International Journal of TESOL Studies (2021)
Vol. 3 (4) 96-112 https://doi.org/10.46451/ijts.2021.12.07

Article

University Students' Attitudes Toward EMI in the Chinese Mainland: A Study of the Moderating Variables

Wei Zhu
University of Oxford, UK

Abstract

In China, while an increasing number of research studies have shed light on English-medium instruction (EMI) at the tertiary level, very few have investigated the influence of EFL learners' negative emotions (e.g., anxiety) on their attitudes toward EMI. Furthermore, limitations from a methodological perspective exist in related research, in which the effect size is often ignored when reporting the statistics. To overcome the limitations and broaden the research scope of EMI attitude, the present study surveyed 169 university students in the Chinese mainland, incorporating two previously-studied variables, gender and major, and one understudied variable, anxiety in EMI learning. The results of the questionnaire showed that the general attitude toward EMI appears to be positive, and three main themes which emerged from the open-ended questions may help to explain the attitude. Regression analysis revealed that "perceived peer pressure," which is one of the six items of the anxiety scale, appears to be an important predictor for EMI attitudes of students, which accounts for 25.1% of the variance. The findings indicate that attention should be drawn to students' mental health regarding their overall anxiety in EMI learning, in which assistance concerning peer culture improvement should be considered. This article concludes with implications for positive emotions in EMI learning.

Keywords

English as the medium of instruction, bilingual education, attitudinal research, effect size, language anxiety

1 Introduction

English Medium Instruction (EMI) in this study takes the definition of Macaro (2018), namely, "the use of the English language to teach academic subjects (other than English itself) in countries or jurisdictions where the first language (L1) of the majority of the population is not English" (p. 19). Spreading from traditional hot spots, that is, the Netherlands and Northern Europe (Rose et al., 2020), EMI provision has been a growing trend even beyond these areas, as a strong response to adapt to the demands of internationalization around the global educational systems (Bukve, 2018).

As Rose et al. (2020) stated, the Chinese higher education system could be viewed as the largest

Address: Department of Education, University of Oxford, 15 Norham Gardens, Oxford, OX2 6PY, United Kingdom
Email: wei.zhu@education.ox.ac.uk

in the world, with one of the fastest-growing EMI provisions, increasingly competing with U.S. and U.K. universities by doing more research and teaching in English. However, due to the heterogeneity and complexity of political, economic, socio-cultural, and educational contexts in which Chinese EMI provisions have been introduced and implemented, many challenges emerged, such as the difficulty of appropriately selecting bilingual materials for instruction due to high price, and the urgent demand for bilingual professionals in China (Tong & Shi, 2012). Pan (2007) also pointed out that teachers' non-standard use of English may lead to misunderstandings for students. Given these considerations, a study of stakeholders' attitudes toward EMI would be valuable for policymakers who revise and further develop the provisions of bilingual education because stakeholders' (e.g., students) attitudes toward EMI may be informative for those considering introducing certain kinds of EMI courses to specific regions in China.

In the past decade, EMI at the tertiary level of education around the globe has received extensive study focusing on various perspectives, such as the perceptions of students (e.g., Macaro & Akincioglu, 2018; Tong and Shi, 2012), teachers (e.g., Kong et al., 2011), and parents (e.g., Wei, 2011). However, the nature of this topic indicates a need for replication of research in various scenarios to provide a more holistic view of the issue; Baker (1996) rightly proposed that even a subtle change in the input may result in different outcomes. In focusing on the Chinese context, this study also seeks to incorporate an important psychological variable into further analysis, namely, the degree of anxiety inherent in the EMI learning process.

Furthermore, in terms of methodology, a common limitation of much empirical research is that it focuses merely on the level of statistical significance, which is related only to the existence of the relationship, while failing to report the strength or magnitude of that relationship (i.e., effect size). With so many Chinese English-as-a-foreign-language (EFL) learners at stake, and evidence suggesting that more rigorous methodological practices are needed for empirical research, monitoring the evolving attitudes of Chinese EFL learners toward EMI courses is doubtless important. Therefore, the current research aims to reinforce recent calls for stronger methodological rigor (Larson-Hall & Plonsky, 2015; Plonsky & Oswald, 2014), hoping to contribute more empirical evidence concerning EMI attitudes in China. It strives to investigate college students' attitudes toward EMI, and the underlying moderating variables in the Chinese mainland. Two research questions guide the study:

RQ1: What are Chinese EFL students' attitudes toward EMI?

RQ2: How do selected variables (namely, gender, grade, and anxiety in the learning process of EMI courses) affect the EMI attitudes of the students?

Specifically, this study targets senior university students in China, to whom bilingual education seems to be exceptionally relevant to educational internationalization generally (Rose et al., 2020). The method includes a main questionnaire about EMI attitudes of students and follow-up open-ended questions. The questionnaire was adapted from a previous study (Bolton & Kuteeva, 2012), in which an exploratory factor analysis was used to ascertain the validity of the adapted scale.

2 Literature Review

Bilingual education (BE) is claimed to be both linguistically and academically beneficial (Bolton & Botha, 2015); however, it may also pose a threat to the existing or native language in certain regions (Al-Qahtani & Al Zumor, 2016; Kim et al., 2017). Because this study aims to investigate Chinese university students' perceptions of EMI, a review of previous studies targeting stakeholders' attitudes appears highly important for detecting areas for improvement and enhancing the effectiveness of EMI or BE programs.

