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WEB PAPER

Teaching conceptions and approaches to teaching of medical school faculty: The difference between how medical school teachers *think* about teaching and how they say that they *do* teach

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Abstract

Background It is often assumed that the way teachers approach their teaching is determined by the way they think about learning. This study explores how teachers of an undergraduate medical programme (UMP) think about learning, how they approach teaching and whether their conceptions of learning relate to their teaching approaches.

Methods Quantitative data of academic teachers involved in the undergraduate programme in medicine were collected and analysed. We used a questionnaire designed to measure teachers' *c*onceptions of their *o*wn *l*earning (COL) and of student learning as well as teachers' *a*pproaches to *t*eaching (AT).

Results Teachers of the medical undergraduate programme hold a variety of COL, of how students learn and their AT. No significant correlations were found between teachers' conceptions of learning and their AT.

Conclusions Although UMP teachers' ideas on learning and teaching are very diverse, some of their conceptions are interrelated. Teachers' ideas on their own learning is sometimes – but not always – related to how they think about student learning. But most importantly, the way UMP teachers think about learning is not automatically converted into the way they approach teaching.

Introduction

Teaching conceptions are presumed to be a primary determinant of the teaching behaviour of medical school faculty members (Williams & Klamen 2006).

Teachers have built their conceptions about teaching from their own learning and teaching experiences as students in primary, secondary and tertiary education, and from their own teaching experiences (Lortie 1975; Könings et al. 2007). Quite often, their view on teaching is founded on the idea that teaching essentially comes down to the transmission of knowledge from an external source to the learner; the teacher is the directing agency prescribing to a high degree what learners do to realize the objectives presented by the teacher (Vermunt & Verloop 1999). This teacher-centred view on learning has come under increasing pressure (Biggs 1996) and is nowadays replaced by a new paradigm, student-centred learning. According to this view, the focus moves away from the teacher towards the learning process of the student, with the teacher as facilitator (Kember 1997). Therefore, curriculum reform based on student-centred learning have been on every university's agenda for the last decades, with lifelong learning, tutorship, competences, reflections, . . . as keywords.

Practice points

- UMP teachers hold a variety of COL and on how students learn.
- The way UMP teachers think about learning is not automatically converted into the way they approach teaching.
- Teachers' ideas on their own learning is sometimes – but not always – related to how they think about student learning.

Successful educational change however depends on what teachers do and think (Fullan 2001). Whereas it was once taken for granted that a competent basic or clinical scientist would naturally be an effective teacher, it is now acknowledged that preparation for teaching is essential (Steinert et al. 2006). To improve medical teacher effectiveness at all levels of the educational continuum, faculty development activities have been designed to promote and maintain academic growth and teaching excellence (Steinert 2000).

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Faculty development programmes often rely on the assumption that there is a clear, causal relationship between teaching conceptions, teaching practice and student learning (Devlin 2006). It is taken for granted that changing teachers' conceptions automatically leads to a change (or even an improvement) in teaching practice (Ho et al. 2001; Williams & Klamen 2006). However, some caution is needed as there is research that does not support this assumption (Fang 1996; Murray & Macdonald 1997; Roelofs & Visser 2001; Donche 2005).

Recent research following medical educational intervention reports a gap between knowledge and behaviour of teachers (Kennedy et al. 2004) indicating that not all changes in their knowledge on learning and teaching result in changes (or improvements) in teaching and curriculum reform.

More research is needed to further explore the links between teachers' beliefs, thoughts, theories, knowledge and attitude on the one hand, and teacher behaviour, classroom practices and student outcomes on the other hand (Opdenakker & van Damme 2006; van Petegem & Donche 2006). Understanding teachers' actions and cognitions provides insight into how to coach teachers successfully through curriculum change.

Three questions are central to our study: What are UMP teachers' conceptions of learning and their *a*pproaches to *t*eaching (AT)? What are the tendencies of their conceptions and strategies? What are the relations between UMP teachers' conceptions and their reported strategies?

Method

Setting

The Medical Faculty of the University of Antwerp (Belgium) offers Bachelor and Masters in Medicine. Students enter the medical school at the age of 18, after passing an entrance exam. They complete their Bachelor degree after 3 years of training, and then enter the Master programme, which takes 4 years. After graduation, students start postgraduate training, ranging from 2 to 6 years, depending on the specialization. The average number of students entering medical school in the first year is 100.

Our study focuses not only on teachers involved in the first 5 years of the programme in Medicine, when students mainly receive formal classroom teaching, but also on interactive teaching sessions in small groups, lectures/group sessions with patient presence, limited hospital and GP clerkships (0.5 to 1 day/week) and small group skills training. During these 5 years, the curriculum is aimed at giving students all knowledge and skills needed to actively participate in a hospital/GP setting. After these 5 years, they enter their fulltime clerkship period in year 6 and the orienting pre-specialization in year 7, where they are supervised and continuously assessed.

