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Comparing the behavioural differences of teachers and students in learner-centred classrooms between China and the USA

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Abstract
This research was designed to examine how teachers and students from various cultures (China vs. USA) might present distinct behavioural features in learner-centred classrooms. The findings of the research would serve the purpose to answer the question regarding whether and how learner-centred instruction could better support the learning of students from non-Western cultures. Chinese students experiencing learner-centred instruction (the experimental group), Chinese students from traditional classrooms (the control group), and American students responded to measures assessing their perceived teacher behaviours, and their own learning behaviours along with other two highly relevant variables, namely academic motivation and self-efficacy. The results indicated that Chinese teachers and students in the experimental group presented certain distinct behavioural features in comparison to both control group and American group. It suggested that the implementation of learner-centred instruction brought certain behavioural changes for Chinese teachers and students. However, on the other hand, their behavioural changes were not completely consistent with expectations. For instance, Chinese teachers in the experiment group did not present better performance in empowerment and individualized instruction, and their students did not exhibit more autonomous and self-directed learning behaviours as expected. The implications of the research were discussed in the paper.

Keywords Learner-centred instruction · Learning behaviour · Academic motivation · Self-efficacy · Cross-cultural study

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Introduction

In recent decades, many Chinese educators (Chang, 2017; Liang et al., 2020; Qiu, 2019; Wang et al., 2018; Yan, 2019; Zhu & Zen, 2017; Zhao, 2018; Zhi, 2020) have made efforts to introduce learner-centred ideas and methods into classroom instruction for the purpose to reform traditional school education which was frequently criticized as being stereotyped, dogmatic, and overly teacher-dominant (Frambach et al., 2014; Wang et al., 2018; Wu & Zhang, 2016; Yan, 2019; Zhao, 2018). However, some critical concerns were raised in these practices including: to what extent learner-centred approach could truly apply to Chinese classrooms; how well Chinese teachers could understand and manipulate the learner-centred ideas; what effects learner-centred instruction would have on Chinese students' learning, etc. The modern concept of learner-centred instruction was largely constructed by Western scholars (Rogers et al., 2013), but perhaps fundamentally conflict with the traditional ways of school instruction in Eastern countries. The implementation of this foreign approach in Chinese classrooms would certainly present challenges to both teachers and students. Some scholars (Chang, 2017; Hattie, 2012; Lavy, 2011; Ma, 2018; Schwerdt & Wuppermann, 2011; Zhu & Zen, 2017) argued that a variety of difficulties or obstacles have been encountered and reported by teachers in practicing learner-centred teaching for Chinese or other non-Western student groups. It was even suggested that learner-centred methods might be unfit for Eastern students (Watkins & Biggs, 2001). However, some other educators (possibly the majority of Chinese educators and education innovators) (Liang et al., 2020; Wang et al., 2018; Wu & Zhang, 2016; Yan, 2019; Zhao, 2018) kept positive attitudes and enthusiastically advocated the implementation of learner-centred methods in Chinese classrooms from pre-schools to higher schools. The learner-centred instruction was considered by many Chinese educators as a promising way to renovate traditional approach of classroom teaching (Qiu, 2019; Wang et al., 2018; Wu & Zhang, 2016; Zhu & Zen, 2017). In this instance, it is urgent for us to know how learner-centred approach would affect the behaviours of teachers and students in Chinese classrooms. Currently, relevant research is far from sufficient.

In a previous study (the authors, 2021), the researchers compared the behavioural features of Chinese teachers and students between experimental group implementing learner-centred methods and control group assuming traditional instruction approaches. It was found that learner-centred instruction had certain positive effects on students' classroom behaviours, but did not significantly encourage students' autonomic and independent learning behaviours. The findings were partially consistent and partially inconsistent with those findings reported in Western literature. Western educators (Harris et al., 2012; Herington & Weaven, 2008; Lee et al., 2017; Pee et al., 2000; Wormington & Linnenbrink-Garcia, 2017) have pointed out that learner-centred instruction could contribute to the improvement of students' academic motivation, self-efficacy, and such learning behaviours as autonomic, self-directed, and self-managing behaviours. However, it was also observed by Western scholars (Frambach et al., 2014; Kennedy, 2002; Li & Yue, 2006) that Eastern students (including Chinese students) in Western classrooms tended to present passive behaviours (e.g. keeping quiet, waiting for guidance, lacking of responses) in the learner-centred instruction. Therefore, both Western and Chinese scholars might have the interest to know whether learner-centred instruction has distinct impacts on the learning of students between Western and Eastern groups. In the mean time, scholars in the relevant fields might also want to know how learner-centred instruction affects the behaviours of Chinese teachers, or to what extent Chinese teachers are actually assuming learner-centred instruction. Therefore, the current research was conducted to examine whether

and how Chinese teachers and students might present distinct behavioural features in 2 in comparison to their Western peers. In addition, two variables, namely academic motivation and self-efficacy, were also involved in this exploration, due to that they were both considered highly relevant to students' learning and were both subject to the influence of learner-centred instruction (Flowers et al., 2000). This examination would provide support to better answer those questions regarding whether learner-centred instruction could be applied to instruct Chinese students, or how to adjust learner-centred ideas and methods to better serve the learning of students from China or other Eastern countries.