2.1 EMI attitudes of different stakeholder groups

Around the world, researchers have focused on different aspects of EMI in their investigations. Many studies focused exclusively on students' perceptions (e.g., Bukve, 2018; Byun et al., 2011; Kim et al., 2017; Kong & Wei, 2019; Macaro & Akincioglu, 2018; Tong & Shi, 2012), the most prominent topic in this research area. Most found an overall level of satisfaction with EMI (Bukve, 2018; Byun et al., 2011; Kong & Wei, 2019; Macaro & Akincioglu, 2018; Tong & Shi, 2012). For example, Macaro and Akincioglu (2018, p. 262), who studied 989 students' perceptions of EMI courses provided in 18 Turkish universities, found "overall relatively high levels of satisfaction…with all averages being well above 3 points" (based on a 5-point Likert scale). In Korea, Kim et al. (2017) studied 523 undergraduate students' perceptions of 12 EMI-courses, covering three major engineering universities. Their study, however, found a contradictory result: An overwhelming majority of the respondents (67.2%) preferred KMI (Korean as the medium of instruction, as a counterpart to EMI) to EMI courses, although more respondents in this study still believed that their schools should continue to provide EMI classes.

The number of studies concerning other stakeholder groups, including parents (Al-Qahtani & Al Zumor, 2016; Wei, 2011), teachers (Dearden & Macaro, 2016; Jiang et al., 2019), and a combination of different groups (Denman & Al-Mahrooqi, 2019; Fang & Liu, 2020), are relatively smaller than the number of studies focusing on students' attitudes. Research on teachers' attitudes generally reported a more favorable attitude toward EMI than research did on students' attitudes. For instance, Dearden and Macaro (2016) carried out a small-scale study among 25 university teachers across three countries, mainly through qualitative interviews, and found an overall more favorable attitude toward the introduction of EMI, in line with previous findings of teachers' perceptions (e.g., Jensen & Thøgersen, 2011). Compared with students and teachers, who are "directly involved in classroom practices" (Fang & Liu, 2020, p.15), parents' belief about EMI has also been a research interest (Al-Qahtani & Al Zumor, 2016; Liao & Larke 2008; Wei, 2011). For example, Al-Qahtani and Al Zumor (2016) investigated 68 parents' attitudes toward EMI in Saudi Arabia, where Arabic is still used as the official language for teaching in all public primary schools. The results showed that while Saudi parents generally hold positive attitudes toward EMI in private elementary schools, some were worried about their children's Arabic language, which might be negatively affected by using English.

Therefore, both the results of Kim et al. (2017) that students may still prefer KMI to EMI during the teaching-learning process, and the potential threat posed to children's native language by English using (Al-Qahtani & Al Zumor, 2016), together help to raise the importance of conducting replicated research within this topic.

2.2 EMI attitudes and moderating variables

There is a wide variety of variables involved in the exploration of EMI attitudes of stakeholders, including gender, age, major, grade, years of learning English, experience of EMI learning and self-perceived language competence. Apart from these socio-biographical variables, some (socio-) psychological variables were also studied, such as the level of confidence (Bukve, 2018). Contradictory results have been presented in different research on some variables, such as gender, as most relevant studies did not find any gender differences regarding the dependent variable (e.g., Kong & Wei, 2019; Tong & Shi, 2012), while a few of them did (e.g., Macaro & Akincioglu, 2018). Specifically, Macaro and Akincioglu (2018) found that females were more likely to feel that EMI was improving their English proficiency than males. They also reported that female students were more likely to feel that EMI was a motivating factor for them, and that it was helpful to set them apart from other students academically, enabling them to enter an elite group (Macaro & Akincioglu, 2018). Therefore, the current study would include gender as one of the chosen variables given the dissimilar results of previous research.

Burke (2018) incorporated a (socio-)psychological variable, namely, students' confidence level in English skills, which turned out to be an important moderating factor in his study regarding students' attitudes toward EMI. Following a multiple linear regression, the confidence level of English skills, which was assessed and aggregated through three self-reported statements on English skills, accounted for 4.47% (R Square = 0.047) of the variance of Norwegian students' attitudes toward EMI courses. Unfortunately, the author did not provide any benchmarks to evaluate this effect size and thus was neither able to assess the strength of the explanatory power of this variable on Norwegian students' attitudes toward EMI nor to make cross-study comparisons with similar research, which is important because research findings may build upon one another to create a perspective that "sees each research project in the context of a coherent whole" (Larson-Hall & Plonsky, 2015, p. 127). Thus, this leaves room for the present study to report the results more rigorously.

Likewise, anxiety, another (socio-)psychological variable, is defined as a rudimentary emotion for humans facing uncertainties or feeling threatened (Sarason, 1978). Anxiety in language learning has also been fully explored, especially in the field of second language acquisition (SLA), where foreign language classroom anxiety (FLCA) is seen as an important influence on language learners' performance and achievement (Dewaele, 2017; Horwitz, 2010). Seeking to identify the sources of FLCA along with its relationships to EFL performance, SLA researchers have long adopted anxiety as a dependent variable in investigating predictors of foreign language anxiety such as gender, age, learning environment, testing, and task complexity (Dewaele, 2017; Horwitz, 2010). Notably, however, this important (socio-) psychological variable appears to be seldom or never treated as an independent variable, especially in the area of EMI, where FLCA may potentially moderate attitudes toward EMI. It is argued in the present study that incorporating anxiety as an independent variable may help ascertain possible links between this under-studied variable and Chinese university students' attitudes toward EMI, thus broadening the research scope of this topic. Also, this switch from a dependent variable to an independent one helps to raise the awareness of the cyclical nature of Baker's (1996) bilingual education model, where the so-called "input" and "output" variables are actually interchangeable depending on the research goal. Therefore, "an altogether more dynamic interaction" is expected, and careful consideration of it is encouraged (Dörnyei & Ryan, 2015, p.33). Baker's BE model will be discussed further in the next section (Theoretical Framework).