The curriculum in which the teachers participated is an integrated curriculum, with system based modules and integrated clinical skills training. The University of Antwerp, in its educational mission statement, aims at providing student-centred education.

Participants

All academic teachers involved in teaching the undergraduate programme in medicine ($N = 108$) received a questionnaire by mail. Overall, there was a 71% response rate ($N = 77$). The majority of these teachers are academic staff (professors); some are assisting academic staff (assistants). Almost all teachers (90%) are MD.

Instrument

We used the Inventory of Teaching Patterns (ITP).[1] The ITP is a self-report questionnaire based on a selection of scales from already validated self-report questionnaires (Vermunt 1995; Roth-van der Werf & Tomic 1998; Roelofs & Visser 2001; Donche 2005). The ITP is designed to measure

(I) Teachers' *C*onceptions of their *O*wn *L*earning (COL, 5 scales),
(II) Teachers' *C*onceptions of how *S*tudents *L*earn (CSL, 6 scales) and
(III) Teachers' AT (5 scales).

The starting point of the ITP is the idea that specific AT are associated with specific conceptions of learning, based on the so-called consistency hypothesis, claiming the interrelatedness between specific conceptions and specific approaches (Murray & Macdonald 1997; Kember & Kwan 2000).

In parts (I) and (II) of the questionnaire, each item comprises a statement for which the participant has to indicate on a 5-point Likert scale to what extent the statement applies to them: 'disagree entirely' (1), 'disagree' (2), 'neutral or don't know' (3), 'agree' (4) and 'agree entirely' (5).

In part (III), each item refers to an activity where the teacher indicates – on a 3-point scale – whether he/she 'performs the activity him/herself' (1), 'encourages students to perform the activity' (2) or 'leaves the initiative upon students and assumes that students – without any encouragement – perform the activity themselves' (3).

Statistical analysis

Scale scores were obtained at the individual level by averaging the scores on the associated items, resulting in the 16 variables indicated in Table 1. For each variable, Cronbach's alpha was calculated to assess the internal consistency. In addition, for each variable the mean, standard deviation (SD) and standard error (SE) were calculated. For the 11 variables of part I and II, a *t*-test was performed to investigate whether the mean score differed significantly from the neutral score (equal to 3). For the 5 variables of part III we performed a *t*-test to investigate whether the mean score differed significantly from the score which indicated that learning was controlled by the teacher (equal to 1 'performs the activity him/herself').

To minimize chances of making a Type I error, we used Bonferroni's corrected significance level, i.e. $\alpha_{\text{bonferroni}} = \alpha / N_c$, where $\alpha_{\text{bonferroni}}$, N_c and α are the corrected significance level for a single comparison, the number of comparisons and the overall significance level, respectively. For the test of the 16 variables and an overall significance level of 0.05 this implies

Table 1. Number of items, Cronbach's alpha, mean score, SD and SE, significance for difference from neutral score.

Scales	Number of items	Cronbach's α	Mean ± SD	Significance[a]
(I) *Teachers' COL*				
Intake of knowledge	3	0.81	3.37 ± 0.91	*
Use of knowledge	4	0.83	3.88 ± 0.82	*
Cooperative learning	3	0.85	2.87 ± 0.92	N.S.
Stimulating education	5	0.86	3.65 ± 0.88	*
Discovery oriented learning	6	0.67	4.13 ± 0.49	*
(II) *Teachers' CSL*				
Intake of knowledge	9	0.58	3.39 ± 0.52	*
Use of knowledge	7	0.74	3.87 ± 0.6	*
Stimulating education	8	0.76	4.1 ± 0.5	*
Cooperative learning	8	0.9	3.29 ± 0.71	*
Discovery oriented learning	7	0.65	3.08 ± 0.57	N.S.
Construction of knowledge	8	0.73	3.94 ± 0.52	*
(III) *Teachers' AT*				
Regulating learning process	11	0.66	1.66 ± 0.37	*
Regulating learning results	13	0.74	1.79 ± 0.37	*
Deep and critical processing	13	0.77	1.69 ± 0.36	*
Stepwise processing	7	0.58	1.55 ± 0.39	*
Concrete processing	4	0.69	1.67 ± 0.49	*

Notes: [a],*For the COL and CSL scales indicates: the mean value differs significantly from the neutral value 3. For the AT scales, it indicates: the mean value differs significantly from the value 1 (1: 'performs actively by him/herself'). For significance, the Bonferroni corrected level 0.0031 is used (0.05 divided by 16, the number of simultaneous comparison), N.S.: not significant.

that for each comparison the corrected significance level is equal to 0.0031.