Learner-centred instruction

The learner-centred instruction was deemed by many educators (perhaps the majority) as a promising approach to cure the weakness, trauma, or sequela caused by the traditional forms of teacher-centred classroom relations (Dyson, 2010). In conventional teacher-directed classrooms, students passively rely on teachers to structure the course, the content, and to evaluate their performances. By contrast, the learner-centred pedagogy encourages teachers to empower students to direct their own learning by choosing study materials, setting up goals and plans, monitoring learning process, and assuming self-assessments (Kaymakamoglu, 2018). Bass (2012) distinguished between learner-centred and teacher-centred as a matter of responsibility. Learner-centred instruction allows students to play more active roles and take more responsibilities in the learning processes. More specifically, Weimer (2013) defined five aspects of teaching that should be considered for the purpose to achieve learner-centred instruction: the balance of power, the role of the teacher, the function of content, the responsibility for learning, and the purposes and processes of assessment. In 2, the balance of power shifts so that the teacher gradually empowers students to assume more control over their learning with the increase of students' ability to handle this control. The learner-centred instructor takes the role as a facilitator creating an environment where all students can manage and direct their learning. It is no more a concern for the instructor to consider how much to cover in teaching certain subject content, but they should think about how the students will use the content and why they should learn it. The instructor should more frequently use assessments and give feedbacks for the purpose of promoting learning instead of just assigning grades. The individual needs of students in regard to what to learn, how to learn, and how to deal with difficulties/failures should be considered and handled by the instructor. To summarize, the learner-centred instructor would ideally present the following behavioural features: assuming the role as a facilitator instead of an authoritarian or other leading figure (facilitating), meeting the individual needs of students (individualization), allowing students to lead learning (empowerment), applying supportive assessments, and adopting learner-directed teaching methods that encourage autonomous learning of students (e.g. problem-based instruction, cooperative learning, project-based learning) (Weimer, 2013).

The effects of learner-centred instruction on students' academic motivation, self-efficacy and learning behaviours

The learner-centred ideas and methods have been prevalent in Western schools for decades, and have been extensively accepted by Western educators and teachers from pre-school level to higher education level as dominant approaches in instructing students (Kaymakamoglu, 2018). A large number of studies (Alfassi, 2004; Hancock et al., 2002;

Kassem, 2019; Macaulay & Nagley, 2008; Meece et al., 2004; Üzüm & Pesen, 2019; Wheatley, 1999) including some meta-analysis of previous research data (Jeffrey, 2016; Zhi, 2020) have examined how learner-centred instruction might affect such affective or behavioural aspects of students as academic motivation, self-efficacy, learning behaviours, etc. Academic motivation refers to the personal push or pull that forces students to engage in learning and achieve in schools (Reeve et al., 2004). According to Vallerand et al. (1992), academic motivation can be separated into intrinsic motivation and extrinsic motivation. Self-efficacy refers to a self-appraisal of one's capabilities to accomplish a task as well as one' s confidence in his/her skills to perform that task (Tseng et al., 2016). The intrinsic motivation, extrinsic motivation, and self-efficacy of students were all proven significantly related to their academic performances (Reeve et al., 2004; Wohlfarth, et al., 2008; Zhu et al., 2011). In the mean time, relevant learning behaviours (such as working on assignments or homework, attending to the lecture, interacting with the teacher, cooperating with other students, making and following learning plans, and reflecting on the learning processes, etc.) were also crucial for students being successful in learning (Bandura, 1997).

A large portion of empirical evidence from Western literature was supportive to the assumption that learner-centred instruction has positive impacts on students' academic motivation (Harris et al., 2012; Flowers et al., 2000), self-efficacy (Eronen & Kärnä, 2018; Quershi et al, 2016; Tseng et al., 2016) and leads to efficient learning behaviours of students (Pee et al., 2000; Xiao et al., 2018). For instance, some scholars (Tseng et al., 2016; Xiao et al., 2018) have argued that learner-centred instruction could attribute to the enhancement of such learning behaviours of students as participating in classroom activities, self-regulated behaviours, cooperative behaviours, etc. It should be noted that some Western scholars might criticize the learner-centred paradigm for its low-efficiency (Andersen & Andersen, 2017), and some might praise the teacher-centred paradigm for its high-efficiency at least in instructing certain subject content (Dong et al., 2019). However, the majority Western educators seem to agree upon the values of implementing learner-centred approaches.

Nevertheless, these findings were largely reported in Western literature. It is unclear whether learner-centred instruction would have similar effects on the learning of Chinese students. In fact, some scholars have observed that Chinese students might present distinctive emotional or behavioural traits in learner-centred classrooms in comparison to Western students (Chang, 2017; Dong et al., 2019; Hattie, 2012; Lavy, 2011; Lee et al., 2017; Ma, 2018). They appeared to be passively involved in classroom activities, waiting for guidance, or to be shy or even nervous in learner-centred classrooms (Frambach et al., 2014). Watkins and Biggs (2001) argued that Asian students who are growing up in collectivistic or Confucian culture are more accustomed to teacher-directed classroom instruction, and are not necessary fit in with learner-centred instruction. Meanwhile, there were still studies indicating that Chinese students were able to adjust their responses or behaviours to fit in with Western classroom environment (Gieve & Clark, 2005; Liang et al., 2020). Currently, it seems still unclear how learner-centred instruction would impact on the motivational or behavioural aspects of Chinese students. After a brief investigation on studies conducted in other Asian countries or regions (Japanese, South Korean, Philippines, Hong Kong, etc.), the results were also mixed with some studies reporting positive outcomes (Choi et al., 2019; Kim et al., 2017; Matsuyama et al., 2019), and some other studies indicating low-efficiency or difficulties (Andersen & Andersen, 2017; Saiki et al., 2011) of implementing learner-centred instruction. According to previous research, it seems that learner-centred instruction might have distinct effects on the learning of Western and Chinese students (or

other Asian students). However, relevant investigation is absent, and it is unclear what are the exact distinctions in regard to the influences of learner-centred instruction on the learning among cross-cultural groups. Further study is needed to evaluate and compare the outcomes of implementing the learner-centred paradigm in Western and Chinese classrooms.

