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Testing a multidimensional model of student motivation: A construct validation approach of the music model of motivation

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ABSTRACT

The purpose of this research is to test the construct validity of the MUSIC model of motivation in the context of English Medium Instruction (EMI) in Sino-foreign cooperative education programmes at the tertiary level. The five-dimension MUSIC theory of motivation (empowerment, usefulness, success, interest, and caring) was utilized as the model for the measurement of student motivation. The quantitative method by survey was used and samples were gathered in questionnaires taken by 350 students studying at EMI programmes where English was used as the dominant language in teaching in three universities of South China. The multidimensional status of the MUSIC model was analyzed with confirmatory factor analysis (CFA). The results present solid evidence for the five-factor MUSIC construct solution, proof of its validity within the EMI environment showing that the model is valid, reliable and applicable to EMI studies. Results proved our assumption that the EMI course motivation construct could be explained using the five first-order factors. Results also proved acceptable internal consistency reliability for the entire scale of learning motivation at the tertiary level. The study confirms the use of the MUSIC model in EMI and makes a general contribution towards knowledge in the field of motivation for cross-cultural higher education contexts.

Contribution/Originality: This study identifies innovative approaches to improve English Medium Instruction (EMI) educational quality. The research offers empirical support for higher education institutions and stakeholders to implement precise motivation strategies in EMI student engagement.

1. INTRODUCTION

Internationalization is now a characteristic of Chinese higher education, including staff mobility, international programmes, and collaborative activities (Dafouz & Smit, 2022; Knight, 2008; Liu, 2021). Chinese universities departed from their comparative isolation from actors in the global community of higher education following the late 1990s, facilitated by the rapid growth of the sector to mass education (Zha, Wu, & Hayhoe, 2019). One of the key strategies in this internationalization has been the implementation of English-Medium Instruction (EMI) to strengthen institutional competitiveness and recruit international students (Zhang, 2018). The trend has sparked controversies regarding its challenges such as its effects on education quality and sustainability (Altbach, Reisberg, & Rumbley, 2010).

By the end of 2021, 2,356 cooperative programmes were approved by the Ministry of Education, covering collaboration with countries and regions counted at 39 involved not less than 1,000 foreign universities with over

900 Chinese institutions (Ying & Wenjing, 2023). These programmes have arrangements, offering different study plans for those students staying in China and those students going to study abroad (Brewer & Cunningham, 2009). The degrees from these programmes are actually like the ones from non-cooperative programmes at the same Chinese universities. The foreign universities give certificates that are also like those given in their own countries. These certificates are the same as others without having words such as "cooperatively run" or "international" written on them, making them not different from normal degrees (Ma, Li, & Gu, 2019; Zuo, Guo, McDougall, & Zhang, 2024).

English Medium Instruction (EMI) understood as the use of English for teaching scholarly content in institutions where English is not the mother tongue of the majority (Macaro, Curle, Pun, An, & Dearden, 2018) has become a global trend, especially at university levels. Although implementation differs across settings, shared issues include teachers' lack of English proficiency and pedagogic training and learners' difficulty regarding language, understanding of content etc. (Macaro, Akincioglu, & Han, 2020; Ruiz-Madrid & Fortanet-Gómez, 2022; Tran, Tran, & Bien, 2020). Hong Kong-based EMI lecturers tend to devote lots of time to translating content, replicating a common myth that successful implementation of EMI hinges on English proficiency but not on pedagogical adjustment (Sung, 2022). Effective pedagogy of EMI hinges on a transition away from conventional teacher-centered approaches toward student-centered pedagogy in a way of catering to the linguistic and pedagogical needs of learners (Ahmed & Alharbi, 2023; Ismailov, Chiu, Dearden, Yamamoto, & Djalilova, 2021).

Despite its increasing popularity, EMI is opposed in some settings due to concerns about academic proficiency, motivation (Rose, Sahan, & Zhou, 2022) as well as the challenge of implementing translanguaging—a pedagogy that identifies and builds on students' multilingual competencies (Canagarajah, 2011; García, 2009). Although research on EMI issues in nations such as Turkey and Japan has been conducted (Aizawa, Rose, Thompson, & Curle, 2023; Selvi, 2014) EMI research in Chinese universities is still scarce, especially regarding student motivation and engagement (Akıncıoğlu, 2024; Galloway, Kriukow, & Numajiri, 2017). This is a significant gap since EMI students tend to encounter double challenges of both content knowledge and language and therefore can achieve lower academic performance (Evans & Morrison, 2017; Kirkpatrick, 2017).

