







Exploring University Teachers' Attitudes  
Towards a Curriculum Reform  
in Which a Process-oriented and Student-centred  
Model is Central

Master thesis  
Educational Science and Technology  
University of Twente

Kim E.M. Evers  
s0169129  
k.e.m.evers@gmail.com

Supervisors: S.I. van Aalderen-Smeets and J.H. Walma van der Molen

Colloquium: 24 April, 2015



# 1 Preface

Last year I spend my time struggling, fighting and finally conquering attitudes. Who would have thought that attitudes are such complicated creatures? We all have attitudes, but I challenge you: try to capture this intangible concept in a definition or a conceptual model (are you even aware of having attitudes?). This was the challenge I studied last year and with success, I caught the university teachers' attitudes towards a curriculum reform in my conceptual model for attitudes and measured them with my instruments. This resulted in some recommendations for curriculum reform and training for getting hold on these influential creatures.

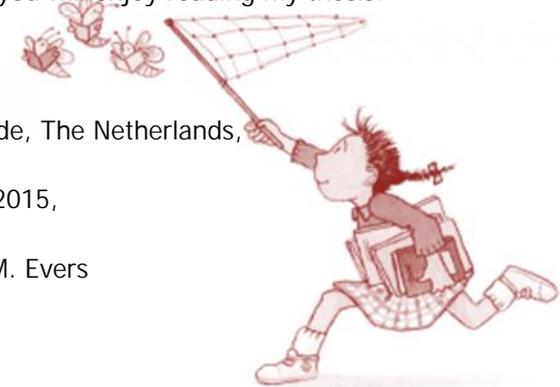
This master thesis is the final proof for having the competencies needed for obtaining my Master's Degree in Educational Science. This research was commissioned by Marije Hahnen of the Centre for Educational Support (CES) of

the University of Twente (UT) and supervised by Sandra van Aalderen and Juliette Walma van der Molen of the Centre for Science Education and Talent Development of the UT.

Thanks to everyone who have guided me through this research process. I thank the teachers who filled in the questionnaire or were interviewed by me and gave me insight into their personal beliefs, thoughts and feelings about the curriculum reform. I also want to extend a special thank you to Sandra and Nelleke for believing in my research capacities and making me feel enthusiastic about research again. Thank you, Juliette, for your fresh insights for my thesis. I am really grateful for the patience of Adam and Marije, thank you for offering me the space I needed. Thank you, friends and family, for just being there and believing in me, I took your advices to heart.

As a smart person once said to me: "Getting your Master's Degree is like having your driver's license. Only after you got your driver's license, do you really learn to drive." I would love to really learn to do research. I want to know more about research regarding professional development and I'm looking forward to grow professionally within the team of inspiring researchers I met during my thesis.

I hope you will enjoy reading my thesis.



Enschede, The Netherlands,

March 2015,

Kim E.M. Evers

PS: If you don't like something in this thesis... Well, you can't change it, so change your attitude instead.

|                           |    |                                   |    |                  |    |                  |    |            |    |
|---------------------------|----|-----------------------------------|----|------------------|----|------------------|----|------------|----|
| Start                     | 2  | Abstract                          | 3  | Introduction     | 4  | Context          | 6  |            |    |
| Theoretical framework     | 8  | Hypothesis and research questions | 9  | Conceptual model | 12 |                  |    |            |    |
| Method                    | 17 | Procedure                         | 18 | Questionnaires   | 20 | Pilot interviews | 23 | Interviews | 23 |
| Results                   | 24 | Questionnaires                    | 25 | Interviews       | 30 |                  |    |            |    |
| Conclusion and discussion |    |                                   | 34 |                  |    |                  |    |            |    |
| The end                   | 41 | References                        | 42 | Appendices       | 47 |                  |    |            |    |



**Start**

## 2 Abstract

---

**Context.** The University of Twente (UT) introduced a new educational model focused on student-centred and process-oriented learning. This required from teachers to adapt a role as a learning facilitator. The Centre for Educational Support (CES) of the UT designed a training programme that taught teachers the skills they needed to be a successful facilitator.

**Theory.** Teachers' attitudes towards a reform are seen as a requirement for successful implementation of a curriculum reform (e.g. Ajzen, 1991; Fullan, 2007; van Aalderen-Smeets, Walma van der Molen and Asma, 2012; Van den Akker, 2003). Teachers' attitudes can be influenced by training that is focused on teachers' values, beliefs and attitudes (Desimone, 2009; Fullan, 2007; Gegenfurtner, 2013; van Aalderen-Smeets & Walma van der Molen, 2015). Van Aalderen-Smeets and Walma van der Molen (2015) showed the positive effect of an attitude-focused training programme on the attitudes of primary school teachers towards science education. This present study investigates whether the CES training programme improved the attitudes of university teachers towards curriculum reforms.

**Method.** A conceptual model for defining university teachers' attitudes was designed based on the model of van Aalderen-Smeets et al. (2012). Based on this model and data from pilot interviews, a questionnaire was developed to measure the attitude of 49 teachers of the University of Twente (25 untrained teachers, 24 trained teachers). The validated questionnaire was used to compare the data between both conditions.

**Conclusion.** The data showed no significant differences between the conditions. The tutor training programme was probably not sufficient. A pre-test post-test study is needed to be sure of the influence of the training programme. Until then, we recommend a more attitude focused training programme, an extension of the duration of the training programme, more forms of active learning (e.g. peer coaching, reflection, mentoring) and a more personal and practicable format.

### 3 Introduction

In 2011, the Dutch Advisory Council for Education (Onderwijsraad) stated that highly educated people should fulfil an innovative role in society. The aim of higher education is therefore to develop and support an innovative and creative way of thinking. Bell (2010) argues that project based education (PBE) provides students with the skills they need nowadays. Examples of these skills are creative thinking, being self-reliant, and collaborative and evaluative skills. The speed of technological, professional and societal changes asks for process-oriented teaching models like PBE, where students learn skills to self-regulate their learning processes (Vermunt & Verloop, 1999). However, the educational model of most universities does not fit the goals of higher education. Therefore the curriculum of higher education should change to provide the opportunities for students to develop these skills.

Teachers play a highly important role in curriculum reforms (Donche, 2005; Fullan, 2009; Maskit, 2011). They are the leading figures in the implementation of the curriculum (Van den Akker, 2003). As the link between policymakers and students, teachers have to interpret and implement the formal written ideas of others (e.g. Fullan, 2007) and they have to create a constructive interaction with the students that leads to lasting learning results (Delhoofen in Donche, 2005; Vermunt & Verloop in Donche, 2005). This is not easy, since curriculum change is a complex innovation, in which teachers have to go through serious and fundamental changes in professional behaviour and their role in education (Bergen & Van Veen, 2004; Oolbekkink-Marchand, 2006, Vermunt & Verloop, 1999).

Curriculum reforms require from teachers to adapt new skills, knowledge and to change

their behaviour. Korthagen (2010) explains that teachers have to reflect on their beliefs and habits regarding learning and education when they have to change their behaviour, because this reflection leads to new views on education and new competences what will change their behaviour (Fullan, 2007). Fullan (2007) agrees that teachers need to reculture in order to change their behaviour successfully. If the attitude of the teachers is not in line with the desired behaviour, than there is little chance the teacher will execute this behaviour (Ajzen, 1991). Therefore teachers' attitudes towards change are described as one of the most influential factors for successful implementation of reforms (Beets et al, 2008; Evers, Brouwers & Tomic, 2002; Rafferty et al, 2013).

Changes in attitudes can be achieved by training, however there is little research about the link between training and the intention to

reform (Gegenfurtner, 2013). Gegenfurtner (2013) and the self-determination theory of Ryan and Deci (2000) argue that people are more motivated to engage in a reform when they can identify themselves with the reform or integrate the reform with their own values. A sense of autonomy is needed to reach these levels of motivation, e.g. teachers should initiate the implementation themselves (autonomous motivation).

Furthermore, van Aalderen-Smeets and Walma van der Molen (2015) found a significant effect of attitude-focused training, in which teachers consciously reflect on their attitudes, on primary teachers' attitudes towards science education. These findings

confirm the plea of Fullan (2007) for reculturing, and emphasize the importance of training focused on values, beliefs and attitudes for stimulating a curriculum reform. Superficial, fragmented and brief training programmes do not support teachers sufficiently to successfully implement a curriculum reform (Ball and Cohen in Fullan, 2007; Cohen and Hill in Fullan, 2007). Gegenfurtner (2013) suggests that trainings should focus on gaining interests and that trainees should have more autonomy in their job when one wants to have effective training results (cf Ryan & Deci, 2000).

In conclusion, the importance of training teachers in curriculum reforms is clear.

Teachers are the key figures in educational reforms and their attitudes have great influence on the implementation of the curriculum reform. On top of that, van Aalderen-Smeets and Walma van der Molen (2015) showed the positive effect of an attitude-focused training programme on the attitudes of primary school teachers. However, it is less clear whether a training programme improves the attitudes of university teachers towards curriculum reforms. Therefore the aim of this study is to investigate the influence of a training programme on university teachers' attitudes towards a curriculum reform in which a process-oriented educational model is central.

## 4 Context

As a response to the demand for more student-centred and process-oriented education, the University of Twente (UT) introduced a new model of education called TOM (Twents Onderwijs Model) in September 2014. It was rolled out over six participating university faculties. The aim of the TOM model is to improve students' study results and provide students with the skills they need in their future jobs. Key characteristics of this model are modular education (ME) and student-centred education (SCE). In ME, the study programme consists of thematic periods that contain one project and several coherent and supporting modules. This thematic approach makes it easier for students to connect the different subject matters and the opportunity for practical application encourages deep learning. Models for SCE focus on the role of the student in the learning process: the students are responsible for their own learning process. The classic

teacher role as the leader who steers the students' learning processes, changes into the role of a learning facilitator who cooperates with students to guide them in their personal learning processes. Within the TOM model this is called a tutor. A tutor in TOM is someone who supports a group of students during their project, focussing mainly on the development of learning- and group processes. The tutor serves both an important academic purpose; he teaches them academic skills and provides information, and an important social purpose; he is students' first contact and is able to refer students for psychological support (Moust, 1993; Schmidt, 2011).

### Tutor training programme

The Centre for Educational Support of the University Twente (CES) designed a basic tutor training programme to teach unexperienced tutors the skills they needed to be a successful tutor in TOM. This training

programme was adaptable to the specific wishes, needs and culture of the concerning UT faculty. The training programme consisted of two sessions of approximately three hours spread over two days. There were six suggested topics during the training programme: the definition of a tutor within TOM, group processes, conversation techniques, assessment, academic and professional skills, and tips and tricks. The goals of the training programme were:

- the tutor knows his role and tasks;
- the tutor is able to support a student group;
- the tutor keeps the diverse roles in mind;
- the tutor is able to execute the right communication techniques;
- the tutor knows how and when to refer students;
- the tutor is able to assess projects;
- the tutor is able to design the first meeting with the student group.