Thus, two questions were raised in this literature review. The first one is whether Chinese students in comparison to Western students (American students in particular in this study) might present distinct traits in academic motivation, self-efficacy and learning behaviours in learner-centred classrooms. If Chinese and American students were found to present distinct learning traits in learner-centred classrooms, it should be further assessed whether their distinctive performances were actually relevant to the impacts of learner-centred instruction. In other words, it should be explored how learner-centred instruction might have dissimilar impacts on the learning of Chinese and American students. Therefore, the next question concerned in this study is whether the relations between learner-centred instruction and students' academic motivation, self-efficacy, and learning behaviours differ significantly across cultural groups (Chinese vs. American).

It should be pointed out that before starting to examine the possible distinct performances of Chinese and American students in 2, it is necessary to ponder over a highly relevant question that is to what extent Chinese teachers are actually able to perform learner-centred instruction. To Chinese teachers, the learner-centred ideas and methods would inevitably form challenges to their traditional way of instruction. And the Chinese education system which is highly exam-oriented, and strictly following the regulation of government offices, could produce certain obstacles for Chinese teachers to authentically implement learner-centred methods (Wu & Zhang, 2016). Thus, it is reasonable to conject that Chinese teachers might perform learner-centred instruction in a way somewhat distinct to American teachers. Therefore, it is necessary to make comparisons of the behavioural features of Chinese and American teachers in 2. This comparison might offer a useful perspective for us to comprehend the distinct performances presented by Chinese and American students in learner-centred classrooms, since their learning behaviours are obviously subject to the influence of their teachers' instruction behaviours.

The present research

The current research was assumed to assess and compare whether teachers' instruction behaviours and students' learning behaviours present distinct traits for cross-cultural groups (Chinese vs. American) in learner-centred classrooms, and to assess whether the relations between learner-centred instruction and the affective/behavioural performances of students differ significantly across cultural groups. To better support the exploration, two samples of Chinese students other than the American group were involved, namely an experimental group recruiting Chinese students who received learner-centred instruction and a control group recruiting students from traditional classrooms. The following research questions and assumptions were raised based on relevant literature review.

1. How might Chinese teachers adopting learner-centred methods present distinct behavioural features in comparison to those Chinese teachers following the traditional approaches and those American teachers who were also assuming learner-centred methods? As suggested by the concept of learner-centred instruction, learner-centred teachers should present better performance in such behaviours as facilitating, empowerment, individualization, supporting assessment, and assuming learner-directed teaching

methods (Weimer, 2013). Since Chinese teachers in the experimental group were trained to perform learner-centred instruction, it was expected that they would be more like American teachers in presenting above behavioural traits, whereas Chinese teachers assuming teacher-centred instruction in the control group would be less likely to present above behavioural traits (hypothesis 1).

2. How might Chinese students in 2 differ in academic motivation, self-efficacy, and learning behaviours with Chinese students in teacher-centred instruction and American students in 2? Previous studies (Alfassi, 2004; Goldschmidt et al., 2016) have indicated that learner-centred instruction contributes to the enhancement of students' academic motivation, self-efficacy, and autonomous learning behaviours. Thus, it was speculated that Chinese students in the experimental group similar to American students tend to gain higher scores in academic motivation and self-efficacy, to indicate more active learning behaviours (e.g. paying attention, making responses, interacting with each other), and to be more independent and self-directed in learning in comparison to Chinese students in traditional classrooms (hypothesis 2).
3. To what extent does learner-centred instruction relate to students' academic motivation, self-efficacy and learning behaviours, and do these relations differ significantly among experimental, control, and American groups? As many previous studies (Hancock et al., 2002; Jeffrey, 2016; Macaulay & Nagley, 2008; Meece et al., 2004; Üzüm & Pesen, 2019) have suggested that learner-centred instruction has significant impacts on certain affective or behavioural aspects of learners, it was also speculated in this study that learner-centred instruction was significantly related to students' academic motivation, self-efficacy, and learning behaviours (hypothesis 3). Furthermore, it was expected that learner-centred instruction should have more significant impacts on the learning of the experimental group than on the control group. In other words, the relations between learner-centred instruction and students' academic motivation, self-efficacy, and learning behaviours might differ across participant groups. In these relations, group (experiment vs. control, or experiment vs. American) could be considered as playing the role as a moderator and should be subject to the tests of moderation effects. As scholars (Frambach et al., 2014; Li & Yue, 2006) suggested that learner-centred instruction might have dissimilar impacts on the learning among cross-cultural student groups, it was thus also assumed that moderation effects might be significant among experimental, control, and American groups (hypothesis 4). In particular, we were interested in how these relations might differ between control and experimental groups, and between experimental and American groups; therefore, the moderation effects were examined specifically for these two pairs of groups (i.e. experimental vs. control, and experimental vs. American).

Methodology

Participants

Three sample groups with 823 participants in total were recruited in this research including 308 Chinese students in a learner-centred instruction program (experimental group), 282 Chinese students from traditional classrooms (control group), and 233 American students from two high schools. The high schools that were chosen for recruiting participants in the USA and China were all public schools and were matched for their reputation, education quality, and demographic profile of students (e.g. age, grade, economic status). All these

chosen schools in both countries are located on urban areas, and provide education with medium or above medium quality to students who were largely from middle-class families.

Chinese participants in the control group were students recruited from two junior high schools in the South-eastern part of China. Their teachers were largely assuming traditional teacher-centred approaches in instruction. One class was randomly chosen from five or six classes at each grade of both schools. A total of 282 students (150 females, and 132 males; $M = 14.13$ years, SD = 1.03) from these classes voluntarily participated in the study. 98 of them were in seventh grade, 90 in eighth grade, and 94 in ninth grade.

