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A cross-cultural study of teacher perspectives on teacher roles and adoption of online collaborative learning in higher education

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This study aims to understand teachers' perspectives on their roles in higher education, their views about the adoption of a social-constructivist approach to teaching and learning and the integration of online collaborative learning in blended learning environments in higher education from a cross cultural perspective. We interviewed 60 Chinese teachers from Beijing Normal University and Capital Normal University in Beijing, China and 30 Flemish teachers from Ghent University in Flanders, Belgium. The results revealed differences as well as specific similarities in perspectives between the Chinese and Flemish university teachers. The cultural and educational context is taken into consideration when discussing the results.

Keywords: teacher perspective; online collaborative learning; social constructivism; teacher roles; cultural context

Introduction

During the last two decades, many initiatives to modernise education and to optimise student learning have been studied. These studies involve collaborative learning, problem-based learning, task-based learning, asynchronous group discussions, etc. The innovations are heavily influenced by constructivist learning principles since they stress learning as an active, constructive process in which the learner builds an internal representation of knowledge and a personal interpretation of experience (Bednar et al. 1992). Additionally, there is strong emphasis on collaboration between learners and with practitioners in society (Lave and Wenger 1991; McMahon 1997). The introduction of information and communication technologies has made it possible to implement these principles in innovative electronic learning environments. The social-constructivist view has also heavily influenced the pedagogical dimension of e-learning, whereas initial e-learning focused on the 'delivery' of content. Kirschner and Paas (2001) propose that computer-supported collaborative learning (CSCL) environments can be considered as social-constructivist learning environments that form the present and the future of learning.

The adoption of e-learning is not just about technology. The adoption of instructional strategies is closely related to teachers' perceptions of their roles and perspectives about teaching and learning (Robertson 2004). Zemsky and Massy (2004) report that one of the main reasons for e-learning adoption in tertiary education is related to the adopters' teaching principles. They also point out that active learning and new roles for teachers and students are the necessary components of the innovation adoption cycle. Furthermore, teachers' perspectives, views and perceptions are linked to the specific cultural contexts where the teaching and learning takes place (Ramsden 2003).

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The question arises whether the implementation of an innovation is in line with teacher views, perceptions and perspectives on teaching and learning, and whether an innovation is compatible with the sociocultural values of the adopters. This is of importance since the actual adoption of the innovations does not always seem to be successful, or remains rather limited.

In this study we aim to investigate and understand teachers' perspectives on the social-constructivist approach to teaching and learning, their perceptions of teacher roles, and their views about the application of online collaborative learning. In doing this, we contrast teachers from Chinese and Flemish (Dutch-speaking part of Belgium) cultural and educational contexts.

Theoretical background

Chinese and Flemish cultural and educational context

Culture shapes people's values, perceptions and behaviour (Berry et al. 2002). It serves as a perceptual framework that guides the interpretation of interactions and the construction of meanings (Cortazzi 1990). Previous research points out that individualist and collectivist cultures not only influence people's different senses of self, but also their cognitive processes (Triandis, McCusker, and Hui 1990). In individualist cultures, people tend to be more direct in speaking out, questioning or being confrontational; whereas in collectivist cultures, people tend to avoid conflict and use more intermediaries. The former indicates a higher respect for individuality and the latter a higher respect for authority. The Flemish culture is situated in a western setting, which is more individualist, while previous studies identified that the Chinese culture, as part of the Confucian-heritage cultures, is traditionally a representative of a collectivist culture (Baron 1998; Hofstede 1986). However, attention should be paid that some cultures that are traditionally collectivist have been shifting towards individualist tendencies, and some individualist cultures also have collectivist qualities (Triandis, McCusker, and Hui 1990). Besides the 'collectivism versus individualism' dimension, 'power distance' (high versus low) is another important cultural dimension, which specifies the degree to which less powerful people in a society accept inequality in power. Previous research indicates that in high power distance cultures, students tend to be more passive and may be reluctant to participate in communicative activities as they are not used to speaking in front of their superiors (Ryan 2000). Former studies put forth that Chinese culture is higher on power distance compared to many western countries (Hofstede and Bond 1984); however, in the last two decades, a mixture of cultural values have been developed in China. Therefore, a study of the current cultural and educational contexts, including the power distance between teachers and students, and the collectivist and individualist dimension, can be very helpful for understanding teacher roles, and teachers' perspectives about teacher–student interaction and peer collaboration.

Teacher roles

In research about modern approaches to teaching, the distinction is often made between teacher-centred orientation and student-centred orientation to teaching (Kember 1997). This shift from teacher-orientation to student-orientation originates

from ideas in constructivism (Ertmer and Newby 1993). Central in this transition is the role of students and teachers. Students are expected to actively construct their knowledge, and the teacher role is to stimulate the construction of powerful knowledge (Harris and Alexander 1998). Grasha (1994) studies five teaching styles that actually reflect five different roles of teachers in the teaching and learning process: expert (transmitter of information); formal authority (sets standards and defines acceptable ways of doing things); personal model (teaches by illustration and direct example); facilitator (guides and directs by asking questions, exploring options, suggesting alternatives); and delegator (develops students' ability to function autonomously). In the teaching and learning environment, teacher roles towards students or the interaction models between teachers and students are a central issue. Therefore, in this study, we adopt the teacher role as the main concept and investigate how teacher perceptions of their roles would be associated with their adoption of educational innovations.

The adoption of specific teacher roles in the instructional process may facilitate or hinder students' ability to acquire content and skills. Among the five teacher roles presented by Grasha (1994), it is suggested that instructors adopting the social constructivist approach would adapt to the role of a facilitator or delegator, and would be less likely to play the role of an authority, an expert or a model (Bauersfeld 1995). The new framework for teaching competencies proposed by Tigelaar et al. (2004) stresses that teachers should be experts on content knowledge, as well as facilitators of learning processes, organisers, and scholar/lifelong learners. The shift from being a teacher who gives a didactic lecture to a facilitator or delegator who helps the learner to develop his or her own understanding of the learning content implies that a facilitator or a delegator needs to display a totally different set of skills than an information or knowledge transmitter (Gamoran, Secada, and Marrett 2000).