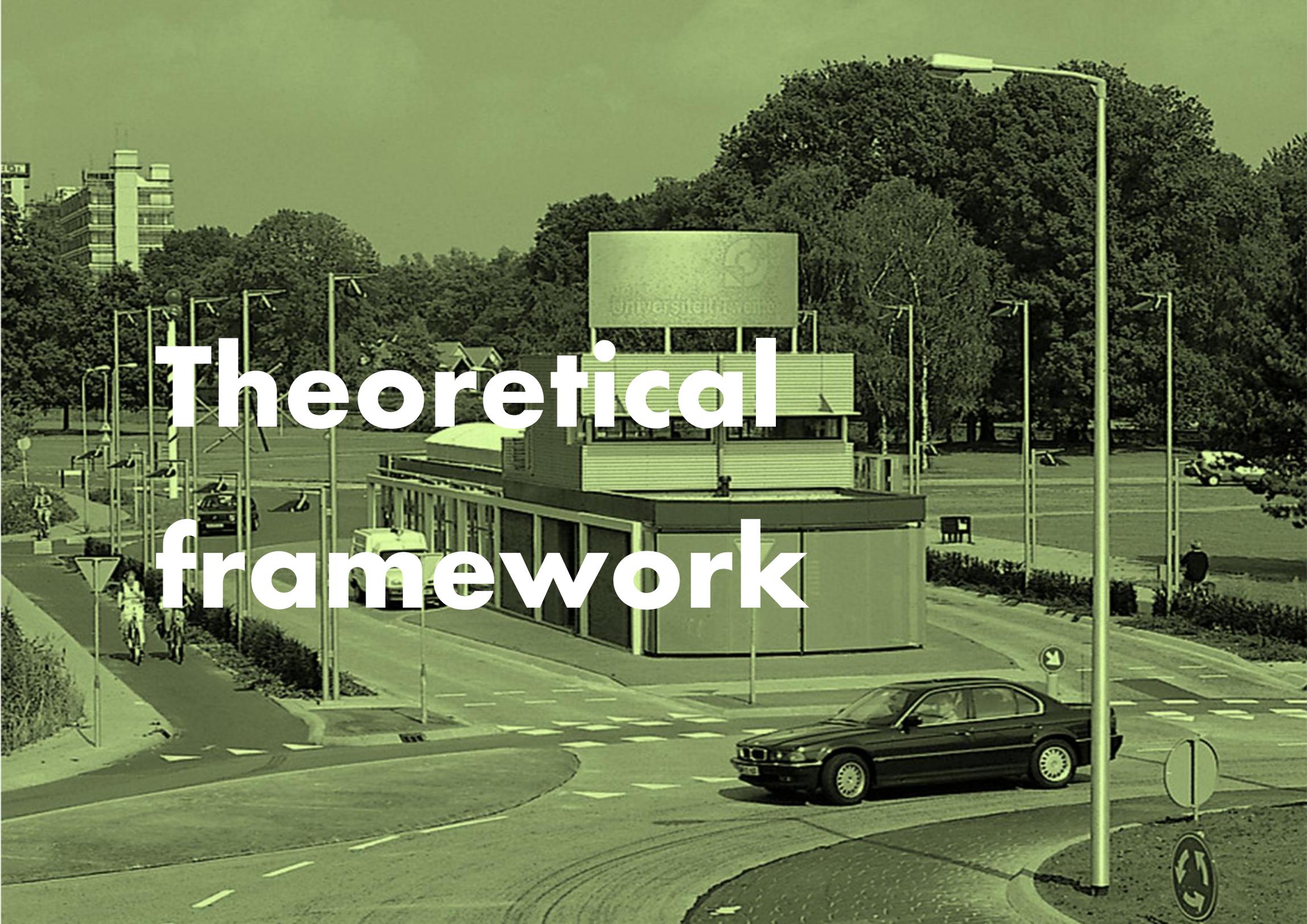
During the training programme tutors attended some lectures on for example the definition of a tutor, academic skills and instruments like Belbin's Team Role test and Leary's Rose. Furthermore, tutors brainstormed about the role of the tutor, they discussed various cases with each other, and they did some role-playing exercises to develop their communication- and coaching skills. Tutors also received some information about student-centred learning, peer feedback and assessing projects. They were also assigned a take-home assignment in which they needed to do the Belbin test, read something about student-centred learning, answer some questions about how they had organised their assessments and answer some questions about the academic skills in their module.

The training programme was tailor-made, so there were some differences between the trainings the tutors of different faculties received. These differences were for example in content, but also in voluntariness of participation and the duration and planning of

the training programme (some tutors had the entire training in one day).

The training programme was focused on improving the tutors' skills and knowledge about tutoring and SCE, but not specifically on changing the tutors' attitudes towards TOM. Nevertheless, during the training days, the CES noticed that the tutors' attitudes did not always match with the intentions of TOM and sometimes led to resistance. This could influence the effectiveness of the training programme and the success of the implementation of TOM. From this perspective it is interesting to get more insights into the impact of the training programme on the attitudes of the tutors.

# Theoretical framework



## 5 Hypothesis and research questions

The study of van Aalderen-Smeets and Walma van der Molen (2015) and other studies about professional development of teachers and adults (e.g. Compton & Jones, 1998; Desimone, 2009; and Fullan, 2007) give some insight in what is needed for a suitable training for changing attitudes. Desimone (2009) argues that there are five critical characteristics of professional development that can increase teachers' knowledge, skills and change in attitudes and beliefs: (1) content focus, (2) active learning, (3) coherence, (4) duration, and (5) collective participation. These elements are further explained below.

**Content focus.** University teachers are content experts and therefore often more focused on content matter than on the learning process of the student (Oolbekkink-Marchand, 2006). Therefore the CES training programme was mainly focused on the pedagogical and didactical aspects of

tutoring. Tutors were provided with extensive information about the required tasks, skills and role of a tutor. This is in line with the findings of Ingvarson (1998). He observed a dynamic, encouraging and student-centred teaching practice when teachers' content knowledge and pedagogical knowledge was more explicit, better connected and more integrated.

**Active learning and collective participation.** The techniques that are seen as powerful ways of learning in adult education show in most cases both, active learning and collective participation. For that reason, these characteristics are discussed together. Active learning and collective participation can be achieved by peer coaching, mentoring, reflection (with colleagues), and discussions about experiences. (Compton & Johnes, 1998; Otero et al., 2005; Polly, Mims, Shepherd & Inan, 2010). The CES used these approaches

in their training programme. Tutors had to bring their own experiences and they did role-playing exercises to get familiar with their tutor role. However, there was also a lot of lecturing (typically characterised as passive learning, the opposite of active learning).

**Coherence.** Coherence is about the consistency between policies, practice, and the training, and also about the coherence between the training and the beliefs and knowledge of the trainees (Desimone, 2009). Ajzen (1991) and Gegenfurtner (2013) both state that the reform will not be properly implemented when it is not in line with the attitudes, beliefs and values of the teachers. The training programme of van Aalderen-Smeets and Walma van der Molen (2015) focused on attitude. Teachers received information about what attitudes are and were provided with exercises to discover their own attitudes. This was not done in the

training programme of the CES. Tutors' attitudes, beliefs and values were hardly used before and during the training programme. As far as we know, there was no indexation of the beliefs and values of tutors concerning for instance SCE or tutoring. Tutors talked a lot about their experiences and practical doubts, but they never consciously reflected on their beliefs and how these could fit with TOM.

**Duration.** The duration of the training programme is also important; fragmented and brief training programmes do not support teachers enough to implement a curriculum reform (Ball and Cohen in Fullan, 2007; Cohen and Hill in Fullan, 2007). Also, the study of Asma, Walma van der Molen and van Aalderen-Smeets (2011) showed that teachers with little training saw more obstacles in implementing the reform. Van Aalderen-Smeets and Walma van der Molen (2015) designed a training programme of six

sessions (eighteen hours) and in their conclusions Van Aalderen-Smeets and Walma van der Molen expected enhanced effects with a more substantiated training programme (of twenty to fifty hours). This is a lot more than the two sessions, with a total of six to eight hours of the CES training programme.

**Autonomy.** Based on recent studies, there is one factor we want to add to Desimone's list: tutors want autonomy in their training, as high levels of self-control could lead to higher intentions to reform (Gegenfurtner, 2013). They want control over their own learning process and they are more committed when they set their own goals (Putnam & Borko in Jimoyiannis & Gravani, 2010). This demand for autonomy is logical, because in adult education there are great differences between learners' learning needs. Therefore tutors' prior knowledge and experiences should be taken into account to

meet these individual needs (Compton & Jones, 1998; Korthagen, 2010). The CES fitted the training programme to the needs, wishes and culture of every faculty, but hardly to the individual needs and wishes of the teachers.

Based on the previous comparison with literature, the CES training programme seems to miss some critical characteristics which are suggested to be essential to achieve an attitude change. The training programme might not be attitude-focused enough to realise a difference in teachers' attitudes and the effectiveness of the training programme is doubtful because the duration of the training programme seems too short. Therefore hypothesis of this study is: "the CES training programme was not sufficient to achieve a difference in attitudes between tutors who followed the training programme and tutors who did not".

To test this hypothesis, this study answers the following research questions:

1. How can university tutors' attitudes towards TOM be defined?
2. How can university's teachers' attitudes be measured in a valid and reliable way?
3. Is there a significant difference in the attitude towards TOM between teachers who followed the CES tutor training programme (trained condition) and teachers who did not (untrained condition)?

To answer the first question, a literature study on attitudes towards curriculum reform, and related attitudes was conducted and a conceptual model was developed. To answer the second question a questionnaire is developed and analysed with pilot interviews, factor analysis and Cronbach's alpha. To answer the third question the data from the questionnaire was analysed with a MANOVA. At the end, the results of semi-structured in-depth interviews gave detailed information about teachers' experiences with and thoughts about TOM and the tutor training programme to clarify the results of the questionnaire.

## 6 A conceptual model for university tutors' attitudes towards curriculum reform

Successfully researching attitudes requires a clear conceptual framework. There is a lot of literature about attitudes, but the definition of the concept attitude itself is not always clearly described (Stevens, 2013; Tabata & Johnsrud, 2008; van Aalderen-Smeets, van der Molen and Asma, 2012). Consequently, Van Aalderen-Smeets et al (2012) did a review study to develop a conceptual framework that describes the attitudes of primary education teachers towards science education. This model can also be suitable for measuring university teachers' attitudes, because the context of the study of Van Aalderen-Smeets et al. (2012) shows considerable similarities within the context of this study. First of all, in both studies teachers had to go through a curriculum reform; the primary education teachers have to implement science education and the university teachers have to implement TOM. Both reforms are about a change towards process-oriented and student-centred

education. This required a change from the role of a leader into the role of a facilitator that supports students in their learning process during designing and researching practical problems. Both groups of teachers faced a similar change in their tasks as a teacher (e.g. creating a suitable learning environment, contact with students, designing curriculum materials).

According to the model of van Aalderen-Smeets et al. (2012) there are three components that represent an attitude towards science: cognitive beliefs, affective states and perceived control (see Figure 1). These components are based on the tripartite model and the model of planned behaviour of Ajzen (1991). These are two well-known models that describe the concept of attitude and the connections with other concepts like behaviour, intentions and beliefs.

The tripartite model describes attitude as a concept covering different components. This

theory is useful for understanding and measuring attitudes, because it divides the evaluative responses that express attitudes in three measurable categories: cognitive responses (beliefs), affective responses (feelings, moods, emotions) and behavioural responses (overt actions and intentions) (Bohner & Wänke, 2002; Eagly & Chaiken, 2007; Eagly & Chaiken, p.10, 1993).

Ajzen states that there are two things that directly predict whether or not the behaviour is executed: the intention to perform a behaviour and the perceived behavioural control (see Figure 1). Intention is influenced by attitudes towards the behaviour (with a cognitive and affective component), subjective norms (social influences) and also by the perceived behavioural control. These factors, in turn, influenced by corresponding beliefs: bits of salient information about the behaviour. For example, control beliefs are about the belief that there are sufficient

resources and opportunities to execute the behaviour (Eagly & Chaiken, 1993).

The model of van Aalderen-Smeets et al. (2012) brings the tripartite model and the model of planned behaviour together. In this model, the behavioural responses (tripartite model) are placed outside the concept attitude. In a preceding study, Asma et al. (2011) discovered that none of the behavioural components were mentioned by the teachers in their focus groups. This finding corresponds with the theory of planned behaviour, where attitude is not

defined by a behavioural component. Based on the same study, perceived control is added to the model, and has close similarities with the perceived behavioural control of the model of Ajzen (1991).