Chinese participants in the experimental group were recruited from two junior high schools in the same city as the control group. The administrators of these schools have encouraged and organized their teachers to attend a training program that was designed to urge the transmission of classroom instruction from teacher-centred to learner-centred approach. This training was offered by a group of professional lecturers from a local college who are specialized in curriculum and teaching design. The training lasted for 2 months. In the first half month, trainees received courses instructing relevant ideas and methods regarding learner-centred instruction, and in the other 1.5 months, trainees were required to implement learner-centred methods in their own classes under the supervision of the trainers. 308 students (162 females, and 146 males; $M = 14.11$ years, SD = 1.01) taught by these teachers receiving training were randomly chosen and participated in the study. A total of 96 of the participants were in seventh grade, 105 in eighth grade, and 107 in ninth grade.

As for the American group, it was difficult to identify a similar training program advocating learner-centred instruction in the USA. However, when we conducted a pre-survey to those teachers in the schools targeted for data collection, the majority of these teachers responded that they were largely implementing learner-centred instruction rather than teacher-centred instruction. These responses offered certain basis for cross-cultural comparison. Two American junior high schools located in a medium size city in the North-eastern part of USA were chosen because they were considered comparable in education quality with those schools in China, and their administrators were personally contacted (via face-to-face meeting or emails) and agreed to support the study. The measures were administered by teachers in their classes. The American participants were 233 students (129 females, 104 males; $M = 13.89$ years, SD = 1.13) with 76 in seventh grade, 72 in eighth grade, and 85 in ninth grade.

Instruments

The Scale of Learner-Centred Instruction

The Scale of Learner-Centred Instruction (SLI) was developed by Yang and Xu (2015) and is used to ask students to estimate the extent to which their teachers are assuming student-centred approaches. The measure adopts a 5-point Likert-style scale ('strongly disagree' to 'strongly agree'). It has 5 subscales (30 items): teaching methods, individualization, facilitating, empowerment, and supportive assessment. A teacher would receive high scores on the subscales, if s/he was frequently perceived to present the following behaviours: (a) the teacher encourages students to be mentally active through tackling problem-based tasks, and encourage students to be self-regulated, to set goals and take responsibility for the learning process; (b) students are allowed to select the learning task and the manner in which it is completed; (c) the teacher provides opportunities for students to learn cooperatively and to construct knowledge of their own; (d) the teacher takes the role of a facilitator

who gradually hand over responsibilities, but provide scaffolds to help students acquire knowledge and skills; (e) the teacher assumes supportive assessments instead of relying on final grades, and promptly provides feedbacks to students.

Yang and Xu (2015) pointed out that results of factor analyses confirmed the construct validity of the instrument, and the significant correlations revealed between subscales of the instrument and some theoretically relevant psychological constructs (e.g. teaching styles, epistemic beliefs of knowledge, conceptions of learning) also provided certain evidence of validity. Cronbach's alphas reported by the two authors were 0.85 for teaching methods, 0.74 for individualization, 0.78 for facilitating, 0.82 for empowerment, and 0.71 for supportive assessment. In 4, Cronbach's alphas for the five subscales were between 0.72 and 0.86.

The Academic Motivation Scale

The Academic Motivation Scale (AMS) (Vallerand et al., 1992) is an instrument assessing students' motivation for engaging in school activities and has been adapted into a few linguistic versions including Chinese (Zhang et al., 2016). It developed seven subscales on a 7-point Likert Scale (1 = not at all true to 7 = very true) to measure three components of motivation: intrinsic motivation, extrinsic motivation, and amotivation. The subscale assessing amotivation was considered irrelevant to the current research and thus was deleted in the adjusted version of the scale. The rest six subscales (24 items) were adopted to measure intrinsic motivation (e.g. 'Because I experience pleasure and satisfaction while learning new things') and extrinsic motivation (e.g. 'Because I think that the school education will help me better prepare for my career in the future'). It should be noted that some scholars (Cokley et al., 2001; Fairchild et al., 2005) have challenged the scale's theoretical foundations. Fairchild et al. (2005) argued that due to the lack of support for an inter-subscale simplex pattern of the measure in empirical studies it might be questionable to consider intrinsic and extrinsic motivation as opposite ends of a continuum. Despite this argument, however, there are quite a few studies that reported evidence supporting the construct validify and internal consistency of the scale. For instance, in a recent study, Kula Kartal and Kutlu (2020) reported goodness-of-fit statistics of confirmatory factor analysis as acceptable (i.e. $\chi^2 = 1017.74$ ($sd = 326$, $p < 0.05$), $AGFI = 0.81$, $CFI = 0.94$, $SRMR = 0.065$, $RMSEA = 0.073$). Cronbach's alphas for the subscales in the current research were in the range of 0.78 and 0.88.

The Academic Self-efficacy Scale

The Academic Self-efficacy Scale (ASS) was composed by Zhou and Dong (2004). This scale has twelve items and was developed for high school students to assess their own level of self-efficacy in general learning activities (sample item: I am confident in successfully mastering academic subjects). The scale assumes a 6-point Likert scale (ranging from 1 = completely disagree to 6 = completely agree). The results of previous studies (Liang et al., 2020) have demonstrated good reliability and validity of the ASS. The Cronbach's alpha of the scale was 0.83 reported by Zhou and Dong (2004), and was 0.89 in the current study.