2.3 The reporting practices and methodological limitations among relevant research

For empirical studies, although some researchers have gone beyond descriptive statements by employing statistical procedures (e.g., *t*-test) to make further inferences from the sample, an important index called effect size, defined as "an objective and standardized measure of the magnitude of observed effect" (Field, 2009, p. 56), appears to have been disregarded to some degree. Highlighting the importance of effect size vis-à-vis the inherent limitations of the *p* value have recently been a prevalence (Ellis, 2010; Larson-Hall & Plonsky, 2015; Plonsky & Oswald, 2014). This is primarily due to the major concern of sample size, given that the statistical significance level (e.g., *p* value) may be easily found with a large sample despite a weak association, whereas the effect size is standardized and much less influenced by sample size (Morgan et al., 2011). Notwithstanding the importance of effect size, only a handful of studies in this area report this index, let alone further attempt to explain or interpret it.

However, failing to report effect size may lead to detrimental consequences (Zientek et al., 2008). Many empirical studies in this area appear to depend merely on the statistical significance level to decide the strength of the relationship between two focal variables without reporting the effect size (e.g., Denman & Al-Mahrooqi, 2019; Macaro & Akincioglu, 2018). For example, in the result section of the research conducted by Macaro and Akincioglu (2018, p. 263), the authors simply stated that "significant differences were found with regard to gender ($t = -2.13$; $p < .05$)" without giving the effect size for

these relationships with attitudes toward EMI, thus making it difficult to gauge or compare the possible different strength of the associations of gender and university types to predict the corresponding variance in perceptions of EMI.

Furthermore, researchers with traditional training erroneously view a smaller *p* value as corresponding with larger or stronger effects. Apart from the influence of sample size as mentioned above, the effects might still differ even when the statistical significance level equals 0.000. For instance, based on the data published by the Steering Group Office for Survey of Language Situation in China (SGO, 2006, pp. 360-361), we may conclude that students from Shanghai, Dalian, and Tianjin performed equally well on language tests based on the same *p* value ($p = 0.000$). However, the corresponding effect sizes revealed the true scenario, that Tianjin (0.572) scored the highest, with Dalian (0.475) coming in second, performing better than Shanghai (0.238). Failure to report effect size in quantitative research may mask a lot of important information in the results of statistical procedures, even leading to a completely opposite conclusion. Thus, it is argued that the statistical significance level and effect size, which are not substitutes, should be reported as complementary tools, and only providing *p* value might be dangerous for not revealing the data interpretation comprehensively (Fan, 2001).

Except the undue negligence of effect size reporting and continual dependence on the statistical significance level, some authors only reported the intervals of the *p* value (e.g., $p < 0.05$, $p < 0.001$) instead of the exact value (e.g., $p = .035$), potentially leading to dichotomous thinking (i.e., significant or not), which might be misleading for the later data analysis (Larson-Hall & Plonsky, 2015). This is related to proper interpretations or explanations after reporting the huge number of statistical results, which would be important not only for a finer illustration but also for a deeper understanding for readers. Thus, the present study follows recent calls for incorporating more interpretative statements in quantitative research (Wei & Hu, 2019). To conclude, this gap in reporting norms and methodological limitations leaves room for more rigor in this study's methodology, in both reporting and interpreting data analysis.