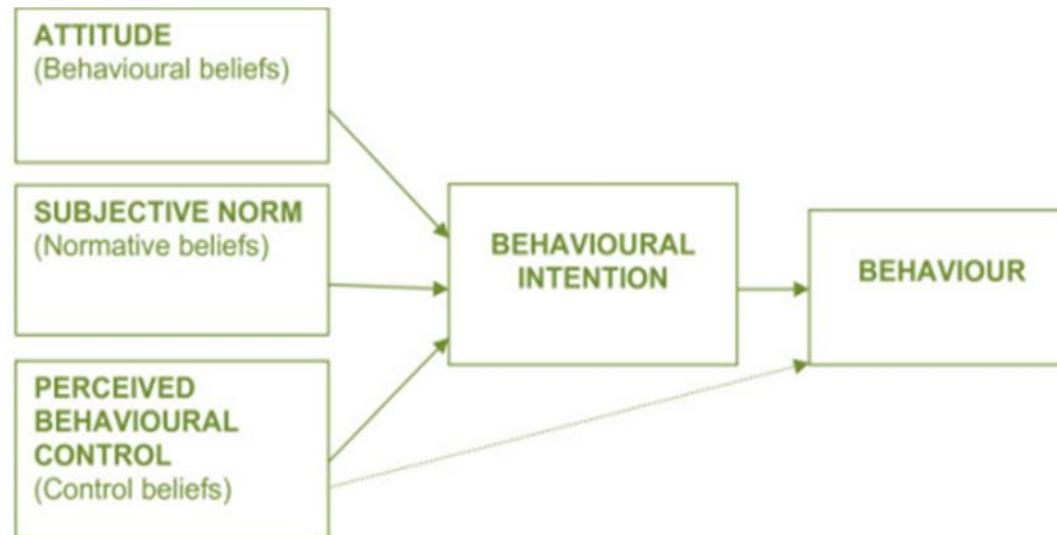
To get a complete image of the suitability of the model of van Aalderen-Smeets et

al. (2012) for this study, the three dimensions of this model are compared with different theories regarding reform: the categories of change by Fullan (2007), the diffusion theory by Tabata et al, (2008) about the way people adapt the curriculum reform, the theory of change readiness about how people can overcome the challenges of change by Rafferty et al. (2013) and Stevens (2013) and the theories about self-efficacy, a concept that is closely related to attitudes and dealing with changes (Ghaith & Yaghi, 1997; Guskey, 1988).

**Cognitive dimension.** The cognitive aspect of attitudes is widely discussed in the literature. There are different cognitive beliefs that define the cognitive dimension. These beliefs can be divided into beliefs about the relevance, advantage or importance of the object and the beliefs about the difficulty or compatibility of the object (Beets et al, 2008; Fullan, 2007; Ghaith & Yaghi, 1997; Guskey, 1988; Rafferty et al., 2013; Stevens, 2013; Tabata et al., 2008). Van Aalderen-Smeets et al. (2012) agree with this point of view, and divided the cognitive beliefs in three

components: the perceived relevance, the perceived difficulty and the gender beliefs. When this definition is applied to the context of this research, the perceived relevance represents teachers' thoughts about the importance of TOM (e.g. whether they believe the implementation of TOM is

FIGURE 1 MODEL OF PLANNED BEHAVIOUR (AJZEN, 1991).



needed to improve the study results of the students and their success in later careers). The perceived difficulty describes how difficult university teachers find it to teach in TOM (e.g. whether tutors find it difficult to implement the pedagogical and didactical skills of TOM in their role as tutor). Van Aalderen-Smeets et al. (2012) added the component gender beliefs to measure the beliefs concerning differences between men and women teaching science. This component is not relevant in this study, since there is no evidence for stereotype beliefs regarding process-oriented and student-centred learning.

**Affective dimension.** The affective dimension encompasses the emotions and feelings teachers have concerning the reform towards TOM. This component was long seen as subordinate to the cognitive component and is hardly mentioned in literature; the affective component showed up after cognitive considerations were made (Fazio & Petty, 2008; Rafferty et al., 2013; Zajonc, 1980). However, Zajonc (1980) started a

foundation of arguments for considering affect as another isolated component that defines attitudes. For example feelings of fear influence the attitudes and behaviour by being helpful when they are low and when people think they are able to avert the behaviour. On the other hand, high levels of fear activate defensive responses as inattention, aggression or avoidance (Eagly and Chaiken, 1992). The affect in this study is based on the feelings teachers have while being a tutor within a TOM module. The affect is defined by feelings of enthusiasm and positive energy (enjoyment) and by feelings of stress or being nervous (anxiety) (Beets et al., 2008; Rafferty et al., 2013; van Aalderen-Smeets et al., 2012).

**Perceived control.** The dimension of perceived control is about the presence of resources and opportunities needed to implement TOM successfully. Ajzen (1991) describes his component perceived behavioural control as compatible with Bandura's concept of perceived self-efficacy. Self-efficacy was defined by Bandura (1977)

as one's belief in one's ability to perform an action that will lead towards a specific goal. Someone with high sense of self-efficacy will set higher goals, is less afraid to fail and is able to find new strategies to cope with a problem. Although Ajzen (1991) puts perceived behaviour control apart from the attitudes towards behaviour, Guskey found in 1988 that teachers' sense of personal efficacy had a great influence on their attitudes towards change. Teachers with high scores on personal efficacy thought that the reform was important, that the reform fitted well with their current practice and that the reform was easier to implement (Ghaith & Yaghi, 1997; Guskey, 1988). Guskey's findings give a clear scientific underpinning to incorporate self-efficacy in the conceptual model for attitudes.

Perceived control is also about influences from the context, for example acknowledgement and support from the management and colleagues and availability of the right resources and materials (Fullan, 2007; Geerlings & Van der Veen, 2010). In the study of Asma et al. (2011) teachers

mentioned context factors often in connection with the intention to implement the curriculum reform. However, teachers who were better trained didn't mention context factors as much as teachers with little training who felt more dependent on support. So, these two groups of teachers had a different perception on how much contextual support

they needed for implementing the reform. Therefore this component is called perceived control. In this study, the perceived control is about the self-efficacy of teachers about executing tutor tasks within TOM and about the support they think they need to implement TOM.

In conclusion, besides the similarities in context, the literature about reform supports the view that the framework of van Aalderen-Smeets et al. (2012) is to a large extent suitable for examining university teachers' attitudes towards TOM. The conceptual model for exploring university teachers' attitudes towards TOM is displayed in Figure 2.

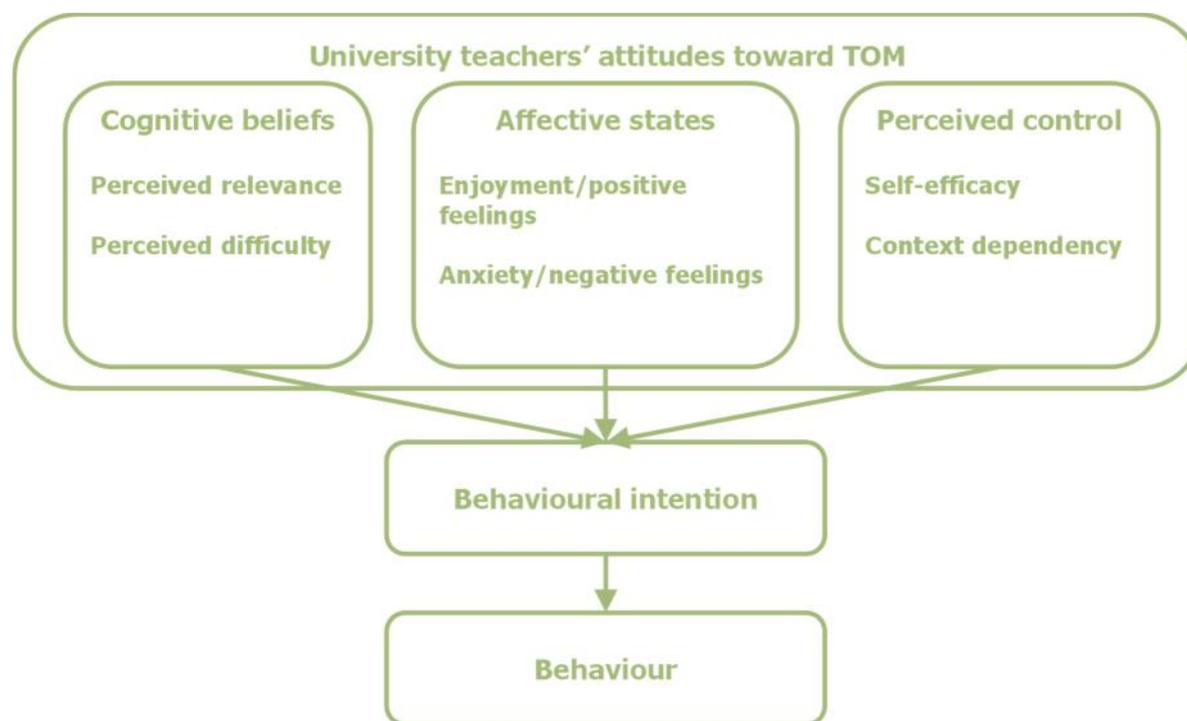


FIGURE 2 CONCEPTUAL FRAMEWORK (BASED ON VAN AALDEREN-SMEETS ET AL., 2012)

### The DAS questionnaire

Based on their model for attitudes (van Aalderen-Smeets et al., 2012) van Aalderen-Smeets & Walma van der Molen (2013) designed the Dimensions of Attitude towards Science instrument (the DAS instrument) to measure primary teachers' attitudes towards science education. The instrument contains seven subscales based on the seven subcomponents of attitude. Respondents are asked how much they agree or disagree with a number of propositions for every subscale to explore their attitude. This instrument is used as basis for the instrument in this study.



# Method

## 7 Procedure

A parallel model of mixed method design was used: data were gathered with interviews and questionnaires to answer the following questions: “How can university’s teachers’ attitudes be measured in a valid and reliable way?” and “Is there a significant difference in the attitude towards TOM between the two conditions?” (see Figure 3).

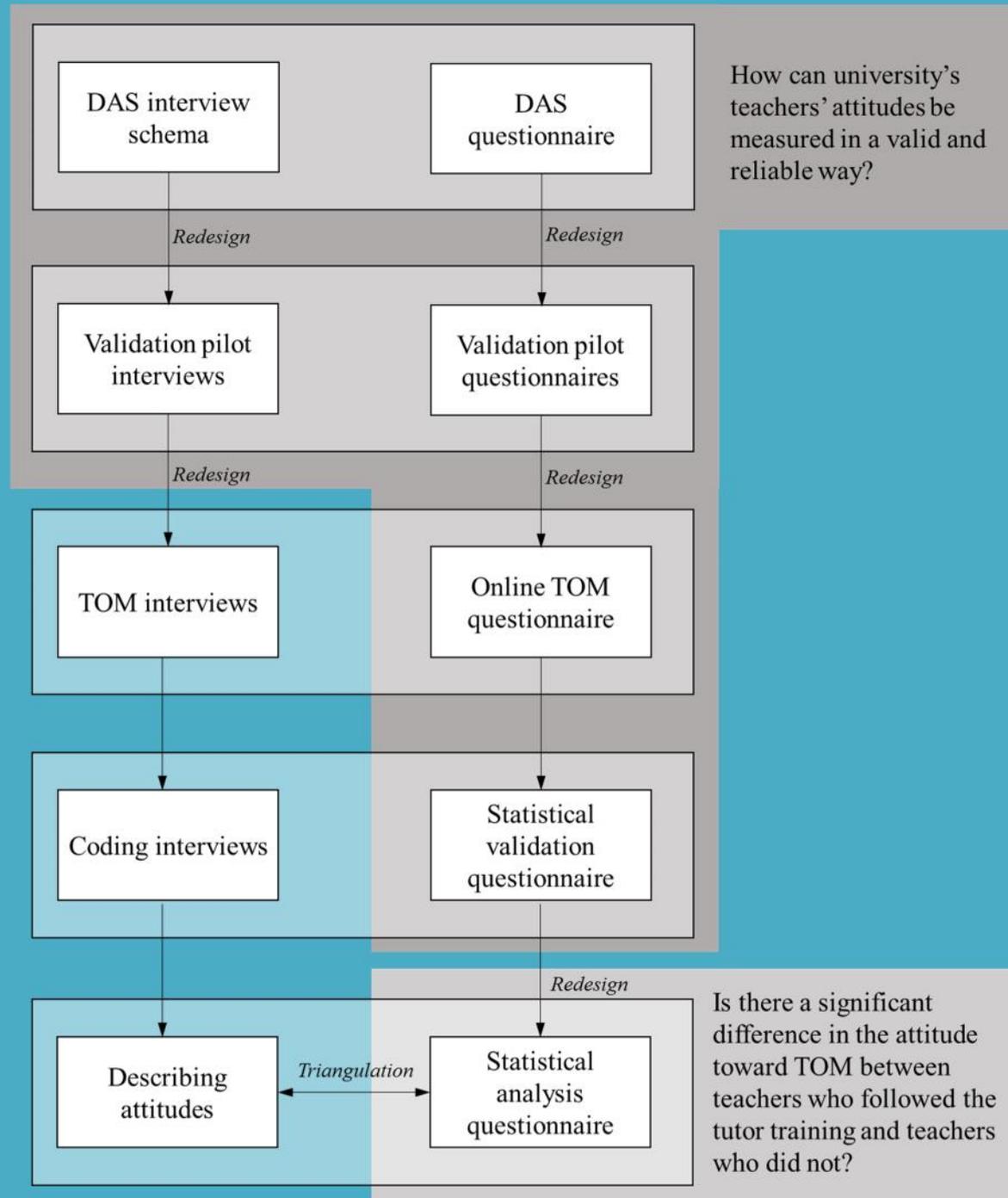
The first question was answered with pilot interviews, reviews of the questionnaire by educationalists and statistical analysis of the developed questionnaire. During the pilot interviews the conceptual model was tested and a walkthrough of the questionnaire was conducted. The conceptual model and the interview schema turned out to be adequate, the questionnaire needed some alternations.