It has to be noted that almost every teacher adopts different roles to varying degrees. In different cultural contexts, there are common features of teacher roles, while at the same time a different emphasis can be laid or additional roles are played. Teacher roles can be generally related to two conceptions of teaching and learning (Cortazzi 1990). One perception views them as hierarchical, positioning the teacher as all knowing and his/her knowledge as being transmitted directly to learners. Another perception views the relationship between the teacher and students as more egalitarian. Previous research has often associated the first perception with high-context cultures, such as the Chinese culture, in which teachers are *authoritarian* (Cortazzi 1990). The latter perception is often linked to low-context cultures that emphasise individual development, innovation and an egalitarian ambiance (McClure 2003). Cortazzi (1990, 58) stresses that both perceptions 'are present in most cultures but receive very different emphasis, with the result that varied expectations come about, affecting presuppositions about learning and teaching'. In the Chinese context, Chinese students are expected to 'respect the teacher's authority without preconditions' (Wang and Mao 1996, 148). Besides their *authority* and *expert* roles, teachers also seem to take up some additional roles, such as a 'parent' role (Wan 2001). This parental role makes the teacher–student relationship appear not as cold or authoritarian as it at first appears (Cortazzi and Jin 1996). Moreover, teachers are expected to act as *models*, and relate students' intellectual development to their moral and personal development (Gao and Watkins 2002). In contrast to the western context, the

Chinese student–teacher relationship seems not to be limited to the classroom and the academic work of that arena (Pratt et al. 1999).

Teacher perspectives on the social-constructivist approach to teaching and learning and the adoption of online collaborative learning

Based on phenomenographic research, an abundant literature is now available about teacher conceptions of teaching and learning (for example, Martin and Ramsden 1994; Trigwell and Taylor 1994). Conceptions of teaching and learning can be placed on a continuum between a *teacher-centred/content-oriented* pole, and a *student-centred/learning-oriented* pole (Kember 1997). Conceptions in relation to the former position are in line with objectivist traditions that stress the transmission of knowledge (Valcke et al. in press). Conceptions in relation to the latter position are compatible with educational innovations based on constructivism and social constructivism. Social constructivism emphasises that individuals make meaning through interactions with each other, thus emphasising the importance of the interactions between student and instructor, and between students (Duffy and Jonassen 1992). Previous research clearly shows that teacher conceptions are reflected in their teaching practices (Jonassen et al. 1995). Therefore, we expect that the adoption of educational innovations can only take place when they are congruent with specific teacher conceptions.

Online collaborative learning allows learners to share multiple perspectives, and to develop critical thinking skills through the process of judging, valuing, supporting, or opposing different viewpoints (Stacey 1999). This is also in tune with criteria to achieve meaningful learning (Löfström and Nevgi 2007). Previous studies provide clear evidence about the beneficial impact of collaborative learning in face-to-face learning settings (Slavin 1996). Recent studies also give growing evidence about the beneficial effect of learning in CSCL settings (Schellens and Valcke 2005).

Building on the earlier discussion about teacher perspectives on teaching and learning, the question is how are these perspectives related to the adoption of e-learning and CSCL. Teacher perceptions of the instructional innovation influence the success of teaching and learning in a new learning environment (Simplicio 2004). Therefore, it is important to find out how teachers think about teaching innovations and what factors influence their perspectives and innovation adoption (Könings, Brand-Gruwel, and van Merriënboer 2007).

Research questions

This study investigates how teachers – working in two different cultural and educational settings – perceive their teacher roles, the social-constructivist learning principle, and their willingness to adopt online collaborative learning. More specifically, the research questions are:

(1) Are there differences in the cultural environment specifically related to teaching and learning?
(2) Are there differences between Chinese and Flemish teachers regarding their perspectives on teacher roles, the social-constructivist approach to teaching and learning, and online collaborative learning?
(3) What factors are related to teachers' adoption of innovations?

Research design

Participants

The participants in the study consisted of 60 teachers working at Beijing Normal University or Capital Normal University in Beijing, and 30 teachers at Ghent University. Participants were volunteers, but an attempt was made to select a representative sample in terms of gender and age. The educational backgrounds of the teachers are similar. Almost all teachers (professors, associate professors and lecturers) hold a PhD degree in psychology or educational sciences. The mean age of Chinese teachers was 39 years (SD = 7.95), and the mean age of Flemish teachers was 41 years (SD = 9.52). The samples were well distributed in terms of gender and age (Table 1). Both interview data and quantitative data were collected from the participants. All teachers teach at least one course for undergraduate students in educational sciences, and some teach both at undergraduate and postgraduate level. The study focused on their teaching position at undergraduate level.

Interviews

The interviews with Chinese and Flemish teachers were organised during four months in Beijing and in Ghent separately. All interview questions were semi-structured and open-ended. The interview questions were designed by the three researchers of this study. The first author acted as the interviewer in both settings. The interview questions focused on teacher perspectives on educational innovations (especially in relation to the use of e-learning format) in higher education, teacher roles, perceptions of teaching and learning relating to the social-constructivist paradigm, and their perspectives in relation to online collaborative learning. When a certain question was not well understood by the interviewee, more explanation was given by the interviewer. All teachers were interviewed individually. Each interview lasted for about 45 minutes to one hour. Often additional questions were asked to clarify related issues or to explore unique experiences of the interviewees. Informed consent was obtained from the participants to record the interview. All teachers were asked to answer the questions while building on their experiences with a particular course they teach at undergraduate level.

Questionnaires

All participants filled out the Cultural Environment Survey and the Teaching Style Inventory. The Cultural Environment Survey is a 10-item questionnaire based on the

Table 1. Number of participants in the study in relation to their background characteristics.

	Flemish	Chinese
Total participants	30	60
Female	13 (43%)	32 (53%)
Male	17 (57%)	28 (47%)
Number of teachers ≤ *M*	16 (53%)	35 (58%)
Number of teachers > *M*	14 (47%)	25 (42%)

Note. *M* = mean age.

inventory adopted by Wang (2004) that was used to analyse cultural factors in an online learning environment. Wang used the Socio-Cultural Environment Scale of Jegede and Okebukola (1990) as a reference for designing the questionnaire. The Jegede and Okebukola questionnaire includes 30 items, reflecting five subscales: authoritarianism, goal structure, African worldview, societal expectation, and sacredness of science. The inventory used by Wang included 25 items, reflecting five dimensions: power-distance, collectivism versus individualism, femininity versus masculinity, uncertainty avoidance, long-term versus short-term time orientation. Reviewing the relevant literature studying the cultural and contextual factors relating to learning environments (Moos 1979; Okebukola 1986; Hofstede 1984; Fisher and Waldrip 1999), we identified three key conceptual constructs that are closely linked to teacher–student and student–student interactions: power distance, collaboration and competition. Therefore, we adopt these three key constructs for the purpose of this study. From the Cultural Environment Inventory of Wang (2004), we used the items reflecting the selected three constructs. The collaboration and competition dimensions come from the collectivism and individualism dimensions. Furthermore, minor language modifications were made for the Chinese and Flemish versions applied respectively. A confirmatory factor analysis confirmed the three-factor constructs ($GFI > .91$, $X^2/df < .28$).