3 Methodology

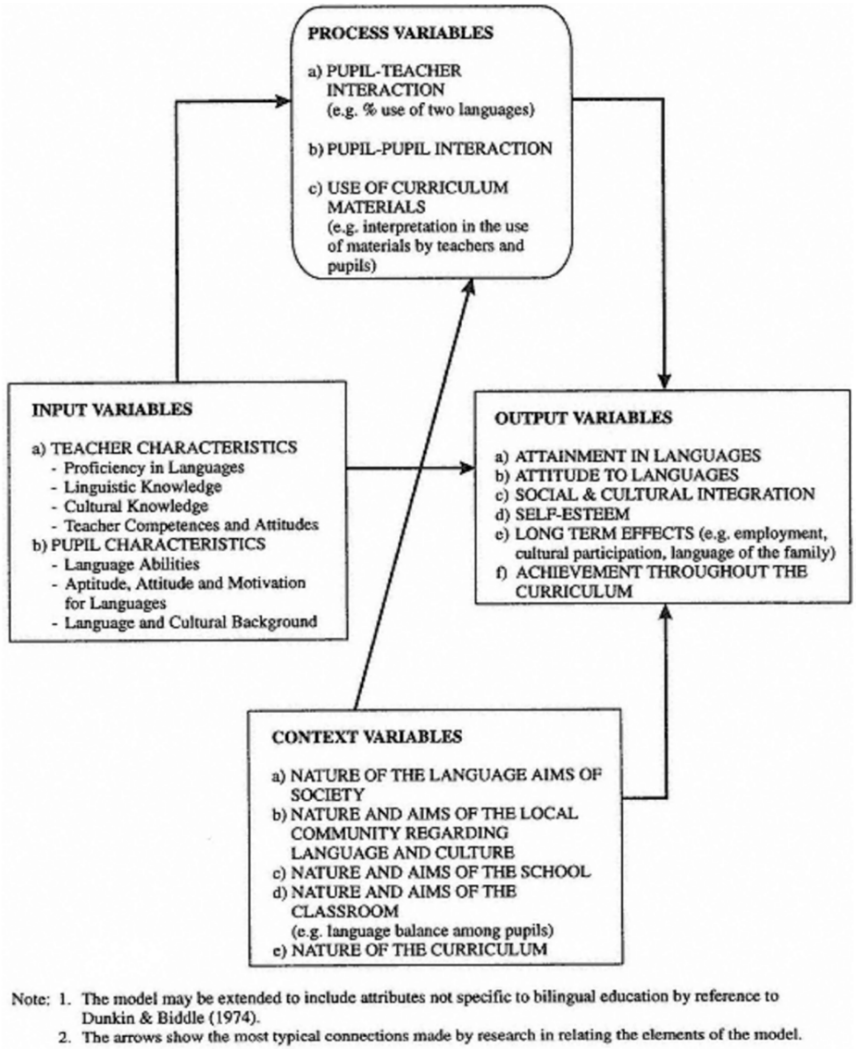
3.1 Theoretical framework

The present study adopts the theoretical model from Baker (1996), which covers important types of variables throughout the overall process of bilingual education. Baker (1996) used an analogy to introduce his four-part model, which stated that the "final outcomes of the language garden cannot be properly judged except by reference to the initial seeds and the contextual climate" (p. 344). He highlighted the importance of identifying and interpreting the relationship between the "input" and "output" variables, comparing the four parts of bilingual education, "the inputs, contexts, processes, and outputs" to "ingredients, environments, the growth process and outcomes" throughout the crop maturation process (p. 344). Notably, given that "attitude" is an "input" variable in bilingual education, this model provides great adaptability to the variable selection and further interpretation of the results, which very much suits the present study's research objective.

Given their prominent position in Baker's (1996) BE model and the contradictory results presented in previous research, two socio-biographical variables were chosen to explore in the present study: gender and major. The present study also incorporates anxiety in the EMI learning process, aiming to broaden the research scope with regard to attitudes toward EMI. Because the three chosen variables all fall into the "input" parts of this BE model, the research results will be discussed and interpreted based on the "input–output" relationship because they are intertwined with pedagogical insights.

Figure 1

Input-Output and Context-Process Model of Bilingual Education (Baker, 1996, p. 343)



3.2 Instruments

The present study employed two instruments: the main questionnaire regarding students' attitudes toward EMI and an auxiliary part exploring the reasoning for their choices. The main questionnaire comprises three parts. The first part surveys background information such as gender, major, and past experience with EMI courses. In the second part, an attitude scale is adapted from Bolton and Kuteeva (2012), which extracts information concerning participants' attitudes toward EMI, including seven five-point Likert-scale items (1 = "strongly disagree" and 5 = "strongly agree"). Six other typical items regarding the degree of anxiety in EMI learning, adapted from Horwitz (1986) *Foreign Language Classroom Anxiety Scale (FLCAS)*, were incorporated in the third part of the questionnaire. Therefore, the whole questionnaire comprises 13 items in total. Factor analysis was performed to assess the questionnaire's internal structure.

To examine the construct validity of the EMI attitude scale, an exploratory factor analysis showed that only one factor was extracted, accounting for 52.0% of the variance in the attitude scores, which suggested that the EMI attitude scale was unidimensional. In terms of reliability, a high Cronbach's alpha value (.841) of the attitude scale confirmed that it was appropriate to add up the scores from the four items to generate a total attitude score for later analysis. Similar analysis was conducted on the anxiety scale, and the results show that two factors were extracted, together accounting for 61.6% of the variance

in the anxiety scores. This indicates that the anxiety scale was dimensional, in a way that consists of two major sections, including the physical anxious syndromes, and perceived mental discomfort relating to peer pressure and nervousness. Similarly, the Cronbach's alpha value (0.834) for the anxiety scale also reaches an excellent level according to Field (2009), showing a good consistency of the internal structure of the scale, which also confirmed the appropriateness of the adding-up process to make a composite variable for anxiety.

In terms of the auxiliary part, participants who indicated their willingness in the end of the questionnaire to answer the follow-up questions were invited to give comments on and/or justifications regarding their choices in the attitude scale. Therefore, the information from the open-ended questions would complement the quantitative data from the main questionnaire through thematic analysis of what the respondents believe and why (Macaro & Akincioglu, 2018).

3.3 Participants

In the total sample of 169 Chinese students, 50.9% (n = 86) were female and 49.1% (n = 83) were male. Among the respondents, 67 (39.6%) were in the final year of their university studies, 55 (32.5%) in year three, 33 (19.5%) in year two, 12 (7.2%) in year one, and two (1.2%) in masters or doctoral programs. Most respondents majored in science and engineering (n = 72, 42.6%), followed by those majoring in the humanities and social sciences (n = 56, 33.1%), business and management (n = 37, 21.9%), and other fields (n = 4, 2.4%). More than half (n = 95, 56.2%) of the respondents reported understanding the definition of EMI well. Respondents who reported no previous EMI experiences (n = 19, 11.2%) were screened out from the "valid" respondent sample. Thus, the effective sample size would be 150.