The remarks were mainly about vagueness and ambiguity of the propositions, about terms tutors did not know and about the introduction on privacy. Their remarks were incorporated in the redesigned questionnaire. The redesigned questionnaire was send to five educationalist for feedback. After this, some ambiguity was removed and the questionnaire about tutor tasks was added to check for differences between the conditions in behaviour. This questionnaire was send to 96 tutors by e-mail. The data were analysed with factor analysis and Cronbach’s alpha. The items that were not valid and reliable were removed from the questionnaire. The remaining items and scales resulted in a valid questionnaire.

The second question was answered with the data of the items and scales that remained in the valid questionnaire. A MANOVA was conducted to define the differences in attitudes between the trained and untrained condition. The questionnaire about the tutor tasks was also analysed with MANOVA to define differences in executing tutor tasks between the two conditions.

Interviews were conducted to get more insight into the attitudes of the tutors of the UT. The interviews were typed out and coded. The data from the interviews was set side by side with the attitude scores on the questionnaire for additional practical information.

FIGURE 3: RESEARCH DESIGN: A PARALLEL MODEL OF MIXED METHODS



## 8 Questionnaires

There were five sub questionnaires combined into one online questionnaire (see Appendix B). Sub questionnaires one till three were based on the DAS questionnaire; these measured respectively the attitude towards TOM, SCE and ME. The attitude towards TOM describes the tutors' perception of the combination of all characteristics representing TOM, which is quite comprehensive. Two questionnaires about SCE and ME were added, because of expected differences in attitude towards the attitude towards TOM, the attitude towards SCE, defined by the tutors' view on their role as a facilitator and their view on the students' role in learning, and the attitude towards ME, defined by the tutors' view on interdisciplinary working and the combination of knowledge domains into one project. The items about affect and perceived context dependency focused only on TOM, because we expected tutors would not be able to describe their feelings and

perceived context dependency for a specific part of TOM. As many as possible items that fit with this research were as least as possible changed. The propositions about gender beliefs were deleted. The subject of the remained propositions was changed into TOM, SCE or ME and accompanying themes like tutors, project groups and module teams. The propositions were also adjusted to the context of the university teachers (e.g. about the teaching research nexus, their lack of pedagogical and didactical education and supporting university students). The level of the language of the propositions was adjusted to the target group. The 5-point Likert-scale remained, to keep the validity of this instrument as high as possible. The online questionnaire contained twelve items (four TOM related, four SCE related, four ME related) about perceived relevance (e.g. "I think TOM is that important for education on the UT that tutors should be trained in tutor

skills that fit TOM."), twelve items (four TOM related, four SCE related, four ME related) about perceived difficulty (e.g. "I think most tutors of the UT find it difficult to be a tutor as meant in TOM."), four items about enjoyment (e.g. "Being a tutor in TOM gives me positive energy."), four items about anxiety (e.g. "When I am a tutor in TOM I feel stressed."), twelve items (four TOM related, four SCE related, four ME related) about self-efficacy (e.g. "I think I have the skills needed to perform as tutor in a TOM module."), and six items about context dependency (e.g. "For me, the support of my colleagues determines how well I can perform as a tutor in TOM."). For every sub questionnaire the items were mixed up, in that way similar items did not follow each other up directly. Sub questionnaire four contained eight items about demographic variables (e.g. age, years of work experience, participation in the tutor training programme and sex). Sub

questionnaire five contained twelve items about the tasks of a tutor, these were based on the task description of a tutor in the tutor training programme (e.g. "I stimulate reflection within the student group."). This sub questionnaire was added to give additional information about differences between the two groups of tutors in behaviour. Tutors could indicate their behaviour on a three point scale (never, sometimes, and always).

**Respondents.** The online questionnaire was sent by e-mail to 96 TOM tutors (see Table 1 and Figure 4). After one week a reminder was sent. In the week after that, the researcher personally approached those tutors that did not respond yet to fill in the questionnaire. A total of 55 teachers responded, six of them were not a tutor in TOM and were removed from the sample. 49 respondents remained (see teacher, three only as teacher.). The trained condition (24 tutors) contained eighteen females and six males. The mean

age was 37.5 with a standard deviation of 12.6 (minimum 18, maximum 60). The mean years of experience as teacher was 8.2 with a standard deviation of 8.0 (minimum 0, maximum 25). Eight tutors were in social sciences, sixteen in natural science. Eleven tutors had experience as tutor before TOM, ten tutors had no experience as tutor or teacher, three only as teacher. The untrained conditions (25 tutors) contained eighteen females and seven males. The mean age was 39.5 with a standard deviation of 10.4 (minimum 26, maximum 59). The mean years of experience as teacher was 10.1 with a standard deviation of 9.6 (minimum 0, maximum 30). Five tutors were in social science, twenty in natural science. Nine tutors had experience as tutor before TOM, thirteen tutors had no experience as tutor or teacher, three only as teacher.

**Analysis.** The data from the attitude questionnaire was used for two types of analysis: for validating the questionnaire and

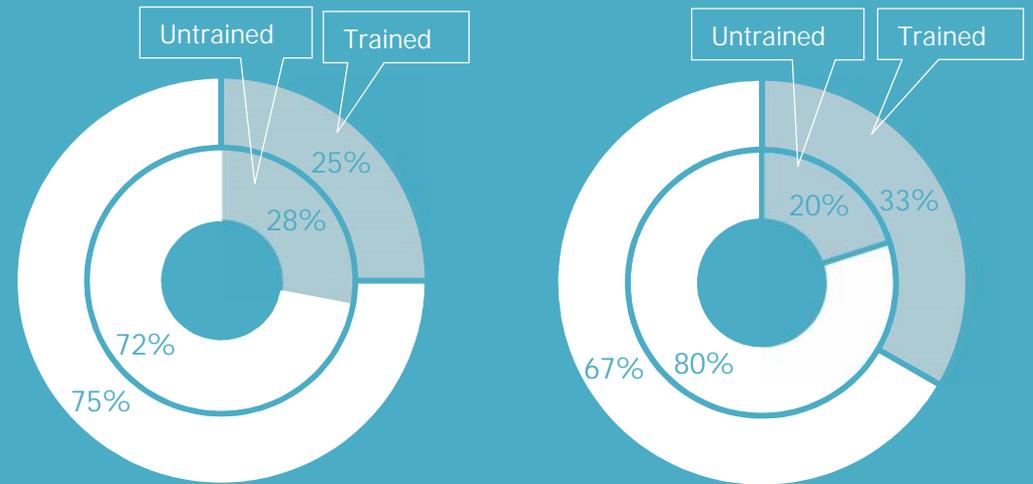
for defining differences between the two conditions. The number of respondents (49) was not enough to give a reliable image of the questionnaire and the attitude of the tutors. Nevertheless an exploration of the questionnaire was done. First the data was used to assess the validity and reliability of the scales. A factor analysis explored the validity of the questionnaire. The internal consistency of the subscales was measured with Cronbach's alpha. The discrimination of each item was analysed by looking at the maximum and minimum responses and the standard deviation. Then MANOVA was executed with the remaining items of the questionnaires to determine whether there was a significant difference in attitude between the two conditions.

The data from the tutor tasks questionnaire was analysed with a MANOVA to determine whether there was a significant difference between executing tutor tasks between the two conditions.

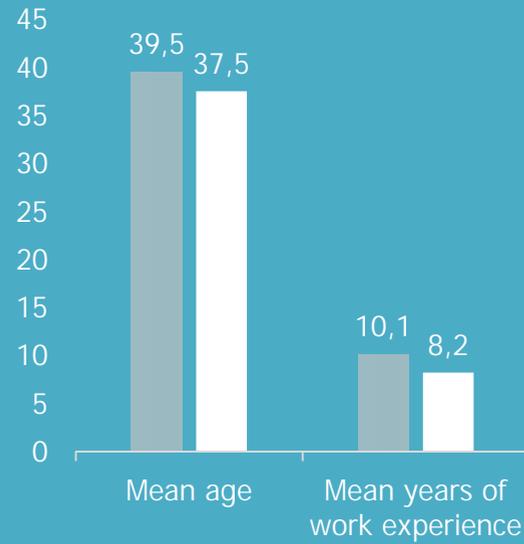
FIGURE 4: RESPONDENTS OF THE QUESTIONNAIRE

TABLE 1: RESPONDENTS OF THE QUESTIONNAIRE

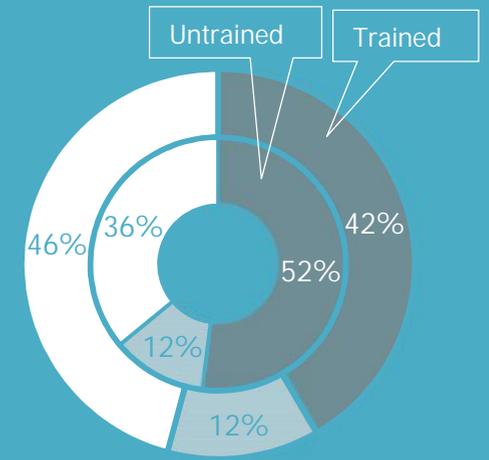
|                              | Untrained condition (25) | Trained condition (24) |
|------------------------------|--------------------------|------------------------|
| Sex                          |                          |                        |
| Male                         | 7                        | 6                      |
| Female                       | 18                       | 18                     |
| Faculty                      |                          |                        |
| Social science               | 5                        | 8                      |
| Natural science              | 20                       | 16                     |
| Experience as teacher        |                          |                        |
| No experience                | 13                       | 10                     |
| Only as teacher              | 3                        | 3                      |
| Experience as tutor          | 9                        | 11                     |
| Age                          | 39.5 (10.4)              | 37.5 (12.6)            |
| Years of teaching experience | 10.1 (9.6)               | 8.2 (8.0)              |



■ Male ■ Female      ■ Social science ■ Natural science



■ Untrained condition  
■ Trained condition



■ No experience  
■ Experience only as teacher  
■ Experience as tutor

## 9 Pilot interviews

---

The semi-structured interviews were based on the focus group interview schedule of Asma et al (2011). The schedule was adapted to the target group and context of this research (see Appendix A). Tutors were asked to give their first thoughts about TOM. Follow up questions were about their perceived relevance, their perceived difficulties, their affect and their self-efficacy in TOM as a tutor. Then tutors were asked about the support activities that found place and their support needs in TOM. At the end there was a walkthrough of the questionnaire. The tutors were asked with every item what they thought the item meant, if the right terms were used, if the item was ambiguous or vague, and if it was clear how to answer.

**Respondents.** Trainers of the CES were asked to send a list with tutors to the researcher (based on motivation, openness and demographic factors). Seven tutors were selected for a pilot interview by purposeful and convenience sampling, because the pilot interviews ask for motivated and involved respondents that can give constructive feedback (Dooley, 2009; Onwuegbuzie & Leech, 2007). Three tutors participated.

