

**To What Extent are Vocational Courses Competence-Based?:
Evaluation of a Model for Self-Assessing Competence-Based
Vocational Education**

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Abstract

The model for competence-based education (CBE-model) as developed by Wesselink et al. (2007a), consisting of 8 CBE design principles and 4 corresponding CBE implementation levels, can be used to assess the extent to which CBE is realized in vocational courses. This study investigated which adjustments of the CBE-model were necessary according to teachers in order to apply the CBE-model as a valid instrument in educational practice. In a first study teachers (N = 57) evaluated the model during group sessions. Then the model was revised. Besides linguistic adjustments, one new CBE design principle and a fifth CBE implementation level were added. One principle was split into two separate principles. In a second study teachers (N = 151) completed a digital questionnaire to evaluate the revised model. The study showed that teachers understood and interpreted the revised model well, were able to position their vocational course by using the model and that the model had a good content validity.

Competence-based education (CBE) has become a dominant trend in vocational and professional education in several countries in Europe and also in Australia (Biemans, Wesselink, Gulikers, Schaafsma, Verstegen and Mulder, 2009; Brockmann, Clarke, Méhaut & Winch, 2008; Clarke & Winch, 2007; Mulder, Weigel and Collins, 2007). Competencies are used more and more as the starting point for designing curricula and instructional methods. From August 2011 senior secondary vocational education and training (VET) institutes¹ in the Netherlands are obliged to provide vocational courses that are based on competence-based qualifications.

The transformation to CBE in Dutch VET is hindered, because the definition of CBE is diffuse and there are no sufficient guidelines, instructions or examples provided by the government or other organizations for developing competence-based vocational courses

(Biemans et al., 2009; Klarus, 2004; Onstenk, De Bruijn and Van den Berg, 2004; Van der Klink and Hendriks, 2002; Wesselink, Biemans, Mulder and Van den Elsen, 2007a). As a consequence of this situation, considerable differences exist in the design of competence-based courses (Wesselink, Dekker-Groen, Biemans and Mulder, 2010). Dutch researchers constructed a conceptual CBE-model based on an international literature review, a focus group session and a delphi study among experts to describe CBE and create clarity about the concept (Wesselink et al., 2007a). The CBE-model outlines eight crucial design principles of CBE elaborated for four implementation levels called not, starting to be, partially and completely competence-based. These levels specify to which extent vocational courses are competence-based (Wesselink et al., 2007a). The CBE design principles are as follows (Wesselink et al., 2007a):

1. The **competencies** that are the basis for the vocational course are defined
2. **Vocational core problems** are the organizing unit for (re)designing the vocational course (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** in 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 fulfill their roles as both **coaches and experts**
8. A basis for **lifelong learning** attitude for students is realized

Further research on the CBE-model appeared to be necessary. First, a study of Wesselink, Mulder and Biemans (2007b) showed that the CBE-model was perceived as comprehensive and useful by teachers, but that adjustments were necessary because some parts of the instrument could be interpreted differently. Second, it is unclear if the results of Wesselink et al. (2007b) who evaluated this model only in the agricultural sector of Dutch VET with a small number of teachers can be generalized to all four VET-domains.

The current study was initiated to fulfill two objectives. First to examine which adjustments of the CBE-model were necessary according to teachers in order to apply the model in educational practice. And second to examine the validity of the revised model. These objectives can be summarized in the following research question: *'Which adjustments of the CBE-model are necessary according to VET teachers in order to apply the model as a valid instrument in educational practice to describe the extent to which CBE is realized in vocational courses?'*

Methodology

In this study a multi-method approach was used. Two studies A and B were conducted. Enrolled in both studies were teachers who were working in Dutch VET. A convenience sample across different VET institutes was taken. To select the participants VET institutes were invited by e-mail to participate. In case of study A, 57 teachers participated who were working in 5 different institutes. A group session was held in which teachers in couples systematically examined which adjustments of the model were necessary. Preceding the sessions teachers filled out an individual questionnaire. Content analysis and descriptive statistics were used to analyze the data. Suggestions for adjustments were accepted if 20% or more of the teachers suggested the same adjustment. Based on these results the CBE-model was revised.

In case of study B, 151 teachers working in 28 different VET institutes completed another individual questionnaire. The questionnaire was based on the revised CBE-model resulting from study A. First teachers were requested to indicate for each CBE principle the extent of realization of that principle in their own vocational course by selecting a level. Second they had to support their answer by giving an example from educational practice. The supportive argumentations provided by the teachers were used to investigate whether the

teachers understood the content of the model. The teachers were also requested to give their opinion on the importance of the various principles of CBE on a three-point scale. Descriptive statistics were used to describe the results of the digital questionnaire. The validity of the revised model was examined by using the content validation approach of Lawshe (1975). Content analysis was used to analyze the supportive argumentations. The answers were coded as follows: 1) sufficient argumentation as support, 2) no sufficient argumentation as support and 3) no argumentation.