3.4 Procedures

The present study adopts an open-access questionnaire on Wenjuanxing.com, a free China-based survey provider. This questionnaire received ethical approval from the affiliated institution (XJTLU) and was advertised through several social media platforms (e.g., WeChat, a popular China-based mobile phone application) and emailed to potential participants. It remained online between March and April 2021 and attracted 169 respondents whose responses were valid for use in data analysis. The online questionnaire required the respondents to indicate if they have had experience of EMI learning in order to gather authentic opinions on EMI from the targeted group for later data analysis. Those who had no EMI experience were screened out. Therefore, the sub-sample size (n = 150) for each variable deviated from the whole data set (N = 169). The software package, SPSS 22, was used to perform statistical procedures based on the questionnaire data. The auxiliary instrument was sent to a total of 15 respondents, who responded to the invitation to participate in the follow-up open-ended questions mentioned at the end of the main questionnaire. Eight of these 15 respondents justified their choices on all seven items and gave written comments, while others only completed part of the justification concerning the seven items. The written feedback complemented the quantitative data analysis from the main questionnaire.

3.5 Data analysis

RQ1 was answered using descriptive data, including mean, frequency, and standard deviation. In addition, a general thematic analysis of the qualitative data (i.e., the reasoning part of the EMI attitudes scale provided by volunteers from the respondents) provided additional materials for further exploration of students' perceptions, which complemented the quantitative data. Following Plonsky and Oswald's (2017) suggestion that "regression can do everything ANOVA can do, and more" (p. 588), regression would be a better alternative for researchers to conduct statistical analysis because it could help estimate the relative contribution of each predictor variable (Plonsky & Oswald, 2017). Therefore, RQ2 was

addressed through regression to demonstrate the contribution of each selected variable, with the exact *p* value and effect size reported accordingly. For convenience in discussing the inferential statistics, the conventional statistical significance cut-off level (α = .05, non-directional) was adopted.

4 Findings

4.1 RQ1: What are Chinese EFL learners' attitudes toward EMI?

Table 1

The EMI Attitude Scale

Item	Mean (SD)
(1) I am interested in attending EMI classes.	3.63 (.96)
(2) EMI helps improve my English language proficiency.	3.68 (.80)
(3) I think it is important to have EMI courses for further studies and future work.	3.75 (.79)
(4) My university should offer more EMI courses.	3.38 (.87)
(5) I feel better prepared for future work when I use English actively in my education.	3.76 (.73)
(6) It is important to learn how to use English properly for further studies and future work.	3.92 (.77)
(7) Accustoming oneself to using English is a competitive advantage when applying for jobs.	4.01 (.70)
Composite for EMI attitudes	3.69 (.58)

According to Table 1, the average score (3.69) for the composite variable "EMI attitudes," based on the seven questionnaire items, has exceeded the mid-point (viz. 3) between "strongly disagree" and "strongly agree" on the five-point Likert scale. More specifically, it actually exceeded 3.5, which shows a relatively high score on this composite variable "EMI attitude." This indicated that, overall, the EMI attitudes of the sampled students were slightly favorable. Findings regarding the constituent items of EMI attitudes appear consistent with those from previous research. For example, for Item 1, 60% of the respondents indicated interest in EMI courses, in line with previous findings (e.g., Byun et al., 2011).

Compared with other results averaging above 3.6, the score for Item 4 is relatively low, which might indicate more neutral perceptions that respondents held regarding the need for EMI courses and their further development at their universities. However, the average score for Item 4 was still above the mid-point (3.0), showing a generally positive attitude. Additionally, a striking finding is that only 0.7% of the respondents chose "strongly disagree" for items 2 and 4, indicating the overall high level of participants' positive perceptions toward EMI.

The generally positive attitude toward EMI could be explained and interpreted through three major themes emerging from the responses to the open-ended questions: pursuit of better future studies or work, the forces of the all-English learning environment, and the inevitable trend of globalization or internationalization. First, nearly all respondents tended to perceive the direct influence EMI learning has on their pursuit of future jobs or studies. As one participant remarked,

> EMI helps me equip myself with abilities to access more English materials. It also helps me feel more confident to use the language, which is not limited to the academic area, but for more daily occasions. For my major (information and computing science), English is employed in most papers on cutting edge technologies and popular communities such as GitHub. Taking EMI course is essential for my further studies and work.

For future studies, one respondent commented on the effectiveness of EMI courses at the tertiary level to better prepare students for their postgraduate studies abroad. Apart from the academic benefits, participants also mentioned the importance and necessity of a good command of English for future work, given the present status of English as a lingua franca.

> Nowadays, communication with other countries is increasingly frequent, and cooperation has also increased. English becomes the most common-used language in the world; therefore, a good command of English would be a plus for job hunting.

The above responses also echo the descriptive data shown in Table 1, in which the average scores for item 6 (3.92) and item 7 (4.01) were generally higher than the scores for other items; these two items were all intended to assess respondents' perceptions toward their perceived benefits of EMI in terms of future studies and work.

Second, the respondents commented on the all-English learning environment of EMI courses which forces students to immerse themselves, in a way that trains their receptive and active capabilities for using English. Such perceptions were reflected in students' comments such as "The way our school educates you creates a language environment where you have to use English" and "in EMI courses, you have to blend yourself into the environment, which helps a lot to develop the sense of using English in a better way, whether it is oral or written work." Perceptions of these language-related benefits seemed to be common among participants. For example, one junior student who has had EMI experience remarked,

> Attending lectures and seminars can improve my listening skills, in which I can also communicate with teachers or group members to practice my oral English. My writing skills have been improved through preparing the coursework. And my reading ability in English has been exercised by reviewing the literature, which is an integral part of writing essays. Therefore, I have improved in all aspects.

