the new set of principles the teacher or coach in practice is also included, because of the increasing importance of this role. Finally, in the first set of principles no attention was paid to developing the (professional) identity of students. However, in this study the importance of developing (professional) identity is emphasised; identity development for individuals in today's society as well as for individual employees is included in the last principle.

Conclusion

Although discussion continues on the added value of competence-based learning, and the pitfalls mentioned in the introduction of this article are still valid, competence-based learning is a popular development in the Netherlands. However, as there still lacks a model for developing competence-based learning, this study was conducted. Its main objective was to reach consensus on a model for competence-based VET. All participants who returned the second questionnaire (fully) supported the current model, so the study finished with a viable consensus on it. Although this is a satisfying result, some final remarks are necessary.

A group of experts reached consensus on the model. It was now important to see whether VET institutions were really able to work with this model. A first attempt to measure the applicability of the model in practice was conducted. The model was tested in three VET institutions. The three institutions for secondary vocational education and higher vocational education developed and implemented competence-based learning separately from one another. Results were analysed and in a final consultation with a representative group of persons (three to five) from each institution, each case, based on the model was analysed and discussed. The following preliminary results of all three cases can be given. First, the representatives recognised their situations in the analyses and determined in which phase implementation of competence-based learning was situated. Second, the representatives could identify which aspects of the current situation should be improved. Finally, the model made it possible to formu-

late a concrete plan for future developments. Although preliminary, the conclusion can be drawn that this model can support VET institutions in their development towards competence-based learning. Further research with these and other programme teams of VET institutions needs to explain the exact added value of the model.

The model concerns the educational processes in a VET institution. It describes principles and items that can be applied at curriculum level. The model does not apply to the organisational level of a VET institution. However, if realising competence-based learning, the whole organisation has to change. Further research has to make clear what implementing competence-based learning means for the organisation of an institution. Mulder (2003) has already indicated that although competence-based learning is a promising development, it is rather complex and needs all developers' collective intelligence to make it a success.

This study only concentrated on agricultural institutions of VET, because the study was commissioned by the Dutch Ministry of Agriculture, Nature and Food Quality. But in other segments of education (teacher education, scientific education) competencies are increasingly the starting points for (re)designing the curriculum. Further research needs to make clear to what extent the model described in this study can be useful in other segments of education. Finally, it is interesting to compare the Dutch view on competence-based learning with developments at European level. In other countries competence-based learning is also an item on innovation agendas (Bjørnåvold, 2000; Descy and Tessaring, 2001).

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