The interview schema of the pilot interviews was adequate. The same schema was used for the interviews, except for the last section with the walkthrough of the questionnaire.

## 10 Interviews

---

**Respondents.** From the tutors that engaged in the training programme, 24 tutors were selected by random stratification and asked to participate in an interview (Dooley, 2009, p. 126-130; Onwuegbuzie & Leech, 2007, p. 110). Diverse results were expected between groups of teachers based on, among others, the factor discipline. Therefore three tutors in social science (faculties: behavioural science and school of management and governance) and three tutors in natural science (engineering technology, science and technology and electrical engineering, mathematics and computer science) were selected.

**Analysis.** All interviews were typed out and coded using a predefined codebook based on the model for measuring university teachers' attitudes (see Appendix C). For example, when a respondent said he found the reform in TOM relevant and important, this sentence got the code "TOM relevancy positive". The data from the interviews was coded using ATLAS.ti. To avoid an interpretation bias, another researcher also coded one interview. Inter-coder agreement was calculated to test if the data was similarly interpreted by both coders. The Krippendorff's alpha was 0.87, this is above the required 0.80 (Krippendorff, 2004). The interview data was used to give some background on the data from the questionnaire.

# Results



# 11 Questionnaires

## Validation of the questionnaire: factor analysis

Factor analysis (FA) was executed separately for every questionnaire (TOM, SCE and ME). Table 2 shows the composition of the questionnaire after conducting FA. The results of the FA are not reliable, because of the small number of participants (n=49) in combination with the low component saturation (always above .40 but not always above .60). Stevens (2009) argues that components with at least four loadings above .60 are reliable, regardless of sample size; and components with ten or more loadings of .40 are reliable with a sample size greater than 150. Nevertheless, it is possible to explore the questionnaires with a FA. The suitability of data for FA was assessed with the Kaiser-Meyer-Oklin (KMO) value and the Bartlett's Test of Sphericity (BTS). The TOM and SCE questionnaire had KMO values above 0.6 (respectively 0.656 and 0.672) and

significant scores on the BTS. The original ME questionnaire was not suitable for FA (KMO = 0.449). After removal of the items measuring difficulty the ME questionnaire was suitable for FA according to the KMO and the BTS.

**The TOM scale.** FA showed the presence of seven components with eigenvalues above 1, explaining 73.3% of the total variance. The scree plot showed a break after the sixth component. The six-component solution explained 69.3% of the variance. Oblimin rotation was performed. There were strong loadings to all factors, some items loaded on more than one factor. The strongest loading was chosen. One item about relevancy loaded on four factors, this item was removed (Table 2). The items about context dependency were also spread over the different factors. Three items loaded strongly on one factor, these are remained. The other items are removed

(Table 2). The items about self-efficacy (positive loading) and anxiety (negative loading) loaded on one factor. Whether anxiety and self-efficacy measure the same factor from opposite angles is not further investigated in this study. There were weak correlations between the different factors ( $r < 0.3$ ). Which assumes that the components are not related. Concluding, according to the FA there are six factors. Some factors strongly related with the expected factors relevancy, difficulty, and enjoyment. The expected factor context dependency was represented by three items on one factor. One factor contained both anxiety and self-efficacy, this is in contrast with the conceptual model where both factors fall within a different subscale (namely affect and perceived control). The last factor was not consistent with theory and did not contain items that only loaded on this

factor. Therefore, it was taken outside of further consideration.

**The SCE scale.** Four components had an eigenvalue above 1. They explained 75.4% of the total variance. The scree plot showed a break between the third and fourth component and between the fourth and fifth component. The items that load on the 4<sup>th</sup> component in the component matrix all load on another component too. In most cases this other loading is higher. Besides that, the items that load on the 4<sup>th</sup> component are not logically linked to each other (based on theory). A three component solution is chosen for further investigation. The three component solution explained 66.8% of the total variance. Oblimin rotation was performed, the rotated solution showed a simple structure with every item loading strongly on only one of the three components. This three factor solution was expected from theory. Factor one was consistent with relevancy, factor two with difficulty, and factor three with self-efficacy. There was a weak negative correlation between the three

factors ( $r_{1 \times 2} = -.130$ ;  $r_{1 \times 3} = -.114$ ;  $r_{2 \times 3} = -.057$ ). It is reasonable to assume that the components are not related.

**The ME scale.** The KMO value of the original ME scale was below 0.6 (KMO = 0.449). This made this data not suitable for FA. The component matrix showed a number of items that loaded on three components and one item loaded on four components. This item was removed from the data set. Another FA was performed with the 11 remaining items, again a KMO below 0.6 was measured (KMO

= 0.408). The component matrix showed one item that loaded on all three components. This item was also removed from the data set. The FA produced again a confusing distribution of items. Because the removed items both came from the component difficulty (based on theory) only two items remained. Assuming these two items caused the confusion, all items about difficulty were deleted (Table 2). The remaining eight items of the attitude towards ME scale were subjected to FA. KMO was 0.641 and BTS was significant ( $p=0,000$ ): the data was suitable for FA. There were two components that had eigenvalues exceeding 1. These explained 51.6% of the total variance (resp. 27.108% and 24.506%). The scree plot showed a clear break after the second component. Oblimin rotation was performed for the component solution, both components had a number of strong loadings. The pattern matrix showed a clear and expected distinction between items measuring self-efficacy and items measuring relevancy. There was a weak correlation between the components ( $r = 0.012$ ). Which assumes that the components are not related.

| Subscale          | N of items after FA | N of deleted items |
|-------------------|---------------------|--------------------|
| TOM relevance     | 4                   | 1                  |
| TOM difficulty    | 4                   | 0                  |
| TOM enjoyment     | 4                   | 0                  |
| TOM anxiety       | 4                   | 0                  |
| TOM self-efficacy | 4                   | 0                  |
| TOM support       | 3                   | 3                  |
| SCE relevance     | 4                   | 0                  |
| SCE difficulty    | 4                   | 0                  |
| SCE self-efficacy | 4                   | 0                  |
| ME relevance      | 4                   | 0                  |
| ME difficulty     | 4                   | 4                  |
| ME self-efficacy  | 4                   | 0                  |

## Reliability of the subscales: Cronbach's alpha

Cronbach's alpha is measured for every subscale obtained from the FA, values above 0.7 are considered acceptable; values above 0.8 are preferable. Because there are less than ten items per scale, the Cronbach's Alpha is expected to be lower, therefore the inter item correlation is also measured to show the strength of the relationship among the items. A range between 0.2 and 0.4 is recommended. Table 3 shows the reliability scores per subscale.

Six subscales show a sufficient Cronbach's Alpha above 0.8. The subscales of TOM support, ME relevance and ME self-efficacy have a Cronbach's alpha lower than 0.7 and therefore should be interpreted with caution. To guarantee more reliable results these subscales were removed from the questionnaire (Table 4).

TABLE 3: RELIABILITY OF THE SUBSCALES

| Subscale          | N of items | Cronbach's alpha | Inter item correlation (range) |
|-------------------|------------|------------------|--------------------------------|
| TOM relevance     | 4          | 0.755            | 0.320                          |
| TOM difficulty    | 4          | 0.847            | 0.350                          |
| TOM enjoyment     | 4          | 0.934            | 0.119                          |
| TOM anxiety       | 4          | 0.927            | 0.216                          |
| TOM self-efficacy | 4          | 0.818            | 0.345                          |
| TOM support       | 3          | 0.645            | 0.113                          |
| SCE relevance     | 4          | 0.812            | 0.196                          |
| SCE difficulty    | 4          | 0.796            | 0.419                          |
| SCE self-efficacy | 4          | 0.835            | 0.321                          |
| ME relevance      | 4          | 0.681            | 0.250                          |
| ME self-efficacy  | 4          | 0.628            | 0.230                          |

TABLE 4: THE REMAINED SUBSCALES FOR FURTHER EXPLORATION OF UNIVERSITY TEACHERS' ATTITUDE

| Subscale          | N of items |
|-------------------|------------|
| TOM relevance     | 4          |
| TOM difficulty    | 4          |
| TOM enjoyment     | 4          |
| TOM anxiety       | 4          |
| TOM self-efficacy | 4          |
| SCE relevance     | 4          |
| SCE difficulty    | 4          |
| SCE self-efficacy | 4          |

## Defining differences in attitude between the two conditions: MANOVA

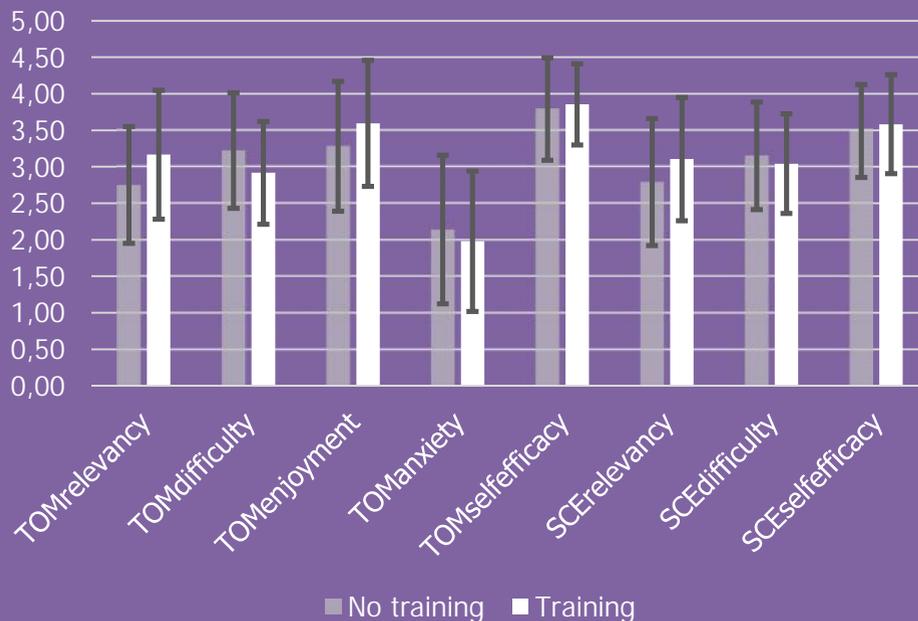
A multivariate analysis of variance was conducted to investigate the difference in attitude components (relevancy, difficulty, anxiety, et cetera) between condition trained and condition untrained. Two MANOVAs were executed for the attitudes towards TOM and SCE. First the multivariate normality, the linearity, the univariate and multivariate outliers, homogeneity of variance-covariance matrices, multicollinearity and correlations between the dependent variables were

checked to see if the data is suitable for MANOVA. There are reasons to doubt a linear relationship for the SCE questionnaire, this relationship between the variables will be underestimated in the MANOVA which reduces the power of the MANOVA. The TOM questionnaire showed no values that questioned the suitability for MANOVA.

The results of the MANOVA showed no significant difference between the two conditions ( $F_{TOM} (5, 43) = 1.255, p = .301$ ,

$Wilks' \Lambda_{TOM} = .873; F_{SCE} (3, 45) = .664, p = .578, Wilks' \Lambda_{SCE} = .958$ ; see Table 5). Nevertheless, the univariate results were checked for more insight into the different scales. As expected, the univariate analysis showed no significant differences, although the significance level of TOM relevancy is pretty low (see Figure 5 and Table 5).