Finally, the trend of globalization and internationalization also emerges as a major theme to help explain students' overall perceptions toward EMI classes, which appears to go beyond mere language-related benefits for individuals, regarding the global trend of integration in which the mastery and use of English would be regarded as a tool and a competitive advantage for individuals, corporations and even nations.

> In an international organization, employees' knowledge of English can eliminate the need for translators in business dealings. In the government sector, mastery of English can also enhance a candidate's core competencies. And with the deepening of internationalization, the role of English has become more and more important, which has penetrated into people's daily lives.

This remark resonated with the comment made by another student, that "over 90% knowledge of human is stored in English. Universities in China still have a long way to go," indicating the need to incorporate EMI at the tertiary level.

In a word, the above qualitative data revealed a more favorable attitude toward EMI, shown by the average score (3.69) in Table 1. This might be explained by both the language-related benefits perceived by individuals, and other non-language factors perceived by respondents, including the pursuit of future work or studies. Apart from these two kinds of perceived benefits of EMI, the trend of globalization and internationalization of universities and enterprises also counts, where fluency in English confers advantages on individuals and their employers. Thus, the first research question was answered, as participants generally held positive attitudes toward EMI provision and learning. Particularly, they provided specific reasoning and justifications for their responses on the attitude scale, in which perceived language-related benefits of EMI learning and non-language related advantages both emerged as major themes in their answers.

4.2 RQ2: How do selected variables affect the EMI attitudes of the students?

As one of the focal variables indicated in the second research question, the anxiety level in EMI courses was studied based on the ordinal data collected by the second part of the questionnaire. Some descriptive information may need to be reported here for later analysis. First, a glimpse at Table 2 indicates that, apart from the item of perceived peer pressure (3.55), the average scores of the other five items went all slightly above 3, the mid-point of the five-point Likert scale. This result demonstrates that, overall speaking, the anxiety level of students in EMI courses averages slightly above the "neutral" point. In other words, the overall anxiety that the participants perceived in EMI courses may not be so strong, as shown by the mean score of the composite variable (3.15).

Table 2
Anxiety Scale

Item	Mean (SD)
(1) I get nervous and confused when speaking in my EMI class.	3.00 (.88)
(2) I perceive peer pressure in EMI learning process.	3.55 (.72)
(3) Even if I am well prepared for EMI class, I feel anxious about it.	3.11 (.90)
(4) I start to panic when I have to speak without preparation in EMI class.	3.13 (.92)
(5) It embarrasses me to volunteer answers in my EMI class.	3.02 (1.03)
(6) I can feel my heart pounding when I'm going to be called on in my EMI class.	3.09 (.89)
Composite for anxiety level	3.15 (.57)

Second, the mean score (3.55) of the item "perceived peer pressure" exceeded the mid-point (3.5) between "Neutral" and "Agree," and was much higher than the mean score of other items in the anxiety questionnaire, indicating that the peer pressure that the respondents have perceived in EMI courses was relatively high. This observation might strengthen the value of studying the effect that this item may have upon students' attitudes toward EMI, given the exploratory nature of the present study.

After reporting the above descriptive data, statistical instruments were adopted to conduct inferential analysis. Following Plonsky and Oswald's (2017) suggestion that "regression can do everything ANOVA can do, and more" (p. 588), regression seems a better alternative for researchers to conduct statistical analysis, as it helps estimate the relative contribution of each predictor variable (Plonsky and Oswald, 2017). Therefore, the present study adopts regression to replace ANOVA, its non-parametric counterparts, to better explore the multivariate nature of language itself, given that ANOVA is basically bivariate in the one-cause-one-effect mode.

Before running regression to answer the second research question, a preliminary analysis was conducted to filter variables that need not be included in later regression. Firstly, an independent-samples *t*-test was conducted upon the variable, gender, and EMI attitudes of students. Results show that there is no obvious gender difference on students' attitudes toward EMI ($t = .056$, $p = .956$, $r = 0.005$). Though the result is not statistically significant because of the large p value, the effect size (.005) was still computed, which indicates that the magnitude of the relationship between gender and EMI attitudes is below the threshold for "small" (.100) according to Cohen's benchmark. This result resonates with previous studies (Wei et al., 2017). Similarly, Spearman's rho shows that the correlation between the nominal variable, grade, and EMI attitudes also lies below the threshold for "small" (.100) in Cohen's benchmark ($p = .540$, $r = .050$). This confirms that these two nominal variables need not be included in later regression.

Second, correlation analysis was conducted between variables of the overall anxiety level and EMI attitudes (see the Appendix for detailed findings). However, the correlation effect size (p = 0.537, r = -0.051) between the composite variable, EMI attitudes, and the anxiety level in EMI courses does not reach the "small" threshold. (0.1) of Cohen's benchmark (0.1, 0.3, and 0.5, respectively for small, medium, and large cutting points), indicating that the overall relationship between these two variables may be irrelevant. Among the six items of the anxiety scale, however, an interesting observation was made that attitudes regarding EMI were strongly correlated with perceived peer pressure (p < .000, r = 0.500), which would justify the value of including this item in statistical analysis, and also leave room for further exploration and discussion of this item.

