

Relations between teachers' emotions in teaching and their approaches to teaching in higher education

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Received: 1 August 2010 / Accepted: 4 October 2011 / Published online: 30 October 2011
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Abstract This study investigated the relations between teachers' emotions in teaching and their approaches to teaching in individual courses. It is derived from two fields of study that have hitherto been largely unconnected in higher education. While the research literature shows (a) a range of variables are related to the teaching approaches that teachers adopt and that these approaches are related to the quality of their students' learning, and (b) that the emotional experience of teachers is an important factor in teaching, no studies have been reported on the connections between emotions and approaches in teaching in higher education. Two self-report questionnaires: the Approach to Teaching Inventory-Revised and the Emotions in Teaching Inventory, were completed by a sample of 175 Australian higher education teachers. The results suggest that there are significant relations between the ways teachers emotionally experience the context of teaching and the ways they approach their teaching, with positive emotions being associated with student-focused teaching approaches and negative emotions with transmission approaches. The relations help explain why new teaching strategies may not be successful or not even adopted.

Keywords Emotions in teaching · Approach to teaching · Dissemination · Teacher-focused · Student-focused

Introduction

This article reports the results of a study of the relations between emotions that university teachers experience in a course they teach and their approaches to teaching in that course. The research literature shows a range of factors are related to the teaching approaches that teachers adopt (Prosser and Trigwell 1999), and educational psychologists also suggest that emotional experience is ubiquitous in teaching practice (Sutton and Wheatley 2003). However, no studies have been reported on the way that university teachers' emotions during teaching a course may be related to qualitatively different approaches they use to

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teach in that course. In this introduction, these two independently researched fields are briefly reviewed.

Approaches to teaching

Research on university teachers' approaches to teaching consistently shows evidence of variation in the ways teachers approach their teaching (Prosser and Trigwell 1999). Furthermore, there is evidence that teachers' approaches to teaching are associated with their conceptions of teaching. A majority of researchers distinguish between a teacher- or content-focused and a student-focused approach to teaching (Biggs 1999; Kember and Kwan 2002; Prosser and Trigwell 1999; Prosser et al. 1994; Samuelowicz and Bain 1992, 2001; Trigwell and Prosser 1996; Vermunt and Verloop 1999). Teachers whose approach to teaching in a certain context can be categorised as being teacher-focused see teaching mainly as the intention to transmit knowledge. These teachers concentrate on the content to be taught and on what they do in teaching. Thus, the emphasis is on how to organise, structure and present the course content in a way that is easier for the students to understand. On the other hand, teachers who adopt an approach to teaching that is categorised as student-focused in a particular context see teaching as facilitating student learning or students' knowledge-construction processes, or as supporting students' conceptual change. These teachers attempt to develop students' existing conceptions, encourage them to construct their own knowledge and understandings, and then focus on what students do in relation to these efforts (Prosser and Trigwell 1999).

The way a teacher approaches teaching is also found to be related to approaches students adopt to learning. Teachers who adopt conceptual change/student-focused (CCSF) approaches to teaching are more likely to be teaching students who self-report adopting more meaningful or deeper approaches to learning than teachers using information transfer/teacher-focused (ITTF) approaches (Ho et al. 2001; Trigwell et al. 1999).

A variety of other factors have been found to be related to the qualitative variation in approaches to teaching. In a series of studies Prosser and Trigwell found that CCSF approaches were more likely when teachers experienced a manageable workload, where the characteristics of the students were more uniform (similar prior academic ability, similar language use levels, etc.) where the class size was smaller, and where they felt that they had some control over what was taught. ITTF approaches were more likely when teachers were in departments where they perceived that teaching was not valued and where they felt that they did not have control over what was taught (Prosser and Trigwell 1999, p. 157). Higher CCSF scores are found in teaching in the soft disciplines (arts, humanities, social sciences, etc.) than in the hard disciplines (science, engineering, medicine, etc.) (Lindblom-Ylänne et al. 2006; Trigwell 2002). Teachers who experience more transformational leadership and work in environments where there is more collaborative management are more likely to adopt CCSF approaches to teaching (Ramsden et al. 2007), as are teachers who have an understanding of their subject matter in terms of wholes, rather than seeing it as being made up of parts, or even parts related to wholes (Trigwell et al. 2005b). Finally, interventions to enhance teaching, such as academic development programs, have also been shown to increase CCSF scores, and in some cases lower ITTF scores (Gibbs and Coffey 2004; Hanbury et al. 2008; Ho et al. 2001; Postareff et al. 2007).