We applied the Teaching Style Survey developed by Grasha and Riechmann-Hruska (1990) reflecting five scales that centre on specific teacher roles: expert, authority, personal model, facilitator and delegator. All 40 items from the original instrument were used, with only minor language adaptations when translated into Chinese and Flemish respectively. When filling out the instruments, teachers were asked to reply to the items by reflecting on their experiences with a particular undergraduate course. Questionnaire items required respondents to indicate on a five-point scale to what extent they agree/disagree with this item. The questionnaire was administered before the face-to-face interview to avoid possible bias. In Tables 2 and 3 we report reliability indices of both questionnaires and present some sample items.

Data analysis

Interview data were analysed with a qualitative data analysis software ATLAS.ti 5.2. The analysis was based on the transcripts of the interviews from audio recording. A content analysis approach was adopted to analyse the responses to the open-ended questions in the semi-structured interview. Interview responses were coded to find

Table 2. Reliability indices of the Cultural Environment Survey.

	Number of items	Sample items	Cronbach's alpha
Power distance teacher–student	4	Students should accept the statements and ideas of the teachers and question them only under special circumstances	.79
Collaboration	3	Students should cooperate in groups during course activities	.76
Competition	3	I encourage individual competition during course activities	.74

Table 3. Reliability indices of the Teaching Style Survey.

Teacher's role	Number of items	Sample items	Cronbach's alpha
Expert	8	Facts, concepts, and principles are the most important things that students have to acquire	.70
Authority	8	I set high standards in this class	.75
Model	8	What I say and do 'models' appropriate ways for students to think about the course content	.76
Facilitator	8	Small group discussions are adopted to help students to develop their ability to think critically	.80
Delegator	8	Students in this course are engaged in self-initiated and self-directed learning experiences	.71

'themes' that represent the central ideas in the teachers' responses. The themes were defined based on the major concepts mentioned by the teachers, for example, 'factual knowledge is important', 'distances between professors and students are smaller than before', 'teaching is not transmission'. Based on the major themes, a code is given to an analysing unit (often a sentence or an extended sentence). Coding continued until a saturated list of themes was attained. Based on these codes, a higher order code was given corresponding to our research questions, e.g., 'supporting the social-constructivist approach'. The coding of the transcripts was conducted by three independent coders. The per cent agreement between the raters reached .88.

The analyses focused on variations in responses between the two cultural groups, between male and female teachers, and between 'younger' and 'older' teachers. Quantitative data were analysed on the basis of descriptive statistics, *t*-tests, and correlation analyses.

Results

Cultural dimensions in the teaching and learning environment

Based on the survey, Chinese and Flemish teachers' perspectives on power distance, collaboration and competition were analysed. The results show that *power distance* between teacher–student and *student collaboration* appear to be similar between the two cultural groups ($p > .05$). However, compared to the Flemish teachers, Chinese teachers put more emphasis on *competition* among students ($p < .001$).

Table 4. Cultural Environment Survey: Flemish and Chinese teacher perspectives.

	Chinese faculty[a]	Flemish faculty[b]	
	M (σ)	*M* (σ)	*p*
Power distance teacher–student	3.25 (.73)	3.22 (.70)	.43
Collaboration	4.33 (.48)	4.29 (.51)	.36
Competition	3.80 (1.04)	2.21 (1.10)	<.000

Notes. (a) n = 60; (b) n = 30.

Based on the interview data, we found that 14 out of 60 Chinese teachers stressed that they encourage competition among students. As one teacher stated, 'our traditional *collectivism* is under the pressure of competition'. Although many Chinese teachers agreed that 'collaboration among students is very important', some commented that 'our educational system has been fostering competition all through primary and secondary education. How can students cooperate now?' A teacher who has implemented online learning said, 'I support student collaboration. But the real implementation among students is not so good. Some students prefer to finish the assignments individually'.

On the contrary, none of the Flemish teachers said they support competition among students. Most of them support student collaboration, as one teacher stressed: 'collaboration is important, it helps students understand the contents and principles'. Regarding their perspectives on power distance, more Chinese teachers agree that students should accept what the teacher presents in class. However, after the class, Chinese teachers seem to have a closer 'friendship' with the students. The latter seems to have mitigated the distance between Chinese teachers and students. One Chinese teacher put it in this way, 'in knowledge transmission, teacher should play a central and leading role; in helping students develop as a person, teacher is also a friend'. Flemish teachers, more often than the Chinese teachers, say that they do not impose their ideas on students and allow/encourage students to question them. 'I work with students', one Flemish teacher said.

Teacher perspectives on teacher roles in higher education

The survey results show that Chinese teachers stress to a larger extent the teacher as an expert, an authority and a model as compared to Flemish teachers ($p < .01$). There are no significant differences in the perception of the teacher's role as a facilitator, or a delegator between the two cultural groups ($p > .05$). In both cultural settings, 'older' teachers (> mean age) stress to a larger extent the expert and authority teacher roles ($p < .05$). There are no differences in age regarding the facilitator role. No significant differences are found between male and female teachers in either Chinese or Flemish teachers.

The additional interview data are helpful to document these analysis results. More details were obtained as to how teachers understand these roles and what additional roles they play in different contexts. Authority and expert roles are important roles for Chinese teachers. According to them, 'a teacher needs to be an authority in the

Table 5. Perception of teacher roles in Chinese and Flemish university settings.