Questionnaire of Learning Behaviours for High School Students

The Questionnaire of Learning Behaviours for High School Students (QLBHSS) was constructed by Cheng, Gu, & Guan (2014) to measure learning behaviours of students presented in or out of the classroom. A few relevant instruments (e.g. Crosby and French, 2002; Mcdermott, 1999) were counselled while writing the items. The QLBHSS employs a 5-point Likert-style Scale ('strongly disagree' to 'strongly agree') and is composed of 12 subscales (60 items). Based on text analysis of relevant literature and the results of factor analyses in pilot studies, the learning behaviours of students were categorized into five dimensions with each dimension comprising several subscales. The dimension of general tasks is composed of three subscales (preview, review, and homework) assessing students' performances in those tasks that are generally implemented outside the classroom. The dimension of classroom regular behaviours also has three subscales (i.e. attentional, participating, and responding behaviours) measuring students' behaviours commonly presented in the classroom, such as attending to the instruction (e.g. observing, listening, and taking notes), participating (e.g. asking questions, participating in classroom activities, operating the assigned tasks), and making responses (e.g. answering questions, making eye contact with the teacher). The dimension of autonomy has two subscales (extro-control behaviour and autonomous behaviour) evaluating the tendency of students either to rely on the instruction of teachers or to manage their own learning. The dimension of sociality has two subscales (independence and interaction) assessing to what extent students present independent or interactive behaviours in learning. The strategic dimension has two subscales (planning and managing behaviour, and reflective behaviour) evaluating whether students present strategic behaviours such as setting goals, making plans, time managing, reflecting on the learning processes, and making self-evaluation. The evidence of reliability and construct validity of the instrument have been reported in previous research (Cheng & Ding, 2021; Cheng, Gu, & Guan, 2014). In the present study, Cronbach's alphas were 0.83 for preview, 0.76 for review, 0.78 for homework, 0.81 for attentional behaviour, 0.79 for participating behaviour, 0.75 for responding behaviour, 0.75 for autonomous behaviour, 0.85 for extro-control behaviour, 0.81 for independence, 0.77 for interaction, 0.70 for planning and managing behaviour, and 0.78 for reflective behaviour.

The above four instruments were all translated into two versions (i.e. Chinese and English) by following a translation-back-translation procedure.

Procedure

The authors contacted school administrators and acquired their permission to conduct the study in their schools. Then the authors made contact with teachers via phone calls and emails, and acquired their agreements to support the study in their classes. The subjects were required to randomly pick one course currently taking and evaluate their own motivation, self-efficacy, and learning behaviours in that course. Meanwhile, they also needed to evaluate instruction behaviours of their teachers in that particular course. A brief instruction was given to all participants in advance to address the issue of confidentiality and the importance of keeping honesty in responding to the items. All participants signed an informed consent form and adequate time (about 25 min) was given to complete the questionnaires.

Data analysis

Preliminary analysis of the data was conducted to test normality, linearity, univariate and multivariate outliers, homogeneity of variance, and no violation was noted. The calculated Tolerance values ranged from 0.208 to 0.452 for the predictors in the research, which were much larger than the threshold value 0.01 (Meyers et al., 2013), and thus indicated that multicollinearity is not an issue. To answer the first research question regarding whether teachers from cross-cultural groups present distinct teaching behaviours, one-way ANOVA was implemented to examine whether the mean differences for three sample groups on the instruction behaviour scale reached significance level. To answer the second research question regarding whether students from cross-cultural groups present distinct traits in academic motivation, self-efficacy, and learning behaviours, one-way ANOVA was also assumed to examine whether the mean differences for three sample groups on the relevant scales reached significance level. To answer the third research question, two steps of analysis were adopted to examine the data. Firstly, a multivariate multiple regression was assumed to estimate the total effects and separate effects of teachers' instruction behaviours on students' academic motivation, self-efficacy, and learning behaviours. And then moderation effects of participant groups (experimental vs. control, and experimental vs. American) were examined to reveal whether the relations between instruction behaviours and the relevant learning variables of students differ significantly across groups.

Results

Comparisons of perceived teaching behaviours among cross-cultural groups

For the purpose of comparing teachers' instruction behaviours as perceived by participants, means, and standard deviations for each of the learner-centred variables by Chinese control group, Chinese experimental group and American group are indicated in Table 1. It was shown that American group had higher means on all five learner-centred variables than two Chinese groups, and Chinese experimental group had higher means on all five variables than control group. One-way ANOVA was used to test whether the mean differences for three cultural groups reached significance level (hypothesis 1). To reduce type 1 error, the Bonferroni correction of p-value that is 0.01 was adopted. As shown in Table 1, all main effects were statistically significant for three groups: (1) teaching method, F (2, 820) = 34.89, $p < 0.001$; (2) individualization, F (2, 820) = 29.26, $p < 0.001$; (3) facilitating, F (2, 820) = 39.16, $p < 0.001$; (4) empowerment, F (2, 820) = 21.77, $p < 0.001$; and (5) supportive assessment, F (2, 820) = 11.18, $p < 0.001$.

Due to that the authors were interested in how Chinese teachers in experimental group differ in instruction behaviours with Chinese teachers in control group and teachers in American group, the Dunnett's post hoc test using Chinese experimental group as the control variable was then assumed to determine whether the two pairs of groups (experimental vs. control, and experimental vs. American) showed significant mean differences on the five learner-centred teaching variables. The results revealed that compared to Chinese control group, Chinese experimental group scored significantly higher on teaching methods, facilitating, and supportive assessment. The mean differences in individualization and empowerment between these two groups were not significant. Compared to American

Table 1 Means and standard deviations and one-way analysis of variance for five learner-centred instruction variables

Variable	Control		Experimental		USA			
	($n=282$)		($n=308$)		($n=233$)			
	M	*SD*	*M*	*SD*	*M*	SD	*F*	*p*
Individualization	2.58	1.19	2.67	1.20	3.03	1.15	29.26	0.000
Facilitating	3.13	1.11	3.61	1.10	3.73	1.07	39.16	0.000
Empowerment	3.08	1.08	3.13	1.14	3.61	1.11	21.77	0.001
Supportive assessment	3.17	1.10	3.47	1.10	3.51	1.09	11.18	0.000
Teaching methods	2.90	1.12	3.31	1.16	3.72	1.11	34.89	0.000

group, Chinese experimental group scored significantly lower on teaching methods, individualization, and empowerment. The two groups had no significant differences on facilitating and supportive assessment.

