

DEVELOPMENT OF TEACHER COMPETENCES IN CREATING POWERFUL LEARNING ENVIRONMENTS IN VOCATIONAL SECONDARY EDUCATION

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Abstract

Background: At the end of Vocational Secondary Education students should be able to solve authentic problems individually and in group. Powerful learning environments could enforce these learning processes. Research question: “Which critical desirable design principles can we define to create a powerful learning environment in Secondary Vocational Education ? Method: We combine different perspectives of teachers, students and researchers to build a shared model of learning environments, which will be perceived as more powerful by all stakeholders. Based on literature we selected design principles followed by organizing focus groups with teacher educators and teachers to further adapt these principles.

Preliminary results: We determined eight design principles: Authenticity learning environment, differentiation, adapted evaluation, self-directed learning, problem solving, teamwork, shared responsibility design learning environment and (labour) identity development. Each principle has been further clarified in indicators. This study is part of a larger research project in developing teacher competences in creating powerful learning environments in Vocational Secondary Education.

Key Words: *secondary vocational education, powerful learning environments, development teacher competences.*

JEL Classification: I2

1. INTRODUCTION

Students in Vocational Secondary Education are expected to cope with daily (vocational) problems, individually and in team, in authentic learning environments. Key competences in these environments are self-directed learning, problem solving and cooperative learning skills. Students in vocational education have difficulties developing these skills (Kicken, 2009, Levett-Jones, 2005).

The characteristics of powerful learning environments (PLE) are expected to have positive effects on student learning.

Moreover teachers' conceptions of learning and teaching influence the implementation of a PLE and students' perceptions of a learning environment affect their subsequent learning behavior and the quality of the learning outcomes (Könings et al., 2005, 2007). Combining the different perspectives of teachers, students and researcher is expected to have positive effects on the power of PLE's.

In order to investigate the quality of the learning environment, a design research is set up.

This paper is part of a broader research line with the following research question in general : "How can teachers, students, teacher educators and researcher design more powerful learning environments?"

As part of the research as a whole, we put forward the following research question : "Which critical desirable design principles can we define to create a powerful learning environment in Secondary Vocational Education that can promote changes in the quality of learning , especially self directed learning, cooperative learning and problem solving".

2. METHOD

Teachers', teacher educators' and students' perceptions concerning learning environments will be used to build and optimize a model of powerful learning environments in Vocational Secondary Education, the PoLEVE. The model puts forward 8 design principles; each principle is further clarified in indicators.

2.1. Data

The development of the model of the PoLEVE occurs in two phases: the development of a draft model based on literature. Based on this draft, quotes are put forward in focus groups to discuss and further clarified by data out of focus groups.

Literature

First we identified design principles of powerful learning environments (PLE) based on literature of Merrill (2002), De Corte (2003), Van Merriënboer et al. (2003) and Könings et al. (2005, 2007). PLE are situations and contexts for learning that aim at the development of complex and higher order skills, deep conceptual understanding and metacognitive skills. Learning is enhanced by a productive use of acquired knowledge and skills and the ability to apply in new problemsituations (van Merriënboer en Paas, 2003, de Corte, 1990) .

These principles have been further clarified on powerful learning environments in vocational education (De Bruijn, et al. 2006; Meijers en Kuijpers, 2007; Anderson, 2009). The pilot model

of Powerful Learning Environments in Vocational Education, the PoLEVE, puts forward eight design principles:

- Authenticity learning environment
- Differentiation
- Adapted evaluation
- Self-directed learning
- Problem solving
- Teamwork
- (labor) Identity development
- Shared responsibility design learning environment

Each principle has been further operationalized in indicators.

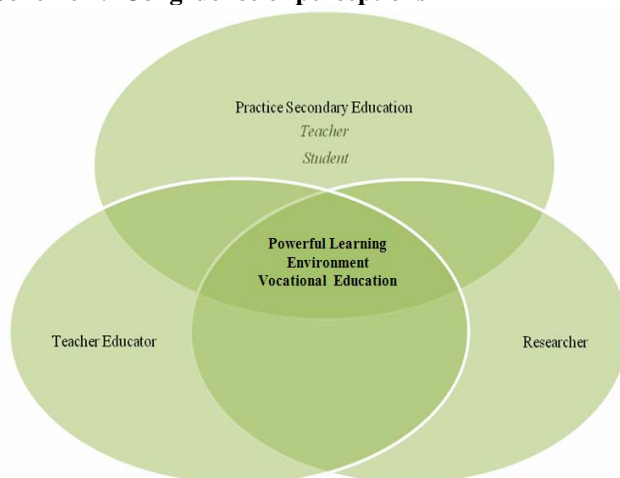
Focus groups

To further clarify the model, we integrated perceptions from different stakeholders because students often don't perceive the learning environment in the same way as intended by designers (Elen & Lowyck, 1999). Moreover the perception of the learning environment determines more than the learning environment itself how effective the learning environment is (Entwistle, 1991, Könings e.a., 2007). There is a discrepancy between the intended learning environment of the designer and the teachers beliefs about powerful learning environments, which leads to an implementation that differ regarding to the intended (Könings e.a, 2007).

Therefore, it's important to build bridge between these discrepancies and to involve every stakeholder in developing a common model, which is perceived more powerful.