	Chinese faculty[a]	Flemish faculty[b]		
	M (σ)	*M (σ)*	*t*	*P*
Teacher as an expert	4.10 (.39)	3.55 (.36)	5.87	<.000
Teacher as an authority	3.90 (.48)	3.41 (.49)	4.26	<.001
Teacher as a model	4.02 (.51)	3.56 (.47)	3.74	.002
Teacher as a facilitator	3.65 (.50)	3.63 (.49)	1.35	.43
Teacher as a delegator	3.52 (.44)	3.59 (.53)	1.36	.41

Notes. (a) n =60; (b) n = 30.

knowledge domain'; 'a teacher needs to be knowledgeable in his/her teaching subject'. As to the facilitator role and delegator roles, Chinese teachers support that a teacher should facilitate the learning process of students. This is similar to the perspective of their Flemish counterparts. However, there might exist some slightly different meanings between Chinese and Flemish teachers. For example, close to the facilitator role, many Chinese teachers refer to their role as a 'guide', who gives guidance and offers help to students during their learning process; while Flemish teachers quite often refer to their role as a 'coach', facilitating, supervising and helping students. Some Flemish teachers also referred to supporting students by meeting the different needs of individuals and groups. Additionally, Chinese teachers also stressed their role as a 'friend' who gives students help and advice in view of their personal development and life.

Both Chinese and Flemish teachers stressed the adoption of different roles depending on the course objectives, student capabilities, class size, etc. However, we found that the teachers seem to view student capabilities differently. For example, many Chinese teachers mostly view the first and second year students as not capable of independent thinking, thus teachers are more likely to play the *expert* and *formal authority* role; and they are more likely to adopt the role of a *facilitator* and *delegator* for advanced undergraduates and master students. This tendency was less obvious among the Flemish teachers. Possibly for this reason, we found that Flemish undergraduates are more often requested to work on cases, projects and papers compared to the Chinese undergraduates.

Teacher views on the social-constructivist approach to teaching and learning

In both the Chinese and Flemish contexts, teachers can be classified into three categories as to their views about the adoption of a social-constructivist approach to teaching and learning and the application of these principles in actual practices:

- Teachers supporting the social-constructivist principles and applying them in teaching practices in an extensive way.
- Teachers supporting the social-constructivist principles but applying them in teaching practices in a limited way.
- Teachers doubting the social-constructivist principles and as a consequence hardly applying them.

The majority (24 out of 30) of the Flemish teachers support the social-constructivist principles and say they apply them extensively in their teaching practice. Some teachers support the social-constructivist principles, but apply these in a limited way. Only one Flemish teacher doubted the relevance of the social-constructivist principles.

A small number (9 out of 60) of Chinese staff support the social-constructivist principles and apply it extensively during teaching. About half of the Chinese teachers expressed agreement with the social-constructivist principles, but they apply them only in a limited way due to the nature of the class, the teaching subject, etc. The remaining proportion of staff stated they do not consciously consider these principles and are comfortable with their conventional lecture-based approach. A few of them expressed doubt about the social-constructivist approach.

We shall now discuss some interview responses of the Chinese and Flemish teachers that reflect their understanding of the social-constructivist approach to teaching and learning and how they apply it in educational practices.

Talking about the social-constructivist principles, one Flemish teacher stated: 'I fully support it. I consciously pay attention to it when preparing the content of the course, and help students when needed… All knowledge is constructed; this includes personal construction and social construction'. As to the application of it, one Flemish teacher said: 'I leave them to read, explore, research, and work together'; 'I give new directions and involve students in discussions'. Other teachers expressed similar support: 'discussions can help students to understand that there are not just one solution, and bring to them more perspectives'; 'peer cooperation is very important, students can construct knowledge from peer interaction'. As to the practical restrictions that limit their actual application, one Flemish teacher put forth: 'I'm in favour of small group collaboration. But there are problems to invite students to discuss. Teachers should design, organise and synthesise the discussed topics'. Other teachers added: 'it is difficult to implement with more than 300 students'; 'it is a demanding task to monitor all the discussions'.

Among the Chinese teachers, a few of them expressed direct agreement with the construction of knowledge via social interaction, and about half of the respondents expressed agreement with collaborative learning modes, without directly referring to the social-constructivist principles. Despite the theoretical support, they expressed concerns as to the practical limitations in teaching practices. According to one Chinese teacher, 'the implementation of these principles in educational practices is rather limited; constructivism is mainly related to educational theories or policies; it is not widely supported in teaching practices'. One of the main reasons for doubting social-constructivism put forward was: 'Undergraduate students, especially in their first two years, hardly master the knowledge base to be able to be involved in a social-constructivist approach to learning. It is therefore the teacher's responsibility to provide them with the knowledge base'. Another reason put forth by one teacher was: 'students can be wrong, teachers need to guide them'.

Although the Flemish teachers did not seem to echo the same concern, both Flemish and Chinese teachers rendered the nature of the class such as large class size, teaching subjects, limited infrastructure (e.g., classroom layout), student interests and perceptions (e.g., towards group work) as restrictions for applying the principles in teaching practices. Compared to the Flemish counterparts, the Chinese teachers seem to face a bigger gap between their theoretical beliefs and teaching practices. Some of the constraints seem to be related to the educational and cultural context, as some Chinese teachers mentioned: 'students are tied up with exams; some students do not like spending time to discuss things, they want to know the conclusion; they aim for high exam scores'; 'some students think that discussion is not meaningful, it is a waste of time'; 'they are used to work individually, due to the influences they got from primary and secondary schools'; 'task based learning activities or discussions do not always interest them', therefore, 'when I face reluctance from students in participating in group activities such as discussions, I opt for the lecturing mode'.

Additionally, differences were found between 'younger' and 'older' teachers in the Chinese cohort. Younger teachers are more in favour of the social-constructivist learning principles. But there appears to be no linear relationship between teacher perceptions and teacher's age. Nevertheless, we observe that teachers carrying

objectivist assumptions and beliefs about teaching and learning are less willing to adopt a social-constructivist approach in their teaching practice. No differences were found between the 'younger' and 'older' group in the Flemish cohort.

Adoption of online collaborative learning

Teachers can be classified into three categories as to their adoption of e-learning and online collaborative learning in blended learning environments:

- Teachers actually adopting online learning, including collaborative learning.
- Teachers adopting e-learning but not online collaborative group work.
- Teachers not adopting e-learning.