To investigate the relation between variables, we computed the bivariate Pearson correlation coefficient for all pairs of variables. For interpretation of the size of the correlations, we used Cohen's (2003) classification, as used in behavioural sciences. A correlation of about 0.10 is considered as small, 0.30 as moderate and 0.50 as large.

Also for the multiple tests of the correlations a Bonferroni corrected significance level was used: with 16 variables, we have $(16 \times 15)/2$ correlations, so, with an overall significance of 0.05, the Bonferroni corrected significance level for each correlation is equal to 0.00042.

Statistical analysis was performed using SPSS version 15.

Results

Cronbach's alpha for internal consistency

Cronbach's alpha of two variables was below 0.60 (variable 6 and variable 15). This means that we have to be careful in the interpretation of the correlations with these variables, as a variable with a low Cronbach's alpha is likely to result in a low correlation (Table 1).

All other variables have acceptable (between 0.60 and 0.70) or good (0.70–0.86) alpha values.

SDs on parts I, II and III

Teachers were found to differ in their COL, as shown by the SD ranging from 0.49 to 0.92. With respect to CSL there is more agreement among teachers; for most variables, SD of CSL are smaller those of COL, ranging from 0.52 to 0.71. Both teachers' statements on COL and on student learning were indicated on a 5-point Likert scale (Table 1).

Part III, measuring teachers' self-reported strategies on teaching, was measured by a 3-point Likert scale. The SD range from 0.36 to 0.49. In order to compare these SDs with those of COL and CSL, the AT SD should be multiplied by 5/3 in order to correct for the effect of different scale width (3-point versus 5-point), resulting in SD-values for AT ranging from 0.62 to 0.82, respectively.

Overall, the SD indicates that teachers have varied ideas on all three scales.

Correlations

Teachers' COL and their CSL.. Between the variables of part (I) and part (II), two significant correlations were found: a large positive significant correlation between *use of knowledge* ($r = 0.65$). This means that teachers who consider their own learning as preferably of a practical nature and relevant for daily practice have the same idea for students' learning. A moderate to large positive correlation was found between *intake of knowledge* ($r = 0.43$): those teachers who think their own learning is about memorizing facts and figures tend to regard the way students should learn in the same way (Table 2).

No significant correlations were found between the five variables of part (I), whereas we did find significant correlations between the six variables of part (II). There are large significant correlations between *construction of knowledge* and both *stimulating education* ($r = 0.71$) and *cooperative learning* ($r = 0.51$). Another large correlation was found between *cooperative learning* and *stimulating education* ($r = 0.63$). These correlations indicate that teachers who expect students to independently find examples and relationships between topics, also see teachers as stimulators for students' learning and consider learning to be a social activity. We found moderate to large significant correlations between

Table 2. Correlations.

Scales	1 Intake of knowledge (COL)	2 Use of knowledge (COL)	3 Cooperative learning (COL)	4 Stimulating education (COL)	5 Discovery oriented learning (COL)	6 Intake of knowledge (CSL)	7 Use of knowledge (CSL)	8 Stimulating education (CSL)	9 Cooperative learning (CSL)	10 Discovery-oriented learning (CSL)	11 Construction of knowledge (CSL)	12 Regulating learning process (AT)	13 Regulating learning results (AT)	14 Deep and critical processing (AT)	15 Stepwise processing (AT)	16 Concrete processing (AT)
(I) *COL*																
1	Intake of knowledge															
2	Use of knowledge	−0.12														
3	Cooperative learning	0.01	0.19													
4	Stimulating education	−0.19	−0.02	0.36												
5	Discovery-oriented learning	−0.04	0.32	0.05	0.25											
(II) *CSL*																
6	Intake of knowledge	0.43	0.19	0.11	−0.04	0.08										
7	Use of knowledge	0.02	0.65	0.06	0.04	0.20	0.41									
8	Stimulating education	−0.15	0.19	0.35	0.27	0.24	0.12	0.24								
9	Cooperative learning	−0.03	0.14	0.66	0.25	0.21	0.33	0.18	0.63							
10	Discovery-oriented learning	−0.10	0.17	0.25	0.18	0.27	0.09	0.05	0.43	0.40						
11	Construction of knowledge	−0.08	0.13	0.32	0.30	0.22	−0.05	0.13	0.71	0.51	0.33					
(III) *AT*																
12	Regulating learning process	−0.04	0.07	0.04	−0.06	0.13	0.06	0.00	−0.05	0.04	0.04	0.02				
13	Regulating learning results	−0.15	−0.06	−0.09	−0.13	−0.02	−0.20	−0.12	−0.18	−0.13	−0.02	−0.11	0.71			
14	Deep and critical processing	−0.14	−0.09	0.04	−0.02	0.00	0.00	−0.14	−0.10	0.17	0.20	0.15	0.38	0.29		
15	Stepwise processing	−0.14	−0.10	0.15	0.11	0.08	−0.23	−0.23	−0.07	0.02	0.01	−0.05	0.51	0.50	0.46	
16	Concrete processing	−0.19	−0.15	−0.01	0.02	−0.08	−0.08	−0.21	−0.02	0.05	0.15	0.08	0.36	0.37	0.65	0.44