The figure below shows the congruence of the different perceptions, resulting in a more shared model of Powerful Learning Environments in Vocational Education (PoLEVE):

Scheme 1: Congruence of perceptions



We collected data during focus groups with teacher educators, teachers and students and linked those with the pilot model, to further clarify.

These gained insights are linked with previous findings to refine the model.

The data collection process of the focus groups is described in table 1:

Table 1: Data Collection Focus Groups

Who?	What?	Data?	Number of meetings?	Number of participants?
1 Teacher educators	- Desirable pedagogy - Principles PoLEVE	Audio / Reports / (Concept maps)	3 (+ vision workshop TE)	11 (+ 26 participants workshop)
2 Teachers	- Desirable pedagogy - Principles PoLEVE	Audio / Reports / (Concept maps)	2 (+ vision workshop T)	11 (+ 11 participants workshop)
3 Students	- Desirable pedagogy - Selection of principles	Interactive methods	2	12

2.2. Participants

Teacher educators

The teacher educators were invited through the newsletter of the VELOV¹, or were participants of the “VELON”² conference and chose to participate at the focus group.

Teachers

Similarly we organized focus groups for teachers. In addition we received further information during a workshop that also focused on self-directed learning, problem solving and teamwork using complementary groups discussions with a plenary presentation.

Students

Students were asked about their perception of good education in Vocational Education. The method was similar but the quotes were adapted. Interactive methods were used to have a clear view of their vision.

Researcher

Later on, while we design together with teachers the learning environment, there will be a further exchange of ideas about learning and perceptions of learning environments. At that moment the researchers view is part of this process. In this way, more congruence can be created between interpretations of learning environments.

¹ Association of Teacher Educators Flanders

² the Dutch Association of Teacher Educators

2.3. Materials

A short written guidance was provided to explain the principles. An example of a quote with its guidance :

Design principle : fostering Self-directed learning

Young people in Vocational Secondary Education aren't able to take control of their own learning process!

Context : In the line of "Long Life Learning" it is important that students learn to take control of their own learning process. Some see reflection as an important tool to foster self-directed learning.

Is attention to reflection a tool to foster self-directed learning in vocational secondary education?

Do you spend attention on improving reflection skills of vocational students in the teacher education Do you see possibilities to spend more attention on reflection? How?

If you look at the practice of your students in teacher education, can they foster reflection skills with your students? What works well? Which obstacles did you notice?

2.4. Procedure

First the participants were asked to describe "a powerful learning environment in Vocational Secondary Education". After the general question, we focused on the different principles in a complementary way.

The principles were posed as quotes.

All the participants get a few minutes to prepare their quotes. A participant started the discussion based on his quote and the others gave their comments. Additionally, a workshop was organized for teacher educators. They were divided into groups of six participants. They were asked to discuss the meaning of powerful learning environments in vocational education and focusing on three principles: self-directed learning, problem solving and cooperative learning. They wrote their ideas down in a concept map on a large sheet of paper. In the end, we plenary discussed the ideas that were written down.

2.5. Data analysis

The results of the conversations were audio taped and fully transcribed.

For analyzing the data, we use³ the text analysis software "MAXQDA".

The literature based design principles with indicators define the categories and applied codes.

3. PRELIMINARY RESULTS

To answer the research question -which critical desirable design principles can we define to create a powerful learning environment in Secondary Vocational Education- preliminary descriptive findings are put forward:

³ In progres

An *authentic* learning environment is desirable, although in practice it is not easy to realise. A *shared responsibility* between teachers general subjects and teachers of vocational subjects in designing a learning environment is seen as a way to make the transfer from general subjects to the vocational context easier.

At present general subjects and vocational subjects are often experienced as separate worlds. *Differentiation* is perceived as an important tool to cope with differences in the classroom. Yet teachers are not sure on how to adapt their *evaluation* to meet on individual needs of their students. Teacher professionalization on these issues is seen as desirable. *Self-directed learning* is considered an important principle, but seems hard to develop. Reflection is perceived as a way to foster self-directed learning, but there is no systematic approach to teaching students in vocational education to reflect on their learning process. Well-know and established is working with heuristics based on different phases of the learning process (orientation, preparation, implementation and reflection).

Teachers in the focus groups do endorse to the importance of working on *problem solving skills*, but do not know how to promote those skills. An illustration: In a workshop, we received an empty paper as an answer to how teachers improve problem solving skills... The set up of *collaborative learning* is not systematic yet, although teachers and teacher educators agree on the importance of this. *(Labour) identity development* is new for the participants of all focus groups. After defining this principle it is also considered an important principle, yet one that is hardly given attention to at present, both in vocational education and TE.

4. PRELIMINARY CONCLUSION

Based on literature we put forward 8 design principles to create Powerful Learning Environments in Vocational Education, a draft PoLEVE model.

The draft has been discussed and further clarified in focus groups with teachers and teacher educators. In this way we became a more shared vision about the 8 principles and its indicators as desirable in order to create powerful learning environments.

The model PoLEVE will be further clarified on a broader scale in a digital questionnaire. From the PoLEVE, being the shared vision on powerful learning environments in Vocational Education, we will make the link to the professionalization program for teachers.

Based on this model a learning environment will be designed together with the different stakeholders. To implement the learning environment, teachers will follow a reflective teacher professionalization program. The development of teacher competences will be described. The learning activities of pupils will be analyzed and related to the designed learning environment as well as to the development of teacher competences. We expect that these results, will give us more tools to design more powerful learning environments in secondary vocational education.

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