The number of e-learning adopters and non-adopters in both contexts is summarised in Table 6. In the Flemish context, Ghent University has implemented university-wide the Minerva e-learning system. Most teachers use this e-learning platform at least for course management and distribution of teaching materials. This results in a nearly full adoption of the e-learning environment by the interviewed Flemish staff. In addition, about one third of the staff also adopt online collaborative learning. The main reasons for the other staff not adopting online collaborative learning are related to lack of time and resources, lack of knowledge and experience on how to organise and monitor online group work.

In the Chinese context, an e-learning platform is available in both universities where we conducted this research. However, there is no university-wide implementation and its use is not required. Only about one third of the interviewed Chinese staff uses the e-learning platform, among them only five teachers adopt online collaborative learning. A majority of the Chinese teachers has thus far not adopted e-learning.

The main reasons for non-adoption are illustrated by quoting some teachers from each cultural context:

(1) Lack of time and resources: 'It would take much time for updating and supervising student online collaborative work. I'm already overwhelmed by the existing workload. I don't have teaching assistants' (Flemish professor).
(2) Practical constraints: 'The class size is too big, and the average (knowledge) level of students is very different' (Flemish professor).
(3) No experiences on how to organise and monitor student online work: 'There are professors who are more familiar with organising and monitoring student online group work, but I am not very familiar with this' (Flemish professor).

Table 6. The number of e-learning adopters and non-adopters among Chinese and Flemish faculty.

	E-learning adopter			
	E-learning adopter without online collaboration	Online collaboration adopter	E-learning non-adopter	Total
Chinese faculty	15	5	40	60
Flemish faculty	21	8	1	30

(4) No need for innovation: 'The current teaching and learning methods are working very fine. I don't see any need or incentive to adopt an online approach' (Chinese professor).
(5) Lack of institutional incentives: 'Investing more time in maintaining online learning and mentoring online group work are not included in teacher performance assessment. If the university or faculty requires teachers to do so, I will do it' (Chinese professor).
(6) Lack of technical skills and training: 'I am not good at using computers. I type slowly' (Chinese professor).
(7) Sceptical about online interaction and communication: 'I don't trust computers, especially "online chat". Students are often distracted online' (Chinese professor); 'I don't like to distribute lecture slides, so I would not put it online' (Chinese professor); 'I prefer face-to-face discussions than online discussions. It is more direct and the students get feedback immediately' (Chinese professor).

Adoption of innovations: teacher and contextual variables

First of all, the correlation between cultural environment and the perceptions of teacher roles was analysed (Table 7). The correlation analysis results show that teachers who perceive *power-distance between teachers and students* to a larger extent are more likely to take up the roles as an *expert* and an *authority*. Teachers who score higher on *student collaboration* perceive to a larger extent the roles as a facilitator and a delegator. The perception of *competition* is positively associated with the perceptions of the five roles. This seems to imply that no matter what type of roles the teacher takes, *competition* is very much present in the learning environment.

Furthermore, based on the interview data, several teacher and contextual variables are listed that are related to teachers' adoption of e-learning and online collaborative learning (Table 8). We found that teachers in favour of collaboration and the facilitator/delegator roles tend to be more willing to adopt the online collaborative learning approach. Teachers who are supportive of the social constructivist learning principle also tend to be more willing to adopt teaching innovations. This shows that teachers' perceptions on teaching and learning are critical to the adoption of online collaborative learning. Other teacher and contextual variables also emerged to be relevant. It is found that teachers who expressed a need or interest in innovation and willingness to

Table 7. Correlation between the cultural environment and teacher roles of Chinese and Flemish staff.

	Expert	Authority	Model	Facilitator	Delegator
	Pearson correlation (R)	Pearson correlation (R)	Pearson correlation (R)	Pearson correlation (R)	Pearson correlation (R)
Power distance teacher–student	.312*	.418**	*ns*	*ns*	*ns*
Collaboration	*ns*[a]	*ns*	*ns*	.435**	.582**
Competition	.440**	.464**	.481**	.554**	.342*

Notes. (a) ns = non-significant result; ** Correlation is significant at the 0.01 level; * Correlation is significant at the 0.05 level.

Table 8. Relationship between teacher and contextual variables and teachers' adoption of innovations in higher education.

	Innovation adoption	
Teacher and contextual variables	e-learning	online collaboration
Collaboration stressed in the learning environment		+
Teacher role as facilitator/delegator		+
Supportive of social-constructivist learning principles		+
Perceived need of innovation	+	+
Perceptions of student centered learning and active learning		+
Willingness to learn and invest time	+	+
Computer competence	+	
Sound infrastructure	+	
Institutional impetus (policy, etc)	+	
Training and support	+	

Note. + represents a positive relationship between the factors.

learn are more willing to adopt e-learning and an online collaborative approach. Teachers who use computers more frequently and are more familiar with computer/Internet technologies also expressed more interest in e-learning. Sound infrastructure, institutional incentives and relevant technical training are also considered important conditions for e-learning adoption.

Discussion and conclusion

This study examined Chinese and Flemish university staff perspectives on the cultural dimension in teaching and learning, their preferred teacher roles, their perceptions of social-constructivist principles and their adoption of e-learning and online collaborative learning. In general, specific differences and some similarities were observed between teachers in both cultural settings.

Cultural and institutional context

The findings suggest that social constructivism and the adoption of e-learning and online collaborative learning can be related to cultural differences. The results regarding student–teacher power distance seem to reveal no significant differences between the Chinese and Flemish context in teaching and learning. This seems not to be in line with the previous findings about Chinese culture that reflected a higher *power distance* compared to other low-context cultures (Hofstede and Bond 1984). This can be due to the different research contexts and the evolution in time due to the modernisation and globalisation process. The questions in this study are more specifically targeting the teaching and learning environment, instead of the broader cultural and societal scope. Furthermore, teachers in the Chinese educational context combine an *authority* relationship with *friendship* to the students; this could have narrowed the perceived distance between teachers and students. The unique relationship could be labelled as a 'hierarchical friendship' in the Chinese educational setting. The results seem to imply that the traditional cultural dimensions such as power distance, collectivism

versus individualism are not sufficient to differentiate teachers' perspectives on the specific cultural environment related to teaching and learning. Other cultural and contextual factors should be pursued in order to identify the possible differences that influence teaching and learning, such as the current educational system, institutional environment and socio-economic influences. Additionally, our results show that *competition* among students is promoted more in China as compared to the Flemish educational setting. Competition is in our research the only differential cultural dimension between Chinese and Flemish teachers. Entry into higher education in China is quite competitive, which brings a series of requirements to the teachers and students. The competitive nature of education in the Chinese system often forces teachers and students to adopt more teacher-centred methods. Many Chinese universities are undergoing a reform process in order to be better integrated in the international arena. However, there is still a long way to go to transform the actual teaching and learning practices.