Table 3

Correlation Coefficients in the Anxiety Scale

Item	Effect size (Correlation coefficient)	*p*
I can feel my heart pounding when I'm going to be called on in my EMI class.	.035	.668
I perceive peer pressure in EMI learning process.	.500**	<.0005
I get nervous and confused when speaking in my EMI class.	-.029	.726
Even if I am well prepared for EMI class, I feel anxious about it.	-.002	.977
I start to panic when I have to speak without preparation in EMI class.	.028	.731
It embarrasses me to volunteer answers in my EMI class.	-.048	.561

Based on Baker's (1996) model, described in the methodology section, the cyclical nature of his model determines that any input variables can be converted into output ones and vice versa. Therefore, in this case, the item "perceived peer pressure" can justifiably be treated as an independent variable to be explored with the composite variable, EMI attitudes, in later regression analysis given the robust effect that this item has upon EMI attitudes.

Table 4

Regression Predicting EMI Attitudes: Model Summary

	R Square	R Square Change	F Change	*p*
Model:	.251	.251	49.548	<.0005
Perceived peer pressure				

The ANOVA (F = 49.44, p < .0001) tells us that the regression model, overall, results in a significantly good degree of prediction of the outcome variable (see the Appendix for detailed findings). Table 4 provides the model summary results for the regression model predicting the EMI attitudes score. This model was shown to be statistically significantly added to the prediction of EMI attitudes score (p < .0005). To put it differently, perceived peer pressure emerged as a statistically significant predictor of students' perceptions of EMI. The R Square Change column in Table 4 summarizes the most important information, the percentage of variance in the outcome variable that is shared by the predictor variable. In this case, "perceived peer pressure" alone accounts for 25.1% of the variance in the EMI attitudes. This

result has exceeded the "medium" benchmark and nearly reached the "large" one according to Cohen's benchmark system for regression results (2%, 13%, and 26%, respectively for small, medium, and large cutting points). This means that nearly 75% of the variation in students' attitudes toward EMI cannot be explained by perceived peer pressure alone. Therefore, other variables must also have an influence. Thus, further explorations are encouraged to incorporate other understudied variables to develop a more comprehensive picture of this area of inquiry.

Though this finding appears robust according to Cohen's benchmark (1988), it cannot be compared with previous research because it is the first time that anxiety has been investigated as an independent variable, despite having been previously used as a dependent variable. Further, it is also the first time that the item "perceived peer pressure" has been treated as an independent variable. Given this study's exploratory nature, this finding would better be retained for future research to make comparisons, and therefore, possible conclusions could be drawn to inspire further explorations and appropriate interpretations.

To conclude, among the three selected focal variables—gender, major, and the anxiety level in the EMI learning process—none emerged as important predictors of EMI attitudes toward EMI, whereas one of the six items on the anxiety scale, perceived peer pressure, turned out to be the most important variable influencing EMI attitudes, which can account for approximately 25% of the variance of students' perceptions toward learning through the medium of English. Therefore, the two proposed research questions were answered with empirical evidence.

5 Discussion

Based on these findings, implications could be examined in both methodological and practical perspectives. Firstly, methodologically, the present study stands on rigorous statistical reporting practices, consciously including the effect sizes alongside *p* value, which has been advocated by many academic researchers (e.g., Plonsky & Oswald, 2014). This methodological improvement effectively avoids sole reliance on the statistical significance level to assess the relationship among variables with its strength and magnitude, which could and should be generated and interpreted based on more robust statistics (e.g., effect sizes). As Ellis (2010) argues, "if history is anything to go by, statistical reforms adopted in psychology will eventually spread to other social science disciplines" (p. xiv). More rigorous statistical provisions and applications are believed to prevail in various disciplines and fields, such as applied linguistics (Ellis, 2010). Therefore, researchers should stand on and stick to these suggestions to provide replicable studies.

In addition to the methodological implications, there are some practical implications in terms of students' perceptions toward EMI and their perceived anxiety level during the EMI learning process. Some socio-biographical variables such as gender and grade turned out to be unimportant predictors for EMI attitudes of students as measured by the corresponding effect sizes, in line with many previous studies that also explored such variables (e.g., Kong & Wei, 2019; Tong & Shi, 2012). However, it is noteworthy that one of the six items on the scale of anxiety in EMI learning, namely, the perceived peer pressure, turned out to be an important and influencing predictor variable for EMI attitudes. Based on the result that students' perceived peer pressure can explain over 25% of the variance of their perceptions toward EMI, which nearly reaches the "large" cutting point in Cohen's (1988) benchmark for regression coefficient, it would be wise to explore the sources and consequences of having such negative emotions by students. Thus, this finding may generate practical implications regarding teaching and schooling at different levels.

Previous research concerning peer pressure among students appears to have similar findings in terms of the source. Based on a large-scale survey in three countries, Boehnke (2008) found that peer pressure is one of the induction factors leading to social exclusion, and this pressure is more prevalent in cultures

with low support or preference of achievement values. He also suggested that teaching subjects such as mathematics in single-gender classes may help mitigate the problem, given that the results showed that "boys are more often than girls the perpetrators of peer pressure" (p. 158). This finding echoes that of Bursztyn et al. (2019), who explored stigma related to students' performances. They found that cultures in different schools matter in terms of students' attitudes toward input and efforts, given that in schools where visible efforts are stigmatized among peers, it is likely that students may not wish to reveal their learning inputs (Bursztyn et al., 2019). The authors also proposed a range of programs aiming to improve the peer culture, including an emphasis on the privacy of students' grades, and incentive mechanisms to tackle the problem relating to efforts and stigma among peers, in which students can claim that their efforts are for the extra credit (Bursztyn et al., 2019).