None of the studies of the qualitative differences in approaches to teaching have explored the possible relations with teachers' emotions. Along with cognition and motivation, emotion is widely acknowledged to be one of the three fundamental factors of human mental operations (Mayer et al. 2000; Schutz and DeCuir 2002). For the study of

emotions to be methodologically compatible with the relational approaches to teaching studies, the reported emotional response needs to be from the same context as the reported approach to teaching. It is the emotions evoked by a context rather than emotional dispositions that are the focus in relational studies. While this has not previously been attempted for university teaching, it has been explored for university learning.

The role of emotions in university learning recently emerged as an unexpected finding in a relational study on on-line learning (Ellis et al. 2006) from which a more focused study of the learning experience of first year university biology students was undertaken. The results suggest that there is a relationship between the ways students emotionally experience their biology course, the approach they take to the learning of that course and their academic achievement in that course (Trigwell et al. 2011). Students who experience stronger positive course-related emotions such as hope and pride are more likely to report adopting deeper approaches to their learning than those who experience stronger negative emotions, such as anger, boredom, anxiety and shame. Students who describe more of the characteristics of surface approaches are more likely to report an experience of lower positive emotions and higher negative emotions.

The questions being addressed in this article are whether relations are found between the emotional experiences of university teachers in a particular teaching context and the approaches that they take to that teaching, and whether these relations are similar to those observed for students in higher education (between their approaches to learning and their emotions in learning in a particular course).

Emotions in teaching

In educational settings generally, emotion is ubiquitous, not only being a part of students' learning, but also being felt by teachers during their teaching. Teachers' emotional experience is not only influenced by their individual reality (teacher-self), but is also affected in social interactions with others (students-teacher interaction, teacher-teacher interaction, teacher-parents interactions), and is shaped by the wider socio-political context (college politics and culture). Notwithstanding its ubiquity in educational environments, there is surprisingly little research about emotional aspects in teachers' lives from any perspective (Sutton and Wheatley 2003). The paucity of such research is even more apparent in tertiary education.

Classification of emotions

The classification of emotions into positive and negative forms as described above is common in the research literature, though this is far from a straight-forward process (Kristjansson 2007). According to some exploratory studies on teachers' emotions in primary and secondary school settings, emotions which are generally evaluated positively include joy, satisfaction, pride and excitement (Emmer 1994; Hargreaves 1998; Godar 1990). Teachers' satisfaction often comes from the progress made by their students (Emmer 1994; Hargreaves 1998; Hatch 1993; Sutton 2000) and teachers express their joy and pleasure when their students are responsive and cooperative during teaching (Emmer 1994; Erb 2002; Golby 1996; Lortie 1975). Teachers, especially novice teachers, always experience excitement in teaching when they receive unexpected comments and behaviours from their students (Hargreaves 1998; Nias 1989). In addition to positive emotions experienced in school teaching, teachers' positive emotions also occur when they perceive their colleagues are supportive (Erb 2002). According to Winograd (2005) high quality

teachers describe feelings of enthusiasm, happiness, confidence, self-assurance and passion about, and satisfaction toward, teaching.

Teachers also experience negative emotions, such as anger, frustration, anxiety and sadness (Sutton and Wheatley 2003). It has been found that school teachers' anger is most likely to arise from students' misbehaviours and violation of rules (Emmer 1994; Erb 2002; Hargreaves 2000; Sutton 2000). Teachers frequently feel frustrated when they observe their students are lazy and inattentive (Hargreaves 2000; Reyna and Weiner 2001) and frustration and anger is also reported to be associated with uncooperative colleagues (Bullough et al. 1991; Erb 2002; Nias 1989) and parents' uncaring and irresponsible behaviours (Lasky 2000). Anxiety and uncertainty are experienced when teaching is perceived to be complex and when teachers are unsure of whether the goals have been achieved (Bullough et al. 1991; Erb 2002; Trickle 1991).