The institutional environment also seems to influence teacher perspectives. Teachers from both the Flemish and Chinese universities report big challenges and pressure on research and teaching. In both settings, there is an evaluation system for academic staff. The Chinese teachers seem to be unhappier with the strictness and the evaluation approach of their institution. Therefore, many are rather unwilling to adopt any teaching innovation that is not included in the evaluation system. The learner-centered and social-constructivist learning approach has been more widely applied in the Flemish educational system. In the Flemish academic evaluation system, more emphasis is put on rewarding investments in educational activities and innovations.

Teacher roles in higher education

Our findings confirm previous claims that Chinese teachers are regarded as a model both of knowledge and morality (Jin and Cortazzi 1998). The teacher's authoritative role is clearly emphasized in the Chinese context (Paine 1990; Brick 1991; Cortazzi and Jin 1996). Nevertheless, the traditional teacher–student relationship is changing. In both cultural contexts, teachers consider it of importance to position themselves as 'facilitators' or 'delegators'. In addition, Chinese teachers more often refer to their role as a 'guide' who is more likely to play a guiding and leading role; on the other hand, the 'coach' role mentioned by the Flemish teachers refers to more of a supporting and supervising role.

The correlation results indicate a significant association between *competition* and the five specified teacher roles. This correlation could possibly indicate that no matter what kind of role a teacher plays, competition is very prominent in the Chinese educational environment. This could also imply that a teacher with a higher perception of competition is likely to play a variety of teacher roles or adopt different teaching approaches. This diversity of teacher roles has been found in the responses of many Chinese teachers.

Our results indicate that there are no significant differences between female and male teachers in their perceptions of teacher roles. This is not in line with previous findings that female teachers were less likely to play expert and authority roles and more likely to play facilitator and delegator roles than male teachers (Eagly and Karau 1991). In fact, many teachers point out that they adopt different roles, depending on the teaching objectives, student background, etc. Nevertheless, each role demands that

teachers have or are willing to acquire the skills to adopt related instructional strategies. In addition, Chinese and Flemish teachers also seem to view the first and second year students differently. For the Chinese first and second years, Chinese teachers consider the transmission of knowledge to be very important, and thus it is the teacher's job to *provide* and *transmit* theories and basic knowledge to them. However, this is not the case in the Flemish setting.

Adoption of instructional innovations: teacher and contextual variables in higher education

In western educational settings, many initiatives to modernise education and to optimise student learning have been implemented. Both constructivism and social constructivism have inspired these innovations that aim at the acquisition of high-quality knowledge, the development of problem-solving skills, and the promotion of self-directed learning, etc (Könings, Brand-Gruwel, and van Merriënboer 2005). In addition, many western universities also promote the adoption of e-learning and online collaborative learning.

The current innovation of university education in China focuses on structural reform or system reform and the adaptation of educational objectives (Ma 2005). The educational reform in China also drives university teaching to encourage students to more reflective thinking and active learning. This could explain why Chinese teachers think of the facilitator and delegator roles as similarly important to the Flemish teachers. However, instructional innovations in universities are conducted in a limited way. The traditional way of teaching that emphasises systematic knowledge transmission and teachers being authoritarian of the subjects they teach is still prevalent (Wang 2006). This is especially related to teachers' teaching principles, the way they were taught and their own learning behaviours (Gordona, Dembob, and Hocevarb 2007). Therefore, it is important for university teachers to articulate their theories and beliefs about teaching. In this respect, the literature clearly suggests that making teaching principles explicit is a necessary step before they can be critically evaluated by the teachers (Prebble et al. 2005, 60). When staff development programmes incorporate these articulation, reflection, and evaluation activities, they have the potential to transform teachers' conceptions about teaching and learning and related teaching practices.

Although e-learning platforms are available in both the Chinese and Flemish settings, the level of implementation is quite different. From the results, we see only about 8% of the Chinese faculty adopted an online collaborative learning mode; however, 27% of the Flemish faculty adopted this innovative mode. The general adoption of e-learning by the Flemish faculty reaches about 95%; however, the general adoption of e-learning is only about 30% among the Chinese faculty. Using Rogers' (2003) model of five stages in the innovation-decision process as a reference, it is clear that Chinese and Flemish faculty are situated at a different stage. The majority of Chinese teachers can be positioned at the first stage ('knowledge' level), and only a very small proportion at the 'implementation' stage, while others are still at the pre-stage ('no knowledge' level). A large proportion of Flemish staff already function at the 'knowledge' and 'implementation' stage. During the interview, we found that a few advanced teachers have reinforced the adoption of e-learning and online collaborative mode during the last decade in their career, and thus have reached the 'confirmation' stage.

The results of this study suggest that there is an association between the support for social-constructivist principles and emphasis on collaboration and the adoption of online collaborative learning. The teaching subject and class size are also considered relevant factors. Faculty members teaching application-oriented or reality-related subjects were more active in their adoption of online collaborative learning as compared to staff teaching general introductory and theoretical courses. Teachers in smaller classes more often embrace group work as compared to teachers responsible for larger classes.

Nevertheless, in both settings, the potential of online collaborative learning is still relatively under-exploited. This is in line with the findings of Elgort (2005) who points out that despite the wide use of ICT in university teaching, e-learning adoption has not reached its full potential. Besides the practical constraints, such as resources and time, teachers' perceived need of innovation is an important factor. Teachers who do not experience a concrete necessity to look for an innovation, hold to old teaching habits. This conforms to the position of Rogers (2003) that one of the factors that influence the adoption of innovations is whether or not the innovation meets a perceived need. Teachers' attitude towards online communication is another influencing factor. Previous studies shed light on the benefits of online asynchronous communication as it offers time to present a more measured and considered view (Ramsay 2005); however, these benefits were not recognised by all teachers. The results also echo previous findings that teachers who are eager to learn are more open for innovative teaching methods (van Eekelen 2005). Our results present to policy-makers and university administration some challenges for instructional innovations in higher education, among them a change of teaching principles, adapting teacher roles, stimulating the need to innovate and providing institutional support are critical.