Comparisons of academic motivation, self-efficacy, and learning behaviours among cross-cultural groups

To reveal whether the participant groups present distinct traits in academic motivation, self-efficacy, and learning behaviours, means and standard deviations for all relevant variables by the three cross-cultural groups are indicated in Table 2. One-way ANOVA was used to test whether the mean differences for the three groups reached significance level (hypothesis 2). To reduce type 1 error, the Bonferroni correction of *p*-value that is 0.003 was adopted. The results indicated that most of the main effects (except extrinsic motivation) were statistically significant (see Table 2). Post hoc analysis (based on the Dunnett' test using Chinese experimental group as the control variable) revealed that compared to Chinese control group, Chinese experimental group scored significantly higher on intrinsic motivation, preview, attentional behaviour, participating behaviour, responding behaviour, and interactive behaviour. The two groups showed no significant difference on extrinsic motivation, self-efficacy, review, homework, autonomous, extro-control, independent, planning and managing, and reflective behaviours.

American group differed significantly with Chinese experimental group in all variables. It had significantly higher scores in comparison to Chinese experimental group on intrinsic motivation, self-efficacy, participating behaviour, responding behaviour, autonomic behaviour, independent behaviour, interactive behaviour, planning, and managing behaviour. It had significantly lower scores on attentional behaviours, preview, review, homework, extro-control, and reflective behaviour.

Relations and moderation effects of groups

The third research question concerns to what extent learner-centred instruction relates to participants' academic motivation, self-efficacy, and learning behaviours, and whether these relations differ significantly among three cross-cultural groups. As the first step, a multivariate multiple regression analysis was conducted to measure the relations among the predictors and criterion variables (hypothesis 3). Five learner-centred instruction variables were entered as predictors, and two motivation variables, one self-efficacy variable,

Table 2 Means and standard deviations and univariate analysis of variance for academic motivation, self-efficacy and learning behaviour variables

Variable	Control		Experimental		USA			
	(*n* = 282)		(*n* = 308)		(*n* = 233)			
	M	SD	*M*	SD	*M*	SD	*F*	*p*
1. Intrinsic motivation	3.01	0.89	3.39	0.95	3.63	0.92	27.73	0.000
2. Extrinsic motivation	3.16	0.91	3.19	0.87	3.34	0.96	3.42	0.033
3. Self-efficacy	3.38	0.82	3.42	0.89	3.87	0.87	33.82	0.000
4. Preview	3.07	0.79	3.45	0.82	2.47	0.86	102.52	0.000
5. Review	3.54	0.78	3.55	0.85	2.80	0.73	92.83	0.000
6. Homework	3.64	0.83	3.73	0.88	2.84	0.70	80.39	0.000
7. Attentional	3.67	0.70	4.19	0.78	3.97	0.85	31.72	0.000
8. Participating	2.55	0.74	3.20	0.79	3.66	0.85	134.69	0.000
9. Responding	3.60	0.67	3.81	0.76	4.14	0.80	33.90	0.000
10. Autonomic	3.47	0.61	3.52	0.62	3.80	0.70	54.05	0.000
11. Extro-control	3.30	0.78	3.22	0.82	2.91	0.89	15.73	0.000
12. Independent	2.93	0.80	3.05	0.92	3.82	0.90	86.81	0.000
13. Interactive	2.77	0.70	3.35	0.71	3.64	0.80	101.61	0.000
14. Planning & managing	2.79	0.93	2.89	0.86	3.29	0.79	128.29	0.000
15. Reflective	3.35	0.84	3.50	0.95	2.69	0.74	71.10	0.000

and twelve behavioural variables were used as the criterion variables. The results indicated that learner-centred instruction accounted for 53% variance in criterion variables, Wilks's $\lambda = 0.47$, $F(14, 804) = 64.07$, $p < 0.001$, $\eta^2 = 0.53$ (where η^2 is the multivariate effect size). The results of follow-up analyses revealed that learner-centred instruction was significantly related to all motivation, self-efficacy and behaviour variables, and the effect sizes were between 0.04 and 0.08.

As the second step, two sets of hierarchical regression analyses were conducted separately to assess the moderation effects (hypothesis 4) for group 1 (experimental vs. control) and group 2 (experimental vs. American). The group 1 and group 2 were transferred into dummy variables. In Step 1 of these analyses, group 1 or group 2 and the general means of teachers in five learner-centred instruction variables were entered as simultaneous predictors. One of the academic motivation, self-efficacy, or learning behaviour variables was entered as the criterion variable. In Step 2 of these analyses, the two-way interaction between the assigned predictor and group that was created by multiplying the scores of the predictors after centred around the means was entered to assess the moderation effects. Fifteen hierarchical regression analyses were subsequentially conducted for group 1 (control vs. experimental) and group 2 (experimental vs. American) comparison.

For the group 1 comparison (control vs. experimental), the results of hierarchical regression analyses revealed that the moderation effects of group1 were significant in the relations between learner-centred instruction and intrinsic motivation ($\Delta R^2 = 0.02$, $p < 0.001$), attentional behaviour ($\Delta R^2 = 0.01$, $p < 0.05$), participating behaviour ($\Delta R^2 = 0.04$, $p < 0.001$), responding behaviour ($\Delta R^2 = 0.02$, $p < 0.01$), and interactive behaviour ($\Delta R^2 = 0.04$, $p < 0.001$). To further interpret the significant interaction effects, simple regression lines for experimental group and control group were examined respectively. It was revealed that learner-centred instruction was a significant predictor of participating behaviour, attentional behaviour, and responding behaviour both in the control group ($\beta = 0.17$, $p < 0.001$; $\beta = 0.16$, $p < 0.01$; $\beta = 0.09$, $p < 0.01$, respectively), and in the experimental group ($\beta = 0.30$, $p < 0.001$; $\beta = 0.29$, $p < 0.001$; $\beta = 0.39$, $p < 0.001$, respectively). The significance level, however, was higher for the experimental group than for the control group. Learner-centred instruction was a significant predictor of intrinsic motivation ($\beta = 0.26$, $p < 0.001$) and interactive behaviour ($\beta = 0.47$, $p < 0.001$) for the experimental group, but not for the control group. The moderation effects appeared to be non-significant for group 1 in the relations between learner-centred instruction and the following criterion variables: extrinsic motivation, self-efficacy, preview, review, homework, autonomous, extro-control, independent, planning and managing, and reflective behaviours.