Importance of emotions

Cognitive and social psychologists have demonstrated that emotions can shape cognition, influence motivation and subsequently affect people's behaviours (Derryberry and Tucker 1994; Ledoux 1996; Mesquita et al. 1997). In an extensive review of teachers' emotions, Sutton and Wheatley (2003) extrapolate the potential influence of teachers' emotions by summarizing findings of general emotion research in cognitive and social psychology. They suggest that teachers' emotions might exert an influence on their own cognition and motivation, which subsequently also affect students' perception and learning.

Research also suggests that school teachers' emotions can influence their attention, memory, thinking and problem solving (Emmer 1994; Isen 1993; Mogg and Bradley 1999). For instance, Emmer (1994) found that teachers' anger and frustration caused by students' misbehaviours can distract their focus and attention from instructional goals. Moreover, a teacher with a high-level of anxiety is unlikely to succeed to solve classroom problems as anxiety can reduce limited resources of working memory (Eysenck and Calco 1992). In terms of positive emotions, such as joy, pride and satisfaction, Sutton and Wheatley (2003) suggested that teachers with more positive emotions might "generate more teaching ideas and strategies" (p. 338). In terms of motivation, Ryan and Deci (2000) proposed that negative emotions often reduce teachers' intrinsic motivation whereas positive emotions are only a necessary but not sufficient prerequisite for intrinsic motivation. Teachers' emotions can also affect students' motivation in learning as in examples from Wentzel (1996) and Wong and Dornbusch (2000) who separately reported that middle school students who perceived their teachers to have positive emotions are found to be more motivated and more cooperative.

University teachers' emotions

There are very few studies on the emotions of university teachers, and most of them focus on how they manage their emotions during teaching. In a recent study, Zhang and Zhu (2008) examined Chinese college instructors' emotional labour and its effects on teachers' burnout and satisfaction by using a questionnaire consisting of 14 items on emotional labour strategies (Diefendorff et al. 2005), the 22-item Maslach Burnout Inventory (Maslach et al. 1996), and a Teacher Satisfaction Scale (Plax et al. 1986). Three dimensions of emotional labour are described, namely surface acting (e.g. hiding their anger and disappointment but showing humour and enthusiasm), deep acting (e.g. remembering positive interactions with students; identifying poorly performed students as developing

students; perceiving students' complaints as a sign of trust from students) and authenticity. They found that the Chinese university teachers engaged in deep acting the most and surface acting the least. Additionally, they also found that surface acting had detrimental effects on teachers' satisfaction and contributed to burnout, whereas deep acting and authenticity tended to exert positive effects.

In a study conducted by Gates (2000), nine university teachers' emotional management was examined using qualitative research methods, including classroom observation and in-depth interviews. Negative emotions, such as anger, irritation and frustration were found to be frequently reported by all nine teachers when they experienced disturbance from students, such as talking to each other in lectures, leaving class early without giving notice, or complaining about their grades. Most of the teachers felt that negative emotions should not be expressed, whereas positive emotions are more appropriate to be displayed. In terms of emotional management strategies, Gates found that teachers were involved in both surface and deep acting.

Despite the importance of emotional management, university teachers' emotions during teaching is an under-researched area. There are no studies that investigate the links between teachers' emotions and teaching approaches in tertiary education. As stated by Sutton and Wheatley (2003, p. 345) "A fuller understanding of teachers' emotions in teaching may help researchers understand the complex reasons underlying the limited success of even well designed programs and the reasons new teaching strategies are often not adopted or even attempted".