Implications and limitations

One strength of this study is that it enriches previous studies that teachers' perspectives on teaching principles and teacher roles are deeply rooted in specific cultural contexts (Gao and Watkins 2002). More specifically, this study provides insights into the differences in higher education innovations that can be related to various cultural and contextual variables in China and Flanders. The results have clear practical implications to foster educational innovations, both in the Flemish and Chinese contexts. A critical list of factors – both at the micro-level of the staff and at the meso-level of the university organisation – affects a large-scale adoption. At staff level, we have to stress teachers' perceptions of the need for an innovation, their perceptions of teaching and learning (social constructivist principles). At meso-level, we have to stress the institutional policy, technical readiness, the available infrastructure, etc. The mixed design of this study with both quantitative and qualitative methods brings a deeper understanding of Chinese and Flemish teacher perspectives and can be a good basis for future research.

Our study has a number of limitations. Firstly, the number of teachers and universities involved in the research was limited. The results in this study could also be linked to the particular environment of the specific institutions. Future research should aim at involving more universities and more teachers in China and Flanders. Secondly, the use of the same questionnaire in two distinct cultures could impose potential biases. Therefore, we need to be cautious when generalising the results

generated from the questionnaires. The interpretation of the results from the questionnaires needs to be combined with the qualitative findings. Thirdly, the current study focused especially on the teacher perspectives. Future research could attempt to focus on the institutional level. Tondeur, Valcke and van Braak (2008) found that the institutional level plays a critical role in innovation adoption at teacher level by applying a multilevel approach. Building on the results of the present study, a future study could apply such a multilevel approach to include the cultural and institutional context as additional theoretical and empirical dimensions. Only when all these factors are taken into account, can a culturally appropriate teaching and learning take place.

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References

Baron, J. 1998. Teaching on-line across cultures. In *Proceedings of the 3rd International Conference on Open Learning,* ed. A. Gooley, C. Pearson, and S. Towers et al., 67–72. Brisbane: Queensland Open Learning Network.

Bauersfeld, H. 1995. The structuring of structures: Development and function of mathematizing as a social practice. In *Constructivism in education,* ed. L.P. Steffe and J. Gale, 137–58. Hillsdale, NJ: Erlbaum.

Bednar, A.K., D. Cunningham, T.M. Duffy, and J.D. Perry. 1992. Theory in to practice: How do we link? In *Constructivism and the technology of instruction: A conversation,* ed. T.M. Duffy, and D.H. Jonassen, 17–34. Hillsdale, NJ: Erlbaum.

Berry, J.W., Y.H. Poortinga, M.H. Segall, and P.R. Dasen. 2002. *Cross-cultural psychology: Research and applications.* Cambridge: Cambridge University Press.

Brick, J. 1991. *China: A handbook in intercultural communication.* Sydney: Macquarrie University.

Cortazzi, M. 1990. Cultural and educational expectations in the language classroom. In *Culture and the language classroom,* ed. B. Harrison, 54–65. Hong Kong: Modern English Publications and the British Council.

Cortazzi, M., and L. Jin. 1996. Cultures of learning: Language classrooms in China. In *Society and the language classroom,* ed. H. Coleman, 169–206. Cambridge: Cambridge University Press.

Duffy, T.M., and D.H. Jonassen. 1992. Constructivism: New implications for instructional technology. In *Constructivism and the technology of instruction: A conversation,* ed. T.M. Duffy, and D.H. Jonassen, 1–16. Hillsdale, NJ: Lawrence Erlbaum Associates.

Eagly, A.H., and S.J. Karau. 1991. Gender and the emergence of leaders: A meta-analysis. *Journal of Personality and Social Psychology* 60: 685–710.

Elgort, I. 2005. *E-learning adoption: Bridging the chasm.* http://www.ascilite.org.au/conferences/brisbane05/blogs/proceedings/20_Elgort.pdf.

Ertmer, P.A., and T.J. Newby. 1993. Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. *Performance Improvement Quarterly* 6, no. 4: 50–72.

Fisher, D., and B. Waldrip. 1999. Cultural factors of science classroom learning environments, teacher-student interactions and student outcomes. *Research in Science and Technological Education* 17, no. 1: 83–96.

Gamoran, A., W.G. Secada, and C.B. Marrett. 2000. *The organizational context of teaching and learning: Changing theoretical perspectives.* In *Handbook of sociology of education,* ed. M.T. Hallinan, 37–63. New York: Kluwer Academic/Plenum Press.

Gao, L., and D.A. Watkins. 2002. Conceptions of teaching held by school science teachers in P.R. China: Identification and cross-cultural comparisons. *International Journal of Science Education* 24, no. 1: 61–79.

Gordona, S.C., M.H. Dembob, and D. Hocevarb. 2007. Do teachers' own learning behaviors influence their classroom goal orientation and control ideology? *Teaching and Teacher Education* 23, no. 1: 36–46.

Grasha, A.F. 1994. A matter of style: The teacher as expert, formal authority, personal model, facilitator, and delegator. *College Teaching* 42: 142–9.

Grasha, A.F., and S. Riechmann-Hruska. 1990. *Teaching style survey.* Cincinnati: University of Cincinnati. http://longleaf.net/teachingstyle.html.

Harris, K.R., and P.A. Alexander. 1998. Integrated, constructivist education: Challenge and reality. *Educational Psychology Review* 10, no. 2: 115–27.

Hofstede, G. 1984. *Culture's consequences.* Newbury Park, CA: Sage Publications.

Hofstede, G. 1986. Cultural differences in teaching and learning. *International Journal of Intercultural Relations* 10: 301–20.

Hofstede, G., and M.H. Bond. 1984. Hofstede's culture dimensions: An independent validation using Rokeach's Value Survey. *Journal of Cross-Cultural Psychology* 15: 417–33.

Jegede, O.J., and P.A. Okebukola. 1990. Development and validation of an instrument to measure the socio-cultural environment in science classrooms. Paper presented at the Annual Meeting of the American Educational Research Association, in Boston, MA.

Jin, L., and M. Cortazzi. 1998. Dimensions of dialogue: Large classes in China. *International Journal of Educational Research* 29: 739–61.