For the group 2 comparison (experimental vs. American), the results of data analyses revealed that the moderation effects of group 2 were significant in the relations between learner-centred instruction and self-efficacy ($\Delta R^2 = 0.04$, $p < 0.05$), preview ($\Delta R^2 = 0.04$, $p < 0.05$), review ($\Delta R^2 = 0.01$, $p < 0.05$), responding behaviour ($\Delta R^2 = 0.03$, $p < 0.001$), autonomic behaviour ($\Delta R^2 = 0.02$, $p < 0.01$), independent behaviour ($\Delta R^2 = 0.01$, $p < 0.01$), and interactive behaviour ($\Delta R^2 = 0.04$, $p < 0.001$). Simple regression lines for experimental group and American group were then examined respectively. It was revealed that learner-centred instruction was a significant predictor of self-efficacy, responding behaviour, autonomic behaviour, and independent behaviour both in the experimental group ($\beta = 0.12$, $p < 0.001$; $\beta = 0.17$, $p < 0.001$; $\beta = 0.23$, $p < 0.001$; $\beta = 0.11$, $p < 0.05$, respectively) and in the American group ($\beta = 0.47$, $p < 0.05$; $\beta = 0.41$, $p < 0.001$; $\beta = 0.50$, $p < 0.001$; $\beta = 0.34$, $p < 0.001$, respectively). The significance level was however higher for the American group than for the experimental group. Learner-centred instruction was a significant predictor of preview ($\beta = 0.41$, $p < 0.001$), review, ($\beta = 0.23$, $p < 0.001$), and interactive behaviour

($\beta = 0.42$, $p < 0.001$) for the experimental group, but not for the American group ($\beta = 0.09$, $p > 0.05$; $\beta = 0.07$, $p > 0.05$; $\beta = 0.09$, $p > 0.05$). The moderation effects of group 2 were non-significant in the relations between learner-centred instruction and the following criterion variables: intrinsic motivation, extrinsic motivation, homework, attentional, extro-control, and reflective behaviours.

Discussions

While starting to inspect how learner-centred instruction might affect the learning of Chinese students, it was necessary to reveal in advance to what extent Chinese teachers were truly assuming learner-centred instruction. The results of comparing the perceived instruction behaviours among three cross-cultural groups indicated that Chinese teachers in the experimental group in comparison to the control group presented better ability to utilize resources or formative assessments to support students' learning, and to assume more student-directed methods (e.g. problem-based teaching, cooperative learning, project-based learning). However, they were not perceived with better performances in meeting individual needs of students and empowering students to lead learning. By contrast, American teachers were observed better in meeting individual needs and empowering students. In addition, American teachers were perceived to be more likely to assume student-directed teaching methods in comparison to Chinese teachers in the experimental group. Thus, it seems that Chinese teachers received training in 2 exhibited certain expected behavioural changes in their daily instruction, but failed to present some anticipated changes particularly in two aspects, namely individualization and empowerment.

The ideas of learner-centred instruction have been extensively accepted by Western teachers, and relevant concepts (e.g. individualization and empowerment) have been deemed by most Western teachers as basic principles to follow in daily instruction (Dyson, 2010; Kaymakamoglu, 2018). Therefore, it is expected that American teachers as perceived by students would receive significantly higher scores in individualization and empowerment. However, it was unexpected that Chinese experimental group did not differ significantly with Chinese control group in individualization and empowerment. The reason might be that the education in Chinese schools is in general rigidly organized under the close supervision and administration of relevant government departments, and teachers are required to use assigned textbooks and to instruct unit by unit in similar speed. This strictly pre-arranged teaching procedure might leave no much space for teachers to assume individualized instruction. Meanwhile, Chinese education is highly exam-oriented (Wu & Zhang, 2016). Fixed examination criteria and items are equally applied to evaluate each student in the classroom. Teachers need to lead their students to acquire ideal scores in exams. This aim would be more efficiently achieved by following a rigid and uniform teaching procedure. As perceived by students, teachers in the experimental group although trying to assume learner-centred instruction were unlikely able to surpass the requirements imposed by the education system, and to break the teaching routines by allowing students to lead their own learning. Therefore, it is understandable that Chinese teachers would face certain difficulties or obstacles in their efforts to implement learner-centred instruction (Wu & Zhang, 2016).

When the three student groups were compared in their academic motivation, self-efficacy, and learning behaviours, it was revealed that Chinese experimental group compared with control group had significantly higher scores in intrinsic motivation, and in such

learning behaviours as attentional, participating, responding, and interacting. However, these two groups did not differ significantly in such variables as self-efficacy, review, homework, autonomous, independent, planning, managing, and reflecting. It seems that learner-centred instruction had more evident impacts on Chinese students' learning behaviours inside the classroom rather than their behaviours outside the classroom. In comparison to American group, the two Chinese groups had higher scores on preview, review, homework, extro-control, reflective behaviour, and had significantly lower scores on the rest variables (intrinsic motivation, extrinsic motivation, self-efficacy, participating, responding behaviour, independent behaviour, interactive behaviour, planning, and managing behaviour). These results were in general consistent with the observation that American students tended to be more confident and active in the classroom. On the other hand, American students were generally not required to complete as many assignments at home as Chinese students do. Thus, it was understandable that American students had lower scores on such behaviours as preview, review, and homework.