Highlighted terms: significant correlation

use of knowledge and *intake of knowledge* ($r = 0.41$); between *discovery-oriented learning* and *stimulating education* ($r = 0.43$); and between *discovery oriented learning* and *cooperative learning* ($r = 0.40$). Most teachers who see student learning as being of a practical nature and for everyday use also like students to memorize facts and figures. Most of our participants who like students to actively and independently take decisions on their own learning, see teachers as stimulators and student learning as a social activity.

Teachers' AT. Large significant correlations were found between *regulating the learning process* and both *regulating learning results* ($r = 0.71$) and *stepwise processing* ($r = 0.51$), and between *stepwise processing* and *regulating learning results* ($r = 0.50$). This means that teachers who tend to leave the initiative of all metacognitive activities (planning, orienting, self-assessing,. . .) regarding the learning process to students also prefer to leave the metacognitive activities for learning results to their students. The same goes for regulating learning results and the cognitive activities of stepwise processing.

Moderate to large significant correlations were found between *stepwise processing* and *deep and critical processing* (0.46) and between *concrete processing* and *stepwise processing* (0.44).

Teachers' COL, CSL and AT. We found no significant correlations between parts (I) and (III) and parts (II) and (III). This indicates that participants' personal scores on how they conceive of their own learning and student learning do not correlate with how they report to approach their teaching.

Discussion

Our study suggests that UMP teachers prefer learning for a practical reason, using what they learn in their daily practice; they like to be stimulated and to decide themselves when and how to learn. When they think about student learning, UMP teachers expect students to actively construct knowledge: to independently find relationships between studied topics, etc. UMP teachers not only see it as their role to stimulate students' learning, but also want students to remember facts and figures. Regarding their approach to teaching, UMP teachers tend to choose a shared responsibility for both teachers and students in the learning process. These results, however, come from the mean scores we derived from the questionnaires.

When looking closer, on an individual level, we see that teachers hold a variety of conceptions of learning and teaching. There is neither general and shared idea about learning nor teaching. Some conceptions of learning are interrelated, indicating that how teachers think about their own learning is sometimes – but not always – related to how they think about student learning.

Our study also shows that the way UMP teachers think about learning is not automatically converted into their teaching practice. Although we did find some correlation between how teachers think about their own learning and student's learning, we found no consistent correlations between how they think about learning and how they approach their teaching activities.

From the results of our study, we challenge the assumption that changing teachers' conceptions automatically leads to a change in teaching practice, even in their self-reported practice. This has grave implications for designers of faculty development programmes, and further research is needed.

According to Eley (2006), studies finding a relationship between conceptions of teaching and AT do not in truth demonstrate such a relationship. They show a relationship between espoused conceptions and *reported* approaches. This is indeed a limitation of self-report questionnaire methodology and of our study: reported AT might indeed differ from reality. For further research, we suggest using qualitative research methods such as observation, to verify these data (van Petegem & Donche 2008).

These findings are contradictory to former research finding correlations between teachers' conceptions and approaches. Many of those studies used the Approaches to Teaching Inventory (ATI), a quantitative instrument developed by Trigwell and Prosser (1996) to measure AT in large numbers of teachers. Their original ATI-study showed a strong and logical relationship between conceptions of teaching and AT (Trigwell et al. 1996): how teachers think about teaching influences the ways in which they teach. However, some caution should be attached to this claim: with the almost tautological relationship between the category descriptors of conception and approaches, it is hardly surprising that lecturers were assigned to related categories of teaching conceptions and approaches (Kember & Kwan 2000). Then there is the concern with the rigour and methodology adopted in the psychometric development of the ATI; although the questionnaire has been used in many studies, the procedures developed in the ATI's development have not been subjected to any independent scrutiny (Meyer & Eley 2006). This is not the case with the ITP: category descriptors from the scales on conceptions differ from those of approaches.

To conclude, our study showed that teachers hold a variety of conceptions of how they prefer learning. There are some interrelated conceptions of how they see their own learning and how they see student learning. We found no sound relationship between how UMP teachers think about learning, and how they report to approach their teaching.

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Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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Note

1. The ITP cannot be published due to copyright. Readers can obtain the ITP upon request for scientific purposes by contacting the first or second author of this article.

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