Results

Study A

The individual questionnaire showed that 87% of the teachers agreed with the principles of CBE as defined as they compared them with their own key words of CBE. When asked whether the principles that made up the model gave a recognizable picture of CBE, 26% of the teachers considered principle 1 (concerning the job competence profile) to be superfluous. But since, principle 1 is the basis for implementing CBE and is mandatory by the government this principle did remain in the model.

According to 10% of the teachers the CBE-model was incomplete. Flexibility of vocational courses and collaboration were aspects of CBE which according to some of the teachers were missing in the model. Although less than 20% of the teachers suggested these adjustments, a principle about flexibility of vocational courses was added because according to the researchers this aspect is also a crucial characteristic of CBE. Collaboration was embedded in the remaining principles.

During the group sessions teachers were asked whether they agreed with the implementation levels mentioned in the model. The results showed that 40% of the teachers were not satisfied with the levels, because they experienced a gap between the last two levels.

Table 1 shows the percentages agreement with the aspects a) the comprehension of the principle; b) the comprehension of the cells and c) the readability of the model.

Table 1.

Percentages agreement with the aspects a to c

| Aspects | Principles | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--|------------|-----|-----|-----|-----|-----|-----|-----|-----|
| a) Comprehension of the principle | | 90% | 77% | 89% | 88% | 93% | 93% | 88% | 90% |
| b) Comprehension of the cells of the model | | 74% | 83% | 93% | 91% | 93% | 88% | 88% | 90% |
| c) Readability | | 74% | 71% | 74% | 77% | 88% | 93% | 88% | 90% |

On aspect a) the scores varied between 77% and 93%. The lowest score (77%) was found for principle 2 (vocational core problems). Teachers explained that they were confused about the meaning of the term ‘vocational core problem’. The words ‘organizing unit’ were considered vague. Most of the teams felt that the meaning of the remaining principles was relatively clear. The scores on the comprehension of the cells varied between 74% and 93%. A relatively high percentage of the teachers (26%) stated that the descriptions of principle 1 in the corresponding levels were not clear. Least satisfied were teachers with the readability of the principles. The scores varied between 71% and 93%. Especially the first four principles (competencies, vocational core problems, assessment and authentic situations) scored relatively low on readability. Some definitions, sentences or single words were not always clear to the teachers and some parts of the model could be interpreted differently. During the group sessions teachers gave concrete suggestions to improve the readability. Another remark teachers made during the group sessions concerned principle 6 (self-responsibility of students and (self)-reflection). Teachers suggested splitting the principle in two principles since two

indicators are assessed in one principle. Based on the results of study A, the CBE model was revised: besides linguistic adjustments, one new CBE design principle (flexibility of vocational courses) and a fifth CBE implementation level (largely competence-based) were added. Principle 6 was split into two separate principles (self-responsibility and self-reflection).

Study B

Teachers were asked to rate the importance (not essential; useful, but not essential; essential) of each CBE-principle of the revised model. The content validity ratio (CVR) was calculated by means of the percentage “essential” for each principle. Table 2 shows the CVR-scores of each principle. All principles showed significant CVRs. A positive score (+1) indicates that at least more than half of the teachers considered the principle to be essential. Principle 1 to 6 scored higher CVR's than principle 7 to 10. The lowest CVR was ,32 and the highest scored ,81. The model as a whole also had a good content validity (,61).

Table 2.

CVR-scores of each principle

| Principle | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| CVR | ,76* | ,72* | ,81* | ,72* | ,68* | ,71* | ,44* | ,32* | ,55* | ,36* |

* $p < 0,05$

The supportive argumentations for the levels of CBE implementation of the various principles as provided by the teachers was coded as level 1, 2 or 3. The main part (in total 85%) of the support was coded as the highest level 1. Teachers presented a personal experience as source of information for the support or gave an example of a situation that showed the selected level on the model. The supportive argumentations of the teachers showed that they understood the principles and the differences between the levels. Argumentation level 2 was only assigned to 9 % for principle 1, 7% for principle 2 and 2% for principle 4 and 0% to the remaining principles. Support at level 2 was mainly characterized by the fact that the answer given was irrelevant to the principle. In case of principle 1 irrelevant explanations concerned a description on internships in vocational practice instead of an explanation concerning the job competence profile and how this profile is used in their vocational courses. The irrelevant explanations for principle 2 concerned different subjects for example assessment, vocational practice or teachers' opinions about CBE. In only 13% of the cases the support was coded as level 3 (no argumentation).