Methods

Instruments

The on-line questionnaire used in this study consists of two parts: an Emotions in Teaching Inventory (ETI) (Trigwell 2009) and the Approaches to Teaching Inventory (ATI-R) (Prosser and Trigwell 1999, 2006; Trigwell and Prosser 2004; Trigwell et al. 2005a). The ATI-R, developed from the identification of qualitatively different approaches to teaching is composed of 22 items, with 11 items in the conceptual change/student-focused (CCSF) approach scale and 11 items in the information transmission/teacher-focused (ITTF) approach scale. The Emotions in Teaching Inventory (ETI) was developed from qualitative studies on teachers' emotional experience, including studies of emotional labour (Dieffendorff et al. 2005), and is informed by the framework of the Student Experience of Emotions Inventory (SEEI) used to study the relations between students' emotions and their approach to learning (Trigwell et al. 2011).

The ETI contains 20 items (Appendix 1) with 10 items measuring positive emotions (Items 1, 4, 6, 8, 11, 12, 13, 14, 17 and 19) and 10 items measuring negative emotions (Items 2, 3, 5, 7, 9, 10, 15, 16, 18 and 20) on a 1–5 Likert scale, from "strongly disagree" to "strongly agree". The components in the positive emotions scale include Motivation (3 items, e.g. Item 8: When I consider what students can do with what I have taught them I feel motivated), Pride (3 items, e.g. Item 13: I get a feeling of pride as a result of my work on this course), Confidence (2 items, e.g. Item 12: I am usually sure that things are going well in the teaching of this course) and Satisfaction and Happiness (single items 4 and 17, respectively). The components of the negative emotions scale are Anxiety (4 items, e.g. Item 2: I feel anxious when preparing learning activities for this course), Embarrassment (2 items, e.g. Item 15: When I get teaching activities wrong in class I feel embarrassed),

Frustration (2 items, e.g. Item 20: Trying to teach students in this course is a frustrating experience) and Boredom and Annoyance (single items 3 and 16, respectively).

As the study was designed to be relational, the ETI, like the ATI-R, captures responses in a specific context. Self reports of teachers' experience in the same individual course were requested for both inventories.

Sample and procedure

To collect the data, an invitation-to-participate letter was sent by email to a sample of over 500 full-time academic staff at one Australian university with a link directing respondents to the on-line questionnaire. The sample was selected from a public database of academic staff, but filtered to ensure that the participants would have some recent teaching experience to reflect on and that they are full-time teaching staff so that a more homogeneous teaching environment could be assumed. Several follow-up emails were sent after the initial invitation, and 175 completed response sets were included in the study.

Results

Questionnaire scales

The descriptive statistics of the 20 ETI items were screened for the values of variance. Two items with low variance (3 and 17) were discarded. Factor analysis (Principal Component Analysis, PCA) of the remaining 18 items yielded a five factor solution with one item (14) with high multiple coefficients loaded across factors (Field 2009). The five factor solution with item 14 removed is shown in Table 1, and the factor intercorrelation matrix in Table 2.

The factors 1–5 correspond to the following aspects of emotions: Motivation (4 items), Embarrassment (3), Frustration (3), Anxiety (4) and Pride (3), respectively. While these labels suggest either positive or negative emotions, a two factor solution with one factor containing only positive items and a second with only negative emotions items was not found. These five emotions categories are used in the analyses reported below, and while they only contain three or four items each, for the sake of convenience they are referred to, and treated as scales.

The emotions in teaching scales show acceptable internal consistency. The Cronbach alpha reliabilities are Pride, 0.82; Motivation, 0.76; Anxiety, 0.77; Embarrassment, 0.74 and Frustration, 0.74. The ATI-R scale reliability Cronbach alpha is 0.74 for the ITTF scale and 0.82 for the CCSF scale. The descriptive statistics of the seven scales used in the study are shown in Table 3.

Relations between emotions in teaching and approaches to teaching

In order to examine the relations between emotions in teaching and approaches to teaching, the data analyses included a Pearson Product Moment correlation analysis, Principal Component Analysis and a Hierarchical cluster analysis of the scale scores.

Correlation analysis

A series of bivariate Pearson Product Moment correlation analyses were performed to examine the relations between scale variables. The correlation matrix for the five emotions scales and the two approaches to teaching scales are shown in Table 4.