FIGURE 5: MEAN SCORES AND STANDARD DEVIATIONS ON THE ATTITUDE QUESTIONNAIRE



(DIFFERENCES CONDITION UNTRAINED AND CONDITION TRAINED).

|               | Condition untrained<br>(n = 25) |      | Condition trained<br>(n = 24) |     | F-value | Sig. |
|---------------|---------------------------------|------|-------------------------------|-----|---------|------|
|               | M                               | SD   | M                             | SD  |         |      |
| TOM           |                                 |      |                               |     | 1.255   | .301 |
| Relevancy     | 2.75                            | .80  | 3.17                          | .88 | 2.997   | .090 |
| Difficulty    | 3.22                            | .79  | 2.92                          | .71 | 1.998   | .164 |
| Enjoyment     | 3.28                            | .89  | 3.59                          | .86 | 1.568   | .217 |
| Anxiety       | 2.14                            | 1.02 | 1.98                          | .96 | .323    | .573 |
| Self-efficacy | 3.79                            | .70  | 3.85                          | .56 | .125    | .725 |
| SCE           |                                 |      |                               |     | .664    | .578 |
| Relevancy     | 2.79                            | .17  | 3.10                          | .18 | 1.649   | .205 |
| Difficulty    | 3.15                            | .14  | 3.04                          | .15 | .285    | .596 |
| Self-efficacy | 3.49                            | .13  | 3.58                          | .13 | .247    | .621 |

## Defining differences between the two conditions in executing tutor tasks: MANOVA

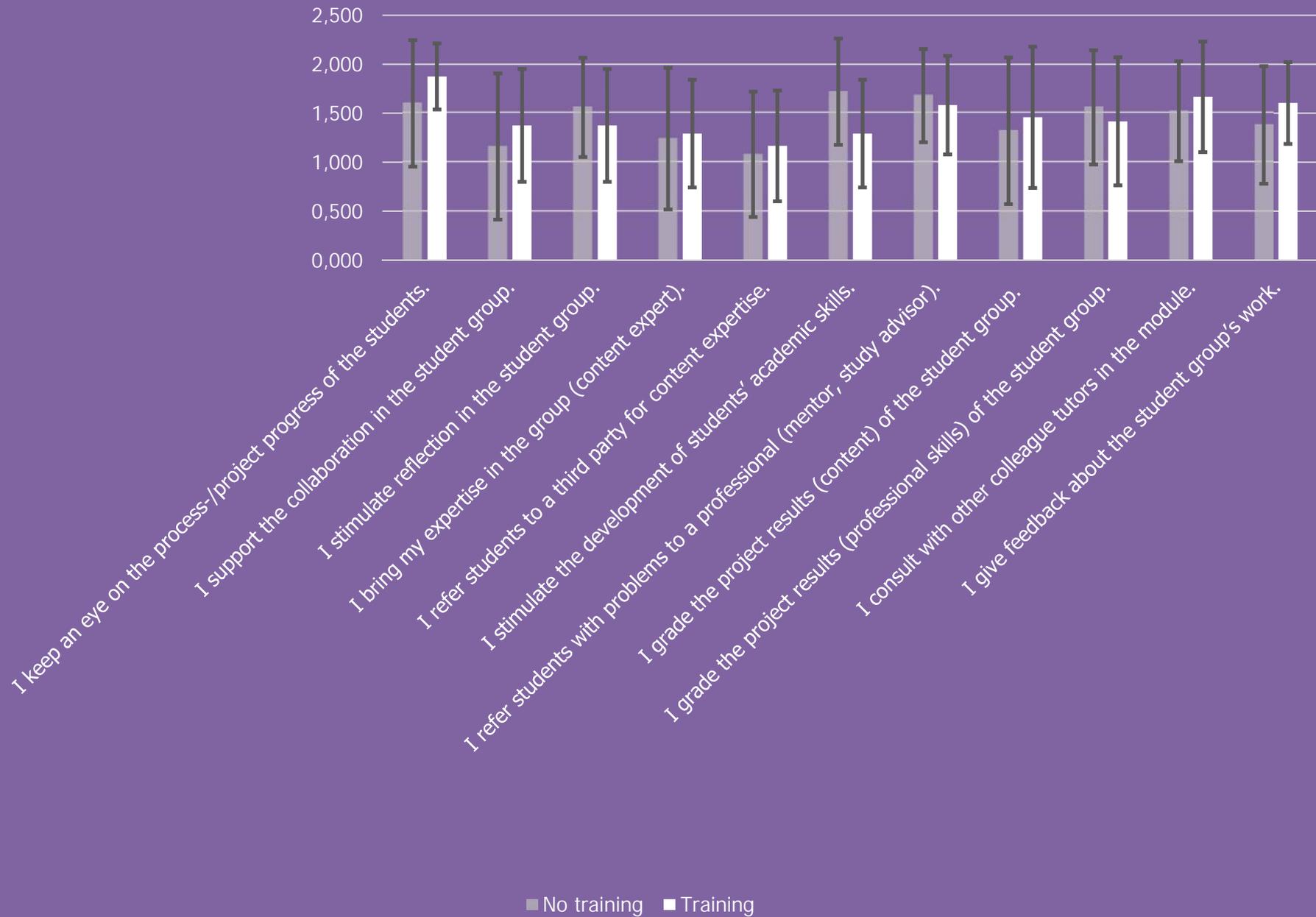
Finally a MANOVA was executed to investigate if there is a difference between the condition trained and condition untrained in executing their tutor tasks. First the multivariate normality, the linearity, the univariate and multivariate outliers, homogeneity of variance-covariance matrices, multicollinearity and correlations between the dependent variables are checked to see if the data is suitable for MANOVA. There are reasons to doubt a linear relationship, as this reduces the power of the MANOVA. The item "I keep an eye on the process-/project progress of the students" violates the assumption of equality of variance. The results of the MANOVA showed no significant difference between the conditions ( $F(11, 37) = 1.745$ ,  $p = .101$ , Wilks Lambda = .658; see Table 6). Again univariate analysis is done to get more insight in the individual items. From this test a significant difference appeared with the task "I stimulate the development of students' academic skills" (see Table 6 and Figure 6).

TABLE 6: MEAN SCORES ON USE OF TUTOR SKILLS (DIFFERENCES CONDITION UNTRAINED AND CONDITION TRAINED).

|   | Condition untrained (n = 25) |     | Condition trained (n = 24) |     | F-value | Sig. |
|---|------------------------------|-----|----------------------------|-----|---------|------|
|   | M                            | SD  | M                          | SD  |         |      |
| I keep an eye on the process-/project progress of the students.           | 1.60                         | .10 | 1.88                       | .11 | 3.447   | .070 |
| I support the collaboration in the student group.                         | 1.16                         | .13 | 1.38                       | .14 | 1.268   | .266 |
| I stimulate reflection in the student group.                              | 1.56                         | .11 | 1.38                       | .11 | 1.429   | .238 |
| I bring my expertise in the group (content expert).                       | 1.24                         | .13 | 1.29                       | .13 | .079    | .780 |
| I refer students to a third party for content expertise.                  | 1.08                         | .12 | 1.17                       | .12 | .252    | .618 |
| I stimulate the development of students' academic skills.                 | 1.72                         | .11 | 1.29                       | .11 | 7.543   | .009 |
| I refer students with problems to a professional (mentor, study advisor). | 1.68                         | .10 | 1.58                       | .10 | .477    | .493 |
| I grade the project results (content) of the student group.               | 1.32                         | .15 | 1.46                       | .15 | .434    | .513 |
| I grade the project results (professional skills) of the student group.   | 1.56                         | .12 | 1.42                       | .13 | .657    | .422 |
| I consult with other colleague tutors in the module.                      | 1.52                         | .11 | 1.67                       | .11 | .912    | .344 |
| I give feedback about the student group's work.                           | 1.38                         | .10 | 1.60                       | .11 | 2.290   | .137 |

M: mean; SD: standard deviation; F-value: MANOVA

FIGURE 6: MEAN SCORES AND STANDARD DEVIATIONS FOR EXECUTING TUTOR TASKS



## 12 Interviews

The results from the questionnaire measuring tutors' attitudes towards TOM showed no differences between the two conditions. Both conditions showed moderate scores on different scales of the questionnaire. The data from the interviews can explain the moderate scores on attitude.

**Perceived relevance.** Tutors reported positive and negative arguments regarding the implementation of TOM. Negative comments were about the way TOM was implemented: top-down and pretty rigorous (such as "If you want to implement an educational model like TOM you have to invest in team building. TOM is not a model that works with a top-down implementation."). Tutors stated that one model could never be suitable for all courses. Furthermore they were not convinced that the old educational model needed such a drastic change. Apart from that, they doubted TOM whether would improve the quality and the

efficiency of education (such as "How is it possible to cost-cut on the one hand, and offer more support to students on the other hand?"). They thought TOM contains too much project work (such as "Project based education is at the expense of the content of education") and it is a scholastic way of supporting students. Finally, they stated that their research activities were overlooked; they could not understand that TOM was considered more important than their research activities.

Most positive comments were about the practical skills (cooperate, creative thinking, conferencing, et cetera) that students learned in TOM. Tutors thought this practical approach fitted Bachelor education and students' future working life better. Moreover, some tutors experienced higher success rates and more study commitment of students. Tutors believed the students benefited of the

modular, thematic division of education; the curriculum seems better integrated and structured now. Finally, they experienced that the growing pains of TOM slowly disappear ("TOM works out more structured the second year."), they believe that the implementation of TOM would eventually turn out right.

In conclusion, the tutors that were interviewed started often with some negative thoughts about TOM, especially about the top-down implementation and the big role of projects in TOM. However, they also acknowledged positive aspects about TOM; such as the fact that students were more committed and students learned the skills they needed. This constant consideration of pros and cons explains the moderate scores on the questionnaire (see table 5).

Maybe tutors were not convinced of the necessity of TOM, but at the same time

experienced some advantages while working with the students in TOM.

**Perceived difficulty.** While asking tutors about their perceived difficulty, they shifted immediately to their own capabilities and difficulties in TOM education which fits with the attitude component self-efficacy better than perceived difficulty.

Tutors answered they had no idea whether their colleagues struggled with TOM or others thought colleagues encountered not big difficulties with TOM.

The moderate scores on the questionnaire can possibly be explained by the lack of insight into or awareness of the difficulties colleagues encounter (see Table 5).

**Enjoyment.** The enjoyment tutors experienced was for a great part dependent on the students they coached. If students were not motivated, tutors had to invest a lot of energy to put them to work. Besides that, tutors considered TOM as time consuming, you don't have time left to develop yourself (e.g. in research skills or creative thinking).

Especially the diminishing time for research and the top-down implementation were seen as very tedious and made it less fun to be involved with TOM. However, tutors got excited about the personal contact with students (such as "I like the students, although they were also nice when there was no TOM."), it made teaching less predictable. They found it nice to see the progress of the students and how students used the feedback in their products. Besides that, tutors liked the more intense contact with their colleagues and felt proud about their module (such as "I like the team spirit. It's like, together we create something nice"). The mean scores in the questionnaire show that tutors enjoyed working in TOM (see Table 5).

Apparently the social contacts with students and colleagues gave tutors energy and outweighed the lack of time to spend on tasks of their own choice.

**Anxiety.** The implementation of TOM caused a lot of stress. Almost every tutor reported an immense increase in workload and too less time to implement TOM properly. Moreover, they had to deal with organisational problems and dissatisfaction and stress of students (such as "At the end it felt like I was an emotional wastebasket for students."). Tutors stated that sometimes it was hard to mark exams without being aware of the strict consequences (redoing the whole module) when a student failed on a test. The low mean scores on the questionnaire seem therefore a bit unexpected (see Table 5). A possible explanation is that the items in the questionnaire did focus on the tutor role.

The interviewed tutors mentioned they were not stressed about only executing the tutor tasks, the combination with other tasks made it stressful.

**Self-efficacy.** The general self-efficacy about working in TOM seemed to be pretty low. The enormous workload and the lack of time made it difficult to combine TOM with research activities. The modular construction

asked for more preparation time and meetings with colleagues and the educational duties are very compelling (such as “You have many responsibilities and the deadlines are short term. You also have sixty disappointed students in front of you if you don’t do enough.”).

Nevertheless, when focussing only on executing the tutor tasks, most tutors thought they are capable enough to be a good tutor.

They were aware of their new identity and were trying to find balances between support on content and group- and learning processes and between personal and formal contact with students. Some tutors adopted the “wait and see” attitude easily, because they putted the responsibilities with the students. But a lot of tutors found it difficult to decide when to interfere or not to interfere in the learning process. Especially tutors who were more content focused found it difficult to be dependent on the students learning processes (such as “You have to give students space ... And then it is uncertain where the ship goes and whether it reaches the harbour.”). Some

tutors thought they were not the appropriate person for the job (such as “When I talk with a student who did nothing I say “You did nothing again!” while a tutor would say “Why didn’t you manage to complete your tasks?”. I think tutoring is not my expertise.”). Most tutors thought they could motivate students, but experienced now and then that it did not work; sometimes they experienced a lot of resistance of students towards TOM. Frequently, tutors experienced vagueness about the organisation (of the module), this made it more difficult to deal with questions of students and made tutors extra uncertain. However, almost every tutor expected to become a better tutor (such as “I thought: this is the first time I’m a tutor, so I’m learning. For now, I’m a good tutor, the next time I’m better.”). This positive view on their tutor capabilities explains the high scores on the questionnaire (see Table 5).