Furthermore, the examination of the moderation effects of cultural groups revealed that the relations between learner-centred instruction and learning behaviours inside the classroom (such as attentional, participating, responding, and interactive behaviours) were more significant for the experimental group than for the control group. The two Chinese groups did not differ significantly in the relations between learner-centred instruction and self-efficacy along with the rest behavioural variables. As for the comparison between Chinese experimental group and American group, learner-centred instruction was more significantly related to outside-classroom behaviours for Chinese experimental group than for American group, but was more significantly related to self-efficacy and such behaviours as autonomic behaviour and independent behaviour for American group than for Chinese experimental group. To summarize, learner-centred instruction seems to have certain influences on Chinese students' intrinsic motivation and learning behaviours inside the classroom, but did not improve Chinese students in self-efficacy and such behaviours as autonomic, independent, planning, managing, and reflecting.

These results were inconsistent with the belief that learner-centred instruction would encourage students to be more autonomic and self-directed in learning (Herington & Weaven, 2008; Pee et al., 2000). To a certain extent, this inconsistency might be explained by the finding in this paper that Chinese teachers perceived in the experimental group did not present better performances in individualization and empowerment than those teachers in the control group. The highly formalized and exam-directed Chinese school education might leave no much space for teachers to assume individualized instruction or to empower students, and consequently made them difficult to encourage students to be autonomous and self-directed.

Conclusions and limitations

The study revealed that in comparison to American teachers and Chinese teachers in traditional classrooms, Chinese teachers experimenting with learner-centred instruction were able to present certain behavioural changes, but did not show significant improvement in empowering students and performing individualized instruction. These behavioural traits of Chinese teachers might at least partially explain the behavioural features presented by students in the experimental group who indicated increased intrinsic motivation and more active classroom behaviours, but showed no significant improvement in being more

autonomous and independent. The reasons leading to these behavioural features of Chinese teachers and students in 2 might be somewhat relevant to the traditional education values/approaches, the assessment system focusing on final grades, the pressures from high-stake exams, and other cultural or institutional causes. However, the study might also suggest that Chinese teachers in comparison to American teachers could have unique interpretations regarding the implications and measures of learner-centred instruction. In other words, Chinese teachers might intentionally or unintentionally make adjustments of this teaching approach imported from Western culture to fit in with Chinese classroom instruction. The potentially existence of their distinctive comprehension of this teaching approach deserves further exploration in future.

The findings of this research could foster our better understanding on how learner-centred instruction might present distinct impacts on the instruction behaviours of teachers and the learning behaviours of students between Chinese and American groups. Especially, it emphasized the importance to further investigate the difficulties or barriers that Chinese teachers would encounter while they were experimenting with learner-centred instruction, and to encourage policy makers, school administrators, and educators to explore feasible measures to promote the implementation of this instruction approach. It also indicated the importance to investigate how Chinese teachers might interpret learner-centred instruction in distinctive ways in comparison to American teachers, and urge the exploration on alternative interpretations of learner-centred instruction in Eastern cultural environment.

It should be noted that the current research has limitations. First of all, while three cross-cultural student groups were recruited, their schools have been compared using certain criteria such as school reputation, education quality, location of the school, and economic background of students. However, it was not guaranteed that the three participant groups were completely comparable in very aspects. Therefore, it is not conclusive that their distinct behavioural features measured in the study could be totally attributed to the learner-centred instruction. There might be other explanations that were not considered and discussed in this paper. Secondly, the participants in the experimental group were from a training program which lasted for two months. One might question whether this sample could be representative to other student populations experimenting with the learner-centred instruction. Many experiments in this field were conducted in China following various procedures, handling with various subject materials, and producing dissimilar outcomes. The findings of this study might await verification through future research by recruiting participants from other experiments or training programs designed to implement learner-centred instruction. Thirdly, teachers' instruction behaviours were assessed through the observation of students in this study. Due to that this was a cross-cultural study, the authors did not possess enough resources to conduct on-site observation especially for the American group. However, students were not trained observers, and their perceptions on instruction behaviours could be somewhat biased (Pat-El, et al., 2014). For the same reason concerning the difficulty of conducting a cross-cultural study, only self-report measures were assumed in data collection. The limitations of these methods might provoke some challenges or oppositive opinions regarding the results of the study. Thus, it is necessary to conduct more studies in future to reveal how learner-centred instruction affects the learning of Chinese or other Asian students, and whether learner-centred ideas or methods should be subject to certain adjustments to meet the unique needs of Eastern learners.

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Declarations

Conflict of interest The authors declare no competing interests.

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Current themes of research
The research of the author in these years has been focused on the investigation of the cross-cultural differences in learning behaviour, cognitive style, and learning style between Chinese students and Western students. He also investigated how various teaching approaches might affect Chinese students' learning behaviors and how to assume appropriate teaching designs to induce effective learning behaviours of students. A few relevant articles have been published in professional journals.
Most relevant publications in the field of Psychology of Education
1. Hongyu Cheng, &Shuqiang Zhang. (2017). *Examining the relationship between holistic/analytic style and classroom learning behaviors of high school students*. European Journal of Psychology of Education, 32(2).
2.Cheng, H. & Guan, S. (2012). *The role of learning approaches in explaining the distinct learning behaviors presented by American and Chinese undergraduates in the classroom*. *Learning and Individual Differences, 22*(3), 414-418.
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Current themes of research
The research of Miss Tian is largely focus on the learning styles presented by Children in classroom environments, and the development of lying. She use experimental methods to investigate how children come to grips with the concept and moral implication of lying, whether children are gullible or they are able to detect others' lies, and whether children can tell convincing lies in various social situations.
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Current themes of research
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