Table 1 Rotated factor loadings (pattern matrix) for 17 ETI items

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Item 1 (motivation)	0.70	-0.20	-0.30	0.02	-0.39
Item 2 (anxiety)	-0.17	0.19	0.20	0.76	0.06
Item 4 (motivation)	0.68	-0.15	-0.21	-0.18	-0.49
Item 5 (frustration)	-0.25	0.02	0.87	0.11	0.21
Item 6 (motivation)	0.77	-0.13	-0.26	-0.23	-0.34
Item 7 (anxiety)	-0.38	0.33	-0.09	0.76	-0.06
Item 8 (motivation)	0.73	0.05	-0.37	-0.21	-0.23
Item 9 (embarrassment)	-0.20	0.88	-0.01	0.36	-0.04
Item 10 (anxiety)	-0.23	0.40	-0.05	0.76	0.18
Item 11 (pride)	0.41	-0.17	-0.32	-0.12	-0.85
Item 12 (confidence)	0.49	-0.03	-0.53	-0.13	-0.34
Item 13 (pride)	0.37	0.05	-0.33	0.02	-0.86
Item 15 (embarrassment)	-0.12	0.82	-0.15	0.25	0.06
Item 16 (annoyance)	0.00	0.75	0.20	0.12	-0.01
Item 18 (anxiety)	0.04	0.10	0.28	0.66	0.31
Item 19 (pride)	0.26	0.06	-0.01	-0.24	-0.81
Item 20 (frustration)	-0.40	0.13	0.85	0.16	0.21

Extraction method: principal component analysis

Rotation method: oblimin with kaiser normalization

Eigenvalues >1; loadings above 0.5 in bold

Table 2 Factor intercorrelation matrix for five factor solution

Component	1	2	3	4	5
1	1.00	-0.13	-0.25	-0.16	-0.31
2		1.00	0.01	0.23	0.01
3			1.00	0.03	0.23
4				1.00	0.12
5					1.00

Table 4 shows that there is a statistically significant positive correlation between the CCSF approaches to teaching scale and both Pride and Motivation emotions scales, $r = 0.20$ and 0.40 , respectively. The CCSF approach also correlates negatively and significantly with the Frustration and Embarrassment emotions scales ($r = -0.33$ and -0.19 , respectively). The ITTF approaches to teaching scale is found to correlate positively and significantly with both the Anxiety and Embarrassment emotions scales ($r = 0.25$ and 0.23 , respectively). According to Cohen's (1988) criteria, r values of 0.10 , 0.30 and 0.50 indicate small, medium and large effects, respectively.

Principal component analysis

As a means of analysing the relations between variables representing the constructs of emotional experience in teaching and approaches to teaching, a Principal Component

Table 3 Descriptive statistics for questionnaire scales

Scales	Min	Max	Mean	SD
Teaching approach				
CCSF	1.91	5.00	3.94	0.62
ITTF	1.55	5.00	2.96	0.62
Emotion				
Pride	1.00	5.00	4.14	0.66
Motivation	1.50	5.00	4.26	0.59
Anxiety	1.00	4.00	1.92	0.74
Embarrassment	1.00	5.00	2.91	0.89
Frustration	1.00	4.00	2.03	0.75

Table 4 Correlation between the emotions scales and the approaches to teaching scales

Variables	ITTF	Pride	Motiv.	Anxiety	Embarr.	Frustr.
CCSF	-0.21**	0.20**	0.40***	-0.14	-0.19*	-0.33***
ITTF	-	0.01	-0.01	0.25**	0.23**	0.11
Pride		-	0.53	-0.22**	-0.04	-0.36***
Motivation			-	-0.34***	-0.16*	-0.55***
Anxiety				-	0.40***	0.26***
Embarrassment					-	0.09

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (2-tailed), $n = 175$

analysis was conducted on the variables. The results are shown in Table 5 with the factor intercorrelation matrix in Table 6.

The factor analysis shows that when the degree of frustration is low, scores on CCSF approaches to teaching, motivation and pride are high. When ITTF scores are high, so too are anxiety and embarrassment scores.