**Perceived control.** The questionnaire could not measure the perceived control of the

tutors, nevertheless, the interviews gave an interesting and informative picture about perceived control. First of all, tutors experienced TOM as something that is implemented top-down. They had the feeling that the plans around TOM were made without hearing the voice of the teachers, students and faculty staff. Which made it difficult to translate TOM into something that fits within their teaching practice. Consequently, this lead to lots of questions towards CES and policy makers about the practical interpretation of TOM (CES tutor training, personal communication, July 3, 2013). Besides that, they felt that TOM education is compelling, because of the regular interaction with the students and the high frequency of assessments. This left not much time to implement all aspects of TOM.

In general, tutors saw the support of colleagues and module coordinators as necessary for successful TOM education.

“You have to give students space ... And then it is uncertain where the ship goes and whether it reaches the harbour.”

Some tutors experienced little support from their environment and felt they had to sort out their role in the module themselves. This led to uncertainty and heightened work pressure. Others experienced a lot of support from their module coordinator and colleagues. There were some module coordinators that gave regular updates, explanations and schedules, and organised tutor meetings where tutors could discuss the student groups

and the problems they encountered. This structured way of working and the contact with other tutors, the study advisor, the programme coordinator, the module coordinator, and/or

“The tutor training is interesting, but when I’m in front of a group students other things happen.”

an educationalist was highly appreciated by the tutors. Team building and working closely with colleagues were seen as valuable investments to ensure the success of TOM; delivering TOM education is only possible in a team. Some faculties had already a close team, but other faculties experienced teamwork as a kind of a struggle

(such as: “In our faculty I don’t feel the real team-effort yet. A technical university accommodates a lot of people that are content oriented; working as a team is not a second nature of this organisation.”)

Tutors experienced sufficient support from the CES. They agreed that the CES is easily accessible when they need educational support, although they hardly made use of the services of the CES. Tutors also reported that the tutor training programme of the CES prepared them for their role in TOM. Nevertheless, tutors found the training programme content too generic (such as: “The tutor training is interesting, but when

“A technical university accommodates a lot of people that are content oriented; working as a team is not a second nature of this organisation.”

I’m in front of a group students other things happen. You’ve learned some basic things about tutoring, but you know nothing about the interaction and how that can go wrong.”). Tutors thought they needed the support of the CES on specific things to be better prepared. For successful implementation of TOM, they were more in need of extra time or supporting staff that supports them on the primary process; designing a project, help during meetings with student groups, and checking assessments (such as: “I think the CES supports me till I’m in the lecture room. Whereas, for me, it all starts when I’m in the lecture room.”).

# Conclusion & discussion



## 13 Conclusion and discussion

The results of this study show no difference in university tutors' attitudes towards TOM between tutors who followed the CES training programme and tutors who did not. This supports the hypothesis "the CES training programme was not sufficient to achieve a difference in attitudes between tutors who followed the training programme and tutors who did not".

This study contributes to research on defining and measuring attitudes: the model and the questionnaire of van Aalderen-Smeets et al. (2012) can be used as a basis for defining and measuring teachers' attitudes towards reforms regarding student-centred and process-oriented education in another context. The adapted conceptual model of this present study seems to be a sufficient basis for exploring university teachers' attitudes. Furthermore, the adapted questionnaire is a valid and reliable way to measure university tutors' attitudes towards TOM. Finally, the results of this questionnaire showed no significant differences in attitudes towards TOM between the two conditions.

There are two possible explanations: training does not affect attitude at all in spite of the content and structure of the training. On the other hand, it is possible that the CES training programme did not contain all the required characteristics for changing attitudes. However, van Aalderen and Walma van der Molen (2015) found in their follow-up study that proper training can influence attitude; they found improved self-efficacy beliefs, less context dependent and more enjoyment in science teaching. Concluding, training can influence attitude. This could imply that the CES training programme was not adequate for changing attitudes.

An added questionnaire measured the effect of the training on executing tutoring skills.

The most items showed no significant difference between the conditions. This is in line with the conceptual model which argues that the behaviour will not change when the attitudes are not changed. However, this study focused only on the attitudes and not the connection between attitudes and behaviour, therefore these conclusions are just suggestions and should be interpreted with caution. The results of this questionnaire also showed an unexpected significant higher score of the untrained condition on the item "I stimulate the development of students' academic skills". Untrained tutors indicated they stimulated the development of students' academic skills more often than trained tutors. Possibly, the trained tutors found out how comprehensive academic skills are, which

suggests that the untrained tutors may be underestimating the complexity and extension of academic skills, and therefore thought they already fulfilled this task. The results on the remaining items on executing tutor tasks showed no significant differences between the two conditions, which suggests that the CES training programme was not adequate to induce teachers to execute the tutor tasks. We think that an extensive training of teachers is needed when you want to change their attitudes. This is confirmed by the results from other studies (e.g. Desimone, 2009; Fullan, 2007; Gegenfurtner, 2013).

### **Recommendations for future research on attitudes**

The conclusions from this study should be interpreted with some caution. Firstly, this study should be seen as an explorative study, because the number of respondents of the questionnaire was 49 which is not enough to obtain reliable results. It would be interesting to see whether the instruments are still valid and reliable with a greater number of respondents. Secondly, to be sure of the

influence of training on university teachers' attitudes, an effect study should be conducted. The research design could be a pre-test post-test design with control group. Thirdly, a part of the respondents participated voluntarily in the training programme of the CES. Thus, it is possible that these respondents were more interested in TOM than those who did not follow the training programme. A similar effect may be expected for the respondents of the questionnaire; only those who were more interested in or concerned with TOM did respond.

Moreover, the results were quite moderate. There are several ways that could be the cause of this. Firstly, the online questionnaire was experienced by some respondents as long and boring, because of the many items and the resemblance between the items. This could have led to careless, moderate answering. Secondly, it is possible the items were too broad and still too ambiguously formulated, which induces doubtfulness and long considerations, weighing pros and cons, leading to moderate answers.

This study narrowed down to a part of the theoretical framework, we made no explicit link between the attitude and the behaviour of the tutors. A follow-up study could incorporate that part of the theoretical framework to get insight in the influence of teachers' attitudes on behaviour. Besides that, we focused on the professional attitudes of the teachers. Pajares states there is a distinction between teachers' general (personal) attitudes towards education and their educational (professional) attitudes towards education (Pajares, 1992). It could be interesting to investigate the influence of the personal attitudes of teachers next to the professional attitudes.

This study showed the applicability of the model of van Aalderen-Smeets et al. (2012) and the DAS instrument of van Aalderen-Smeets and Walma van der Molen (2013) to another educational context. It can be interesting to investigate whether the model and the instrument are also adaptable to a context with less similarities, e.g. to

investigate industry workers' attitudes towards a change in their company.

### Recommendations for designing an attitude focused training programme

Before, we mentioned five critical characteristics of professional development that increase teachers' knowledge, skills and change in attitudes and beliefs: (1) content focus, (2) active learning and collective participation, (3) coherence, (4) duration, and (5) autonomy (e.g. Compton & Johnes, 1998; Desimone, 2009; Fullan, 2007).

**Content focus.** The CES did focus on the pedagogical sides of tutoring. However, tutors still mentioned they wanted to have more pedagogical knowledge (e.g. tutor from interview: "I know enough about the content, but still I can learn a lot about the pedagogical side of education."). Based on what Ingvarson (1998) found in his study, the focus of the training should be regarding integrating student-centred, process-oriented pedagogical approaches with subject matter. For tutors of the UT, it could be more helpful

when they link the pedagogical approaches directly to their content knowledge to make it more practicable.

**Active learning and collective participation.** The CES training programme used several active forms of learning during their training programme. However, the CES training could address deeper learning activities to support attitude change, an important form of deeper learning is reflection. Reflection makes (subconscious) learned knowledge, strategies and skills concrete. It's a conscious process of remembering, thinking of and evaluating experiences which leads to new knowledge and new preferences (Boud in Chirema, 2007; Maclean in Boud et al. 1985; Pearson & Smith, 1985). A lack of consciousness of teaching attitudes can make traditional teaching practices highly persistent. Because teachers often have to react quickly, they show a lot of unconscious behaviours and routines that may be do not fit with the intensions of the curriculum reform that ask for new teaching behaviours (Könings, Brand-

Gruwel & van Merriënboer, 2007). Firstly, reflection can be integrated into the CES training programme. Moreover, it is more valuable when reflection occurs more often, for example with colleagues during the daily teaching practice. An interesting form of reflection with others is peer coaching: a process of goal setting and reflecting on actions, skills and ideas between two professionals. It creates a safe learning environment for constant exchange of knowledge and skills, leading to attitude changes and successful curriculum reforms (Donegan, Ostrosky & Fowler, 2000; Geijsel et al., 2009; Thoonen et al., 2011).

**Coherence.** The coherence in the CES training programme was experienced as weak. Tutors talked a lot about their experiences and practical doubts, but never consciously reflected on their attitudes and how these could fit with TOM. Besides that, they often mentioned a gap between what they had learned from the training programme and how it worked out in practice (such as "But when you stand in front of a

group of students, unexpected things happen ... You don't learn about that kind of things in the training. However, I do learn how to handle these situations from my colleagues.”) and how it builds on their prior knowledge (such as “I was already tutor for half a year, the training did not add something I had not found out already by myself”). The coherence between tutors' attitudes and knowledge and the content of the training programme could be strengthened with peer coaching. Training and coaching could be motivating and strongly related with the learners' practice and needs when learners define and reflect on their own learning goals and learning activities.

**Duration.** The duration is about the number of hours spent on the training programme and the time span of the training programme. The CES training programme's duration was approximately one day (sometimes spread over two days with a week in between). In general, a teacher with less than forty hours of professional development follow more traditional teaching practices than an average

teacher. A teacher that received 40-79 hours of professional development showed average teaching practices. Only a teacher who had more than eighty hours of professional development showed the implementation of the reform in their teaching practices (Supovitz & Turner, 2000, Yoon, 2007). Nevertheless, these numbers should be interpreted with some caution, because the duration of a training programme depends on the content and target group of the training programme.

**Autonomy.** The CES training programme was tailor-made for every faculty. Tutors had also some control in their learning process; there was room for suggestions and tutors could indicate their own goals. Nevertheless, the training programme was not experienced tailor-made by the tutors (such as “The information was too generic, in practice things are different” and “I have worked fourteen years as a teacher, most of what was handled during the training I already knew”). Adults want control over their own learning process, they are more committed when they set their

own goals (Putnam & Borko in Jimoyiannis & Gravani, 2010) (such as “Maybe they can make an educational curriculum vitae for every teacher and you can fill in the gaps with trainings and exercises”).

In conclusion, combining literature about the professional development of adults and the results from the interviews with the tutors offers some suggestions to develop a training programme appropriate for changing attitudes. Amongst these suggestions are: more forms of personal, deeper and active learning (e.g. peer coaching, reflection, mentoring), a more personal and practical touch, extension of the duration of the training and above all a higher focus on attitudes by including experiences that discuss current personal beliefs and exercises for reflection on attitudes. Most training programmes mentioned in literature use workshops and peer coaching and mentoring as a way to organise and share information (Compton & Jones, 1998; Otero et al., 2005; Polly et al., 2010; Wright, 2010). Probably, a combination of training and coaching fits the

teachers' learning needs and wishes and eventually leads to successful curriculum reform.