Jonassen, D., M. Davidson, M. Collins, J. Campbell, and B. Haag. 1995. Constructivism and computer-mediated communication. *American Journal of Distance Education* 9, no. 2: 7–25.

Kember, D. 1997. A reconceptualisation of the research into university academics' conceptions of teaching. *Learning and Instruction* 7, no. 3: 255–75.

Kirschner, P.A., and F. Paas. 2001. Web enhanced higher education: A tower of Babel. *Computers in Human Behavior* 17, no. 4: 347–53.

Könings, K.D., S. Brand-Gruwel, and J.J.G. van Merriënboer. 2005. Towards more powerful learning environments through combining the perspectives of designers, teachers and students. *British Journal of Educational Psychology,* 75, no. 4: 645–60.

Könings, K.D., S. Brand-Gruwela, and J.J.G. van Merriënboer. 2007. Teachers' perspectives on innovations: Implications for educational design. *Teaching and Teacher Education* 23, no. 6: 985–97.

Lave, J., and E. Wenger. 1991. *Situated learning: Legitimate peripheral participation,* Cambridge: Cambridge University Press.

Löfström, E., and A. Nevgi. 2007. From strategic planning to meaningful learning: Diverse perspectives on the development of web-based teaching and learning in higher education. *British Journal of Educational Technology* 38, no. 2: 312–24.

Ma, C. 2005. Some ideas on system reform and innovation in China's higher education. *Science Education in Higher Education* 2. http://scholar.ilib.cn/A-gdlkjy200502010.html.

Martin, E., and P. Ramsden. 1994. *Effectiveness and efficiency of courses in teaching methods for recently appointed academic staff.* Canberra, ACT: Australian Government Publishing Service

McClure, J.W. 2003. The experiences of Chinese international postgraduates studying in Singapore. Unpublished diss., Griffith University.

McMahon, M. 1997. Social constructivism and the World Wide Web: A paradigm for learning. Paper presented at the ASCILITE conference, December, in Perth, Australia.

Moos, R.H. 1979. *Evaluating educational environments: Procedures, measures, findings and policy implications.* San Francisco: Jossey-Bass.

Okebukola, P.A. 1986. The problem of large classes in science: An experiment in co-operative learning. *European Journal of Science Education* 8, no. 1: 73–7.
Paine, L. 1990. The teacher as virtuoso: A Chinese model for teaching. *Teachers College Record* 92, no. 1: 49–81.
Pratt, D.D., M. Kelly, and W.S.S. Wong. 1999. Chinese conceptions of 'effective teaching' in Hong Kong: Towards culturally sensitive evaluation of teaching. *International Journal of Lifelong Education* 18, no. 4: 241–58.
Prebble, T., H. Hargraves, L. Leach, K. Naidoo, G. Suddaby, and N. Zepke. 2005. *Impact of student support services and academic development programmes on student outcomes in undergraduate tertiary study: A synthesis of the research.* New Zealand: Ministry of Education.
Ramsay, G. 2005. Computer-mediated communication and culture: A comparison of 'Confucian-heritage' and 'Western' learner attitudes to asynchronous e-discussions undertaken in an Australian higher educational setting. *E–Learning* 2, no. 3: 263–75.
Ramsden, P. 2003. *Learning to teach in higher education.* London: Routledge Farmer.
Robertson, I. 2004. Teachers at the interface: A model of implementation. Paper presented at the AARE conference, Melbourne. http://www.aare.edu.au/04pap/rob04192.pdf.
Rogers, E.M. 2003. *Diffusion of innovations.* New York: The Free Press.
Ryan, J. 2000. *A guide to teaching international students.* Oxford: Oxford Centre for Staff and Learning Development.
Schellens, T., and M. Valcke. 2005. Collaborative learning in asynchronous discussion groups: What about the impact on cognitive processing? *Computers in Human Behavior* 21: 957–75.
Simplicio, J.S.C. 2004. Today's teachers struggle to educate a generation of students unlike any that has ever been seen before. *Journal of Instructional Psychology* 31, no. 1: 71–5.
Slavin, R.E. 1996. Research on cooperative learning and achievement. *Contemporary Educational Psychology* 21, no. 1: 43–69.
Stacey, E. 1999. Collaborative learning in an online environment. *Journal of Distance Education* 14, no. 2: 14–33.
Tigelaar, D., D. Dolmans, I. Wolfhagen, and C. van der Vleuten. 2004. The development and validation of a framework for teaching competencies in higher education. *Higher Education* 48, no. 2: 253–68.
Tondeur, J., M. Valcke, and J. van Braak. 2008. A multidimensional approach to determinants of computer use in primary education: Teacher and school characteristics. *Journal of Computer Assisted Learning* 24, no. 6: 494–506.
Triandis, H.C., C. McCusker, and C.H. Hui. 1990. Multimethod probes of individualism and collectivism. *Journal of Personality and Social Psychology* 59, no. 5: 1006–20.
Trigwell, K.P.M., and P. Taylor. 1994. Qualitative differences in approaches to teaching first year university science. *Higher Education* 27: 75–84.
Valcke, M., G. Sang, I. Rots, and R. Hermans. in press. Taking prospective teachers' beliefs into account in teacher education. In *International encyclopaedia of education,* ed. E. Baker, B. McGaw, and P. Peterson. Oxford: Elsevier.
van Eekelen, I.M. 2005. Teachers' will and way to learn: Studies on how teachers learn and their willingness to do so. Unpublished diss., Maastricht University, The Netherlands.
Wan, G. 2001. The learning experience of Chinese students in American universities: A cross-cultural perspective. *College Student Journal* 35, no. 1: 28–44.
Wang, J., and S. Mao. 1996. Culture and the kindergarten curriculum in the People's Republic of China. *Early Child Development and Care* 123: 143–56.
Wang, L. 2004. The impact of cultural factors in an online learning environment in Hong Kong. Paper presented at the HERDSA 2004 Conference, Curtin University of Technology, 4–7 July, in Miri, Sarawak, Malaysia.
Wang, T. 2006. Understanding Chinese culture and learning. *The Australian Educational Researcher.* http://www.aare.edu.au/06pap/wan06122.pdf.
Zemsky, R., and W. Massy. 2004. *Thwarted innovation: What happened to e-learning and why.* The Learning Alliance at the University of Pennsylvania. http://www.irhe.upenn.edu/WeatherStation.html.