Therefore, a school's climate and culture appear to be important factors in peer pressure, which in turn, can be improved or changed in different ways, including innovative classroom organization (Boehnke, 2008), incentive programs for promoting a positive learning climate (Bursztyn et al., 2019), and design of assignments mandatory for all students (Bursztyn et al., 2019). Educators may also wish to enlarge the influence of the positive emotions that students perceive, such as feelings of accomplishment and enjoyment in EMI classrooms, perceived benefits of EMI grit, and engagement in EMI learning. By combining these positive emotions with the above programs aiming to reduce peer pressure, educators are more likely to develop more careful implications on what to do and how to do it in terms of classroom organization, interaction, and assessment.

In this sense, research targeting positive psychological variables would be encouraged, following the recent transformation trend of research direction toward positive emotions, as positive mindsets are believed to be more helpful for students to absorb language knowledge, and therefore build their own vocabulary corpus to tackle problems in language learning (Li & Xu, 2019; MacIntyre & Gregersen, 2012).

6 Limitations

Despite its methodological contributions, this exploratory study has two major limitations. Firstly, this research takes the form of an online questionnaire to collect data, which has its inherent drawbacks despite numerous advantages. As Dewaele (2018) pointed out, one major limitation of using questionnaires, and online questionnaires in particular, is the respondents' "inevitable self-selection bias" (p. 271). To be specific, for online surveys, it may not be possible to apply a "systematic sampling strategy" (Dörnyei, 2007, p. 122), as only people interested in the topic would be willing to respond to the questionnaire. In this sense, potential participants who would be enrolled in an online questionnaire are described as "self-selected" (Dewaele, 2018, p. 271).

The second limitation of using an online questionnaire lies in the difficulty of attaining balance regarding age, gender and education level. In this study, the researcher has consciously controlled most of the irrelevant variables, such as gender, making it as balanced as possible. Moreover, since the expected respondents of this study are prescribed to be university students, variables including age and the educational level seem to be indecisive factors. Despite these limitations of online questionnaires, this data collection method does not invalidate the research itself (Dewaele, 2018), where careful interpretations of the results are required to reach any conclusions.

To summarize, it would be unlikely for researchers to have a sample that is perfectly representative of the general population. However, as Dewaele (2018) argued, this should not discourage researchers "as long as we acknowledge the limitations of research design and sample" (p. 276) and, at the same time, remain conscious and careful in drawing any conclusions from the results.

7 Concluding Remarks

This study has added to the existing body of research on stakeholders' perceptions toward EMI which focuses particularly on university students in the Chinese mainland, suggesting that this particular group of stakeholders generally hold positive attitudes toward EMI. The qualitative data have shown that students have benefited from receiving education in the medium of English, both in terms of language-related and non-language-related advantages. By means of introducing an understudied socio-psychological variable in this area of inquiry, namely, anxiety in the EMI learning process, the present study has contributed in terms of broadening the research scope of "EMI attitudes" so as to deepen the understanding of students' attitudes toward EMI in the Chinese context.

Most importantly, this study has found that students' perceived peer pressure, which is one of the items for evaluating the anxiety level in the EMI learning process, appears to be an influential predictor of perceptions of EMI learning. This is the first time that this variable has been treated as an independent variable, which could be justified with reference to the classic model of bilingual education proposed by Baker (1996), given that the relationship between "input" and "output" variables is cyclical in nature, in which the switch between them may encourage researchers to achieve a more dynamic interaction (Baker, 1996; Dörnyei & Ryan, 2015). Though other socio-biographical variables selected in this study turned out to be unimportant as variables influencing attitudes toward EMI, the corresponding effect sizes were still computed to demonstrate and confirm that the strength of the relationship was indeed weak based on the benchmark built by Cohen (1988), following recent calls for more statistical rigour in the methodology.

Notes

1. Before running the factor analysis, the assumptions for factor analysis had been checked: KMO = .833 ("excellent" according to Field, 2009), and all KMO values for individual items were > .64, well above the acceptable limit of .5 (Field, 2009). Bartlett's test of sphericity = 377.345, ($p < .0005$), and the sample-size-to-variables ratio (75.0) showed that the data-set was appropriate for factor analysis. To extract the most appropriate number of factors, both the Kaiser criterion of using eigenvalues over 1 and the visual inspection of a Scree plot were employed. A cut-off point of .40 was adopted for factor loadings (Field, 2009).
2. Assumptions were checked to see if the data are suitable for conducting regression.
3. Note: The claim that some variables are deemed as "important predictors" demonstrates statistical significance with an appropriately large enough effect size (for correlations, the correlate coefficient itself is the effect size, whereas for regression, the column of R square change should be reported as the effect size).

Appendix

1. Correlations between EMI attitudes and Anxiety level

		Composite for EMI attitudes	Composite for anxiety level
Composite for EMI attitudes	Pearson Correlation	1	-.051
	Sig. (2-tailed)		.537
	N	150	150

Composite for anxiety level	Pearson Correlation	-.051	1
	Sig. (2-tailed)	.537	
	N	150	150

2. ANOVA[a] of the regression

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.653	1	12.653	49.440	.000[b]
	Residual	37.877	148	.256		
	Total	50.531	149			

a. Dependent Variable: Composite for EMI attitudes

b. Predictors: (Constant), perceived peer pressure

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Wei Zhu is a graduate student in the Department of Education, University of Oxford. Her research interests are in the fields of minority education, research methods, and applied linguistics including multilingualism and language instruction.