### **Recommendations for successful curriculum reform in higher education**

The attitude of the tutors was not only influenced by the CES tutor training. There are a lot of other factors that play a role in curriculum reform and influence teachers' attitudes. The way the reform is implemented by the management also influences teachers' attitudes. Bergen and van Veen (2004) argue that most reforms are still executed in a dominant, top-down way, while this is the opposite of what is recommended by literature and other research. Teachers are often not involved in the reform and there is little room for professionalization. Secondly, in most cases it is difficult for teachers to fully implement the designed curriculum reform in their teaching (Könings, Brand-Gruwel & van Merriënboer, 2007). Nevertheless, the expectations towards teachers are that teachers realize and execute the reform as

others (i.e. government, school management) intended (Bergen & van Veen, 2004). Thirdly, the management lacks to present evidence regarding how the reform improves education and executes organizational and financial changes that suggest that education is not the priority. This is closely connected with the component perceived relevancy directly influencing teachers' attitudes in the conceptual model. In higher education, this impression is reinforced by the focus on research activities. University teachers have to combine their research activities with their teaching activities (Oolbekkink-Marchand, 2006), while they are in most cases judged on their research activities. That is why a lot of teachers experience teaching as a time consuming activity and rather focus on other responsibilities (van der Rijst, 2009; Visser-Wijnveen, 2009). Finally, the teachers who do not agree with the reform with legitimate reasons are depicted as conservative, traditional or unmotivated. Altogether, this doesn't create a save climate which is necessary for professional development (Bergen & van Veen, 2004).

This is mainly how the UT tutors experienced the implementation of TOM. They experienced it as a rigorous, imposed and top-down process. Only a few tutors understood the added value and the necessity of the implementation of TOM. This led to uninvolved and unmotivated tutors. Besides that, tutors noticed that the compelling TOM activities were at the expense of research activities. Moreover, they found it frustrating to be judged only on their research activities, while they put a lot of effort in successfully implementing TOM.

Contrary to the top-down approach, transformational leadership has positive effects on teachers' motivation and professional development (Thoonen et al., 2011). Transformational leaders focus on human resources for reforms. Their main tasks are vision building, individual support, and providing intellectual stimulation (Thoonen et al., 2011; Kennisnet, 2011). By setting up a clear and shared vision, teachers feel more motivated, more committed and more responsible regarding the curriculum

reform. Individual support of the management leads to a stronger connection between teachers' personal needs and beliefs and the school's vision and goals. Intellectual stimulation support teachers in solving their problems and questioning their beliefs and attitudes towards the curriculum reform, which helps in changing their attitudes (Thoonen et al., 2011; Kennisnet, 2011).

Concluding, the management of the UT should have involved the teachers and students more in their vision building

processes. However, since TOM is already implemented, the approach should be different. Firstly, the management should carry out an unambiguous vision on TOM and a clear explanation of the added value and necessity of TOM. Besides that, they should invest in professional development, preferably attitude-focused coaching: creating a possibility for teachers to discuss about and reflect on TOM together with colleagues, TOM specialists, students and educationalists. Teachers have to find a closer link between the implementation of TOM and their needs

and beliefs. Hopefully, this will lead to tutors' improved attitudes towards TOM.

Nowadays, the main focus of universities is on research, leading to the educational tasks in danger of being overlooked. However, when universities want to deliver highly educated professionals, they should value the teaching activities of their current staff and take both, employees' research contributions and teaching contributions into account.



# References & appendices

## 14 References

---

- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211.
- Asma, L. J. F., Walma van der Molen, J. H., & van Aalderen-Smeets, S. I. (in press). Primary teachers' attitudes towards science: Results of a focus group study. In M. J. de Vries, H. van Keulen, S. Peters, & J. H. Walma van der Molen (Eds.). *Professional development for primary teachers in science. The Dutch VTB-Pro project in an international perspective*. Rotterdam, The Netherlands: SensePublishers.
- Bandura, A. (1977). Self-efficacy: towards a unifying theory of behavioral change. *Psychological review*, 84(2), 191.
- Beets, M. W., Flay, B. R., Vuchinich, S., Acock, A. C., Li, K. K., & Allred, C. (2008). School climate and teachers' beliefs and attitudes associated with implementation of the positive action programme: A diffusion of innovations model. *Prevention Science*, 9(4), 264-275. doi: 10.1007/s11121-008-0100-2
- Bergen, T., & Veen, K. V. (2004). Het leren van leraren in een context van onderwijsvernieuwingen: waarom is het zo moeilijk. *Velon tijdschrift voor lerarenopleiders*, 25(4), 29-39.
- Bohner, G., & Wänke, M. (2002). *Attitudes and attitude change*. Psychology Press.
- Boud, D., Keogh, R., & Walker, D. (Eds.). (2013). *Reflection: Turning experience into learning*. Routledge.
- Chirema, K. D. (2007). The use of reflective journals in the promotion of reflection and learning in post-registration nursing students. *Nurse education today*, 27(3), 192-202.
- Compton, V., & Jones, A. (1998). Reflecting on teacher development in technology education: Implications for future programmes. *International Journal of Technology and Design Education*, 8(2), 151-166.
- Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Towards better conceptualizations and measures. *Educational researcher*, 38(3), 181-199.

- Dooley, D. (2009). *Social research methods*. New Jersey: Pearson.
- Donche, V. (2005). *Leren, onderwijzen en leren onderwijzen: onderzoek naar opvattingen en handelingen van studenten en docenten*. Gent: Academia Press.
- Donegan, M. M., Ostrosky, M. M., & Fowler, S. A. (2000). Peer Coaching: Teachers Supporting Teachers. *Young Exceptional Children*, 3(3), 9-16.
- Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Harcourt Brace Jovanovich College Publishers.
- Eagly, A. H., & Chaiken, S. (2007). The advantages of an inclusive definition of attitude. *Social Cognition*, 25(5), 582-602.
- Evers, W. J., Brouwers, A., & Tomic, W. (2002). Burnout and self-efficacy: A study on teachers' beliefs when implementing an innovative educational system in the Netherlands. *British Journal of Educational Psychology*, 72(2), 227-243.
- Fazio, R. H., & Petty, R. E. (Eds.). (2008). *Attitudes: Key Readings: Their Structure, Function, and Consequences*. Psychology Press.
- Fullan, M. (2007). *The new meaning of educational change*. New York: Teachers College Press.
- Ghaith, G., & Yaghi, H. (1997). Relationships among experience, teacher efficacy, and attitudes towards the implementation of instructional innovation. *Teaching and Teacher Education*, 13(4), 451-458.
- Geerlings, T. & Veen, T. van der (2010). *Lesgeven en zelfstandig leren*. (14e druk). Assen: Van Gorcum.
- Gegenfurtner, A. (2013). Dimensions of motivation to transfer: a longitudinal analysis of their influence on retention, transfer, and attitude change. *Vocations and Learning*, 6(2), 187-205.
- Geijsel, F. P., Slegers, P. J., Stoel, R. D., & Krüger, M. L. (2009). The effect of teacher psychological and school organizational and leadership factors on teachers' professional learning in Dutch schools. *The elementary school journal*, 109(4), 406-427.
- Guskey, T. R. (1988). Teacher efficacy, self-concept, and attitudes towards the implementation of instructional innovation. *Teaching and teacher education*, 4(1), 63-69.

- Ingvarson, L. (1998). Teaching standards: Foundations for professional development reform. In *International handbook of educational change* (pp. 1006-1031). Springer Netherlands.
- Kennisnet (2011). Vier in balans monitor. ICT in het onderwijs: de stand van zaken. Zoetermeer: Kennisnet.
- Könings, K. D., Brand-Gruwel, S., & van Merriënboer, J. J. (2007). Teachers' perspectives on innovations: Implications for educational design. *Teaching and Teacher Education*, 23(6), 985-997.
- Korthagen, F. A. (2010). Situated learning theory and the pedagogy of teacher education: Towards an integrative view of teacher behavior and teacher learning. *Teaching and teacher education*, 26(1), 98-106.
- Krippendorff, K. (2004). Reliability in content analysis. *Human Communication Research*, 30(3), 411-433.
- Maskit, D. (2011). Teachers' attitudes towards pedagogical changes during various stages of professional development. *Teaching and Teacher Education*, 27(5), 851-860.
- Moust, J. (1993). De rol van tutoren in probleemgestuurd onderwijs. Contrasten tussen studenten docent-tutoren.
- Onderwijsraad (2011). Advies Hoger onderwijs voor de toekomst. (Report No. 20110270/997). Retrieved from <http://www.onderwijsraad.nl/upload/documents/publicaties/volledig/hoger-onderwijs-voor-de-toekomst.pdf>.
- Onwuegbuzie, A. J., & Leech, N. L. (2007). A call for qualitative power analyses. *Quality & Quantity*, 41(1), 105-121.
- Oolbekkink-Marchand, H.W. (2006). Teachers' perspectives on self-regulated learning: an exploratory study in secondary and university education. (Doctoral dissertation). Leiden: ICLON.
- Otero, V., Peressini, D., Meymaris, K. A., Ford, P., Garvin, T., Harlow, D. & Mears, C. (2005). Integrating Technology into Teacher Education A Critical Framework for Implementing Reform. *Journal of Teacher Education*, 56(1), 8-23.
- Pajares, M.F. (1992). Teachers' Beliefs and Educational Research: Cleaning up a messy construct. *Review of Educational Research*, 62(3), 307-332.
- Pearson, M., & Smith, D. (1985). Debriefing in experience-based learning. *Reflection: Turning experience into learning*, 69-84.

- Polly, D., Mims, C., Shepherd, C. E., & Inan, F. (2010). Evidence of impact: Transforming teacher education with preparing tomorrow's teachers to teach with technology (PT3) grants. *Teaching and Teacher Education*, 26(4), 863-870.
- Rafferty, A. E., Jimmieson, N. L., & Armenakis, A. A. (2013). Change Readiness A Multilevel Review. *Journal of Management*, 39(1), 110-135.
- Rijst, R. M. V. D. (2009). The research-teaching nexus in the sciences: Scientific research dispositions and teaching practice. ICLON, Leiden University Graduate School of Teaching.
- Rijst, R. M. V. D. (2009). The research-teaching nexus in the sciences: Scientific research dispositions and teaching practice. ICLON, Leiden University Graduate School of Teaching.
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary educational psychology*, 25(1), 54-67.
- Schmidt, H. (2011). Communication patterns that define the role of the university-level tutor. *Journal of College Reading and Learning*, 42(1), 45-60.
- Stevens, G. W. (2013). Towards a Process-Based Approach of Conceptualizing Change Readiness. *The Journal of Applied Behavioral Science*, 49(3), 333-360.
- Stevens, J. P. (2012). *Applied multivariate statistics for the social sciences*. Routledge.
- Tabata, L. N., & Johnsrud, L. K. (2008). The impact of faculty attitudes towards technology, distance education, and innovation. *Research in Higher Education*, 49(7), 625-646.
- Thoonen, E. E., Slegers, P. J., Oort, F. J., Peetsma, T. T., & Geijsel, F. P. (2011). How to improve teaching practices the role of teacher motivation, organizational factors, and leadership practices. *Educational Administration Quarterly*, 47(3), 496-536.
- van Aalderen-Smeets, S.I., & Walma van der Molen, J. (2013). Measuring primary teachers' attitudes towards teaching science: Development of the dimensions of attitude towards science (DAS) instrument. *International Journal of Science Education*, 35(4), 577-600.
- van Aalderen-Smeets, van, S.I., & Walma van der Molen, J.H. (2015). Improving primary teachers' attitudes towards science by attitude-focused professional development.

van Aalderen-Smeets, S. I., Walma van der Molen, J. H., & Asma, L. J. (2012). Primary teachers' attitudes towards science: A new theoretical framework. *Science Education*, 96(1), 158-182.

Van den Akker, J. (2003). *Curriculum perspectives: An introduction* (pp. 1-10). Springer Netherlands.

Vermunt J.D. & Verloop N. (1999). Congruence and friction between learner teaching. *Learning and Instruction*, 9, 257-280.

Visser-Wijnveen, G. J. (2009). *The research-teaching nexus in the humanities: Variations among academics*. Leiden University Graduate School of Teaching (ICLON), Faculty of Social and Behavioural Sciences, Leiden University.

Wright, V. H. (2010). Professional development and the master technology teacher: The evolution of one partnership. *Education*, 131(1), 139.

Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American psychologist*, 35(2), 151.



Additional information and appendices may be requested from the researcher.