Cluster analysis

As a means of analysing the relations between emotions in teaching and approaches to teaching for individual teachers, a cluster analysis was conducted with the aim of identifying subgroups of teachers where the similarities in their experiences within groups, and the differences in their experiences between groups have been maximised. The seven variables were subjected to a Hierarchical Cluster analysis using Ward's method (see Seiffert 1995). The analysis resulted in two clusters based on the increasing value of the Squared Euclidean Distance between clusters. An ANOVA to compare variable means and z -score means was then used to determine the significance of the between-groups contrasts. The results are shown in Table 7 by scale score mean and standard deviation, and scale z -score mean and standard deviation for each cluster. The differences between cluster 1 and cluster 2 scores for each variable are statistically significant at $p < 0.001$ for all seven variables.

Table 5 Rotated factor loadings (pattern matrix) for 2 teaching approaches and 5 emotions in teaching variables

	Factor 1	Factor 2
CCSF	0.50	-0.33
ITTF	0.06	0.73
Pride	0.78	0.15
Motivation	0.85	-0.16
Anxiety	-0.34	0.63
Embarrassment	-0.07	0.74
Frustration	-0.74	0.13

Table 6 Factor intercorrelation matrix for two factor solution

Component	1	2
1	-0.87	0.49
2	0.49	0.87

Table 7 Summary statistics of the two-cluster solution for emotions in teaching and approaches to teaching variables ($N = 175$)

Variables (Scales)	Cluster 1 ($N = 84$)				Cluster 2 ($N = 91$)			
	<i>M</i>	<i>SD</i>	<i>M</i> (z-score)	<i>SD</i> (z-score)	<i>M</i>	<i>SD</i>	<i>M</i> (z-score)	<i>SD</i> (z-score)
CCSF	4.20	0.56	0.42	0.91	3.70	0.57	-0.39	0.93
ITTF	2.72	0.65	-0.39	1.05	3.18	0.50	0.36	0.81
Pride	4.37	0.64	0.35	0.97	3.92	0.61	-0.33	0.92
Motivation	4.57	0.38	0.52	0.63	3.98	0.62	-0.48	1.04
Anxiety	1.43	0.37	-0.67	0.50	2.38	0.71	0.61	0.95
Embarrassment	2.43	0.83	-0.54	0.93	3.36	0.69	0.50	0.77
Frustration	1.73	0.69	-0.40	0.93	2.31	0.69	0.37	0.92

$p < 0.001$ for all variables

The cluster analysis identified statistically significant contrasts ($p < 0.001$) between the two clusters on all seven of the approaches to teaching and emotions in teaching variables, and shows coherent internal relations in each cluster of the sort expected with positive and negative emotions. It identified a group of 84 teachers (cluster 1), who reported that on average they experienced relatively more positive emotions (Motivation, $M = 4.57$, $SD = 0.38$ and Pride, $M = 4.37$, $SD = 0.64$) less negative emotions (Anxiety, $M = 1.43$, $SD = 0.37$; Embarrassment, $M = 2.43$, $SD = 0.83$ and Frustration, $M = 1.73$, $SD = 0.69$); who also tended to adopt more characteristics of a Conceptual Change/Student-focused approach to teaching ($M = 4.20$, $SD = 0.56$) and less of an Information transfer/Teacher-focused approach ($M = 2.72$, $SD = 0.65$). Compared with teachers in cluster 1, the second group of 91 teachers (cluster 2) reported the opposite on all variables. They experienced relatively less positive emotions (Motivation, $M = 3.98$, $SD = 0.62$ and Pride, $M = 3.92$, $SD = 0.61$) higher negative emotions (Anxiety, $M = 2.38$, $SD = 0.71$; Embarrassment, $M = 3.36$, $SD = 0.69$ and Frustration, $M = 2.31$, $SD = 0.69$); and they tend to adopt more characteristics of an Information Transfer/Teacher-focused approaches

to teaching ($M = 3.18$, $SD = 0.50$) and less of a Conceptual Change/Student-focused approach ($M = 3.70$, $SD = 0.57$).

The internal relations within a cluster are illustrated in the z -score means. In cluster 1, CCSF, Pride and Motivation variables have positive mean z -scores, while ITTF, Anxiety, Embarrassment and Frustration scales have negative mean z -scores. CCSF approaches to teaching are associated with higher motivation and pride, and lower anxiety, frustration and embarrassment. Cluster 2 shows that ITTF approaches are associated with higher anxiety, frustration and embarrassment, and lower motivation and pride.