Conclusion and discussion

The original CBE-model (Wesselink et al., 2007a) describes CBE in eight principles and assesses the extent to which CBE is realized in vocational courses by using four implementation levels. The goal of this study was to gain insight in what should be adjusted to the CBE-model according to teachers, in order to apply the model as a valid instrument in education practice to describe the extent to which CBE is realized in their vocational courses. To summarize, based on the findings of our research the following adjustments were made to the CBE-model: 1) Adding a principle about flexibility of vocational courses; 2) Embedding the aspect of collaboration in the model; 3) Adding the implementation level largely competence-based; 4) Dividing principle 6 into two principles (a. self-responsibility and b. reflection) and finally adjustments made to improve the readability of the instrument. This resulted in the following principles of the revised CBE-model:

1. The vocational course is based on **core tasks, working processes and competencies** (the qualification profile)
2. **Complex vocational core problems** are central
3. Learning activities take place in **different concrete, meaningful vocational situations**
4. Knowledge, skills and attitudes are **integrated**
5. Students are regularly **assessed**
6. Students are provoked to **reflect** on their own learning
7. The vocational course is structured in a way that **self-steering** of students continuously increases
8. The vocational course is **flexible**
9. The **guidance** is alternated with and adjusted to the learning needs of the students
10. In the vocational course attention is paid to **learning, career- and citizenship competencies**

As for the validity of the revised model the results of study B show that the model has a good content validity. The teachers were able to position their vocational course on the model and they understood and interpreted the model well.

As Jonnaert et al. (2007, p. 188) said: “The world of education is in the throes of a major paradigm shift, of which many of the major players have barely arrived at the threshold”. The revised CBE-model offers major players in VET a valid instrument to assess their own educational practice and see which aspects they have to work on in order to fully realize the main principles of CBE in actual teaching and learning processes.

In many VET institutes teams of teachers are held responsible for a complete vocational course. The CBE-model is an instrument which might be helpful to teacher teams of the same vocational course to evaluate the extent to which they implemented CBE. More research is needed to investigate whether teacher teams can really work with the CBE-model and to examine whether teachers, teacher teams and students perceive the extent of CBE in their vocational course similarly. Further research is also necessary to examine whether the model can be applied to different forms of education such as higher professional education. This article indicates that so far the CBE-model can be seen as a useful instrument in the process and implementation of CBE by teachers.

Footnote

1. Offers vocational courses at level 4/5 of the European Qualification Framework for youngsters aged between 16 and 22 who have completed the first compulsory cycle of secondary education and can be compared to community colleges in the United States.

References

- Berg, N. van den & de Bruijn, E. (2009). *Het glas vult zich: Kennis over vormgeving en effecten van competentiegericht beroepsonderwijs: verslag van een review.* 's Hertogenbosch: Expertisecentrum Beroepsonderwijs
- Biemans, H., L. Nieuwenhuis, R. Poell, M. Mulder, and R. Wesselink (2004). Competence-based VET in the Netherlands: Background and pitfalls. *Journal of Vocational Education and Training* 56, no. 4: 523–38.
- Biemans, H., Wesselink, R., Gulikers, J., Schaafsma, S., Versteegen, J. & Mulder, M. (2009). Towards competence-based VET: dealing with the pitfalls. *Journal of Vocational Education and Training*, 61(3), 267-286.
- Brockmann, M., Clarke, L., Méhaut, P. & Winch, C. (2008). Competence-based vocational education and training (VET): the cases of England and France in a European Perspective. *Vocations and Learning*, 1, 227-244
- Clarke, L. & Winch, C. (2007). *Vocational education. International approaches, developments and systems.* London/New-York: Routledge
- Jonnaert, Masciotra, Barrette, Morel, & Mane (2007). From competence in the curriculum to competence in action. *Prospects*, XXXVII (2), 187-203
- Klarus, R. (2004). Because it can become better. Competence-based learning of teachers. *VELON Tijdschrift voor Lerarenopleiders*, 25 (4), 18-28
- Lawshe, C.H. (1975). A quantitative approach to content validity. *Personnel Psychology*, 28, 563-575

- Onstenk, J., Bruijn, E. de & Berg J. van den (2004). Een integraal concept van competentiegericht leren en opleiden. Cinop: Den Bosch
- Wesselink, R., Biemans, H.J.A., Mulder, M. & Elsen, E.R. van den (2007a). Competence-based VET as seen by Dutch researchers. *European journal of vocational training*, 40 (1), 38-51
- Wesselink, R., Mulder, M. & Biemans, H.J.A. (2007b). Evaluation of the utility of a model for competence-based VET. Paper presented at AERA, April 2007, Chicago
- Wesselink, R., Dekker-Groen, A., Biemans, H.J.A. & Mulder, M. (2010). Using an instrument to analyse competence-based vocational courses: experiences of teachers in Dutch vocational education and training. *Journal of Curriculum Studies*. (in press)
- Weigel, T., Mulder, M. & Collins, K. (2007). The concept of competence in the development of vocational education and training in selected EU member states. *Journal of Vocational Education and Training*, 59, 51-64