A discriminant analysis was used to assess the degree to which the emotions variables discriminate between the clusters. The one discriminant function was statistically significant (Wilks' lambda = 0.41) with structure loadings as follows: anxiety (0.69), embarrassment (0.51), motivation (-0.48), frustration (0.35) and pride (-0.16), and group centroids of -1.25 (CCSF) and 1.16 (ITTF).

Discussion and conclusions

The results from the correlation, factor and cluster analyses show that there are relations between the self-reported approach to teaching adopted by university teachers in teaching one of their courses, and the nature of the emotions that they describe experiencing in the teaching of that course.

All three analyses also show that teachers' experiences of positive emotions (motivation and pride) are positively associated with the adoption of more of a conceptual change/student-focused approach to teaching. Similarly, the experiences of negative emotions (anxiety and embarrassment) are positively associated with the adoption of more of an information transmission/teacher-focused approach to teaching. The correlational and factor analyses indicate first, that there are no strong relations between the positive emotions scales and ITTF approaches, and second, that lower frustration is associated with higher CCSF approaches to teaching scores.

The cluster analysis, in which individual teacher's responses are grouped according to similar structure of relations between variables and contrasted with other similar structures of relations confirms, and extends to multiple interacting variables, the conclusions from the correlational and factor analyses. Coherent internal relations between all seven variables of the sort hypothesised are found. For example, teachers who report, on average, relatively high positive emotions scores also report relatively high CCSF approach to teaching scores, and the same teachers have relatively low negative emotions scores and ITTF approach scores. In the same sample another group of teachers who report experiencing relatively high negative emotions in teaching also report a relatively high ITTF approach to teaching scores, and low CCSF and positive emotions scores.

While previous research has shown that university teachers do experience positive and negative emotions in teaching and that they are dealing with all three dimensions of emotional labour (Gates 2000; Zhang and Zhu 2008) there is little evidence from these studies on the ways that the emotional experience may relate to teaching practice, other than in the desire to reveal positive rather than negative emotions to students. It is difficult to see how meeting the demands of the requirements of emotional labour (surface acting, deep acting and authenticity) could be unrelated to teaching thoughts and actions, but the question that has remained unanswered from previous research in higher education is whether the relations are systematic.

The results described in this study suggest that there are systematic relations between the ways teachers emotionally experience the context of teaching and the ways they approach their teaching. The teachers who describe higher levels of emotions such as pride and motivation and lower frustration are the teachers who also describe their teaching in terms of a focus more on what the student is doing and experiencing. When anxiety or nervousness are experienced at relative higher levels, teachers are more likely to report adopting approaches to teaching that are based around the “safety” of teaching through transmitting their knowledge to students, and when embarrassment is reported at higher levels, teachers also describe using more teacher-focused methods. When frustration is reported at lower levels, teachers report using methods that involve engagement with students.

Evidence from studies of novice university teachers supports the relations between anxiety and transmission approaches found here. Novice teachers are more likely to adopt approaches to teaching where the focus is on what they do and on how they organise the content of learning (McKenzie 2003). The same novice teachers are also more likely to be anxious and/or nervous than their more experienced colleagues (Boice 1992). Eysenck and Calco (1992) in studies on pre-tertiary teaching describe anxiety as being related to reduced success in solving classroom problems. Since classroom problems are more likely to be avoided using information transmission strategies, there is some confirmation from this study of that observation.

While the results from this study indicate that there is a relationship between the nature of the emotions that university teachers experience in their teaching and self-reported approaches to teaching adopted by them in teaching the same subject, this does not suggest causality. Previous studies of emotions (Derryberry and Tucker 1994; Ledoux 1996; Mesquita et al. 1997; Sutton and Wheatley 2003) do suggest that emotions can affect people's behaviour, but in teaching, the association between teachers' emotional experience and the approaches they adopt could also be bidirectional. Lindblom-Ylänne et al. (2006) have shown that teachers who adopt higher CCSF approaches are more satisfied with their teaching. The variations in interactions with students, and the higher levels of teacher learning from teaching during the use of teaching approaches that are more challenging to students may be associated with higher levels of positive emotions. But equally, the confidence gained from feeling positive about teaching may also lead to more courageous or risk-taking teaching, involving more engagement with students, more questioning of knowledge and more openness to discussion and debate—all of which are characteristics of a CCSF approach. Sutton and Wheatley (2003) note that teachers with more positive emotions might “generate more teaching ideas and strategies” (p. 338) which is also consistent with a CCSF approach and with the development of a greater range of teaching techniques (Gibbs and Coffey 2004).

Bi-directional explanations are also possible for the negative emotions scales and ITTF approaches. Viewing teaching as being mainly about what the teacher does is more likely to lead to embarrassment or anxiety if the plans do not work. Equally, a feeling of anxiety or embarrassment is likely to trigger the safety of transmission approaches.

Frustration, while being a negative emotion, is found in this study to be strongly negatively related to a CCSF approach rather than positively associated with an ITTF approach. Higher feelings of frustration are not found with higher ITTF scores, but lower levels of frustration are found with more student-focused teaching, or higher levels of frustration with reduced student engagement. Irritation and frustration were found by Gates (2000) to be generated by disturbances from students, such as talking to each other in lectures or complaining about their grades. Reducing the extent to which time is given to

working with students in discussions and questioning, while maintaining transmission approaches is understandable.

The academic staff in this study responded in quite different ways to the items on positive emotions than they did to negative emotions items. On average, agreement with the positive items was high, whereas with the negative emotions items, disagreement was high. The mean scale scores in Table 3 show that for the positive emotions (Pride and Motivation), average responses are over 4.0 on the 1–5 scale, and for the Anxiety and Frustration scales, mean scores are near or below 2.0. This suggests that the academic staff surveyed have feelings about their teaching that are more positive than negative. There are similarities in this outcome with the findings of Zhang and Zhu (2008) who, in their study of Chinese college instructors' emotional labour, found that the teachers engaged in deep acting and authenticity the most and surface acting the least. Deep acting and authenticity were found to be associated with more positive feelings.

The relations found in this study are significant, and to paraphrase the words of Sutton and Wheatley (2003, p. 345), finding such relations in teaching may help researchers and academic developers understand the complex reasons underlying the limited success of even well designed programs and the reasons new teaching strategies are often not adopted or even attempted. That there is difficulty in the transferability of educational innovations is not in doubt. The works by McKenzie et al. (2005) and Southwell et al. (2005) give considerable insight into why this may be so, including the effects of teaching conceptions and approaches. This study suggests that there may also be an affective reason. Teachers' emotional experience may be quite different to the affective context in which the innovation was conceived and implemented. Emotional contexts may be an additional factor to consider when seeking the effective dissemination of previously successful interventions. Before this can be expressed with more certainty, research is needed on different samples of university teachers in different contexts. More insights, particularly in relation to causality, could also be gained from further research when a combination of qualitative and quantitative methods is used.

Appendix: Emotions in teaching inventory items

1. I am motivated by my teaching role in this course.
2. I feel anxious when preparing learning activities for this course.
3. Teaching this course is boring.
4. When I finish a teaching session I feel really satisfied.
5. Getting students to engage with learning in this course is a frustrating experience.
6. I look forward to doing the work I do on this course.
7. When I think about teaching on this course I become panicky.
8. When I consider what students can do with what I have taught them I feel motivated.
9. I am embarrassed when my planned learning activities appear to fail.
10. I feel nervous when I ask students to do the learning activities in this course.
11. I am proud of the way I am teaching this course.
12. I am usually sure that things are going well in the teaching of this course.
13. I get a feeling of pride as a result of my work on this course.
14. I generally feel confident that I will assess students well in this course.
15. When I get teaching activities wrong in class I feel embarrassed.
16. If something I design hasn't worked in class I feel annoyed.

17. Explaining well a key concept in this course makes me feel happy.
18. Asking students to engage in discussions in lectures makes me feel anxious.
19. I feel proud of the way I prepare for my teaching in this course.
20. Trying to teach students in this course is a frustrating experience.

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