The MUSIC Model of academic motivation provides an overarching model for the promotion and conceptualization of student motivation in EMI (Jones, 2017). Through the fusion of five elements—empowerment, usefulness, success, interest, and caring—the MUSIC model of academic motivation generally has effects on student motivation, learning, and engagement. In contrast to mainstream L2 motivation models, the MUSIC model offers an integrative account that eclipses typical gaps in models which fits the EMI setting well. Its generalizability was evidenced within various teaching environments, including English language learning in Spain, China, and America (Jones, 2017; Jones, Li, & Cruz, 2023).

This research utilizes the MUSIC model in investigating student motivation within the Chinese university EMI programmes, a critical missing part in the literature on demotivation in an EMI setting. The research maintains cultural applicability and accuracy to ensure maximum validity of results through its re-translating and application of the MUSIC Inventory to this context. Lastly, this study tries to shed light on how the MUSIC model can more effectively facilitate student motivation and engagement in EMI programmes, adding to the broader internationalization enhancement in Chinese higher education.

2. LITERATURE REVIEW

2.1. English Medium Instruction in Chinese Higher Education

The employment of English as a language of instruction practice in higher education worldwide is prevailing, especially in nations and regions where English is not the first speaking language (Dearden, 2016). This trend has led to increasing examination of factors focused on the effectiveness (Hu & Lei, 2014) validity (Ruiz-Cecilia, Medina-Sánchez, & Rodríguez-García, 2023) and equivalence of EMI programmes (Rose et al., 2022) with the new

Chinese adaptation of the MUSIC model of motivation inventory self-report measures being among local examples. The present study is particularly interested in the EMI context of such measures for Chinese undergraduate students in Sino-foreign cooperative programmes.

EMI programmes are also on the increase in China, and the majority of the institutions have now been providing Sino-foreign cooperative programmes through the language of English with the sheer number and variety of issues (Jiang, Zhang, & May, 2016). Far from being unique to China, however, other nations and regions across the world are also adopting EMI programmes in their efforts to internationalize their education and universities (Fang & Liu, 2020; Selvi, 2014). During the controversy, some scholars believe that EMI is not for every learner and debate and argument on cross-cultural applicability and relevance (Zhang, 2018). Therefore, it is necessary to critically discuss the integration of EMI programmes in China and its effects on the learning performance of learners and the learning environment.

However, little research on student motivation among Chinese EMI students has been conducted (Iwaniec & Wang, 2023; Zhang & Pladevall-Ballester, 2022). In particular, it is situated in the EMI setting of the MUSIC model of motivation inventory self-report scales among Chinese college undergraduates studying Sino-foreign cooperative programmes. The study attempts to make a contribution to the controversy regarding whether or not EMI programmes are serviceable and effective by examining what drives students in this special EMI context. It is an attempt at validating markers of learning motivation in a Chinese context through questioning Chinese university students' attitudes and beliefs towards EMI programmes by using the MUSIC model of motivation inventory.

2.2. Sino-Foreign Cooperative Higher Education and EMI Courses in China

Sino-foreign cooperative education programmes which have been approved by the Chinese Ministry of Education were important factors in internationalizing Chinese higher education through the introduction of quality foreign educational resources (Xiao & Zhang, 2017). The programmes provide students with the opportunity to access international education experience at home and provide a financially viable alternative to self-financed overseas study. The students are awarded double-degree academic degree diplomas which are endorsed by the Chinese Service Center for Scholarly Exchange (CSCSE) of the Ministry of Education, thereby making their education internationally and nationally recognized (Xu & Mei, 2018).

One of the characteristics of Sino-foreign cooperative education is the adoption of a foreign language with the most prevalent being English as a teaching medium (Guo, He, & Wang, 2022). It is a variation of the more general phenomenon of English-Medium Instruction (EMI) in Chinese higher education institutions that purportedly improves the language skills of students as well as knowledge transmission (Macaro et al., 2018). Nonetheless, China's adoption of EMI has been confronted by the severe problem of shortages in qualified teachers, inadequate language assistance and the unevenness in students' level of English language proficiency (Jiang et al., 2016). Problems have tested the effectiveness and validity of EMI programmes, especially in Sino-foreign collaborative public universities.

Efficient EMI implementation plans are available to counter such obstacles. They involve offering professional development to the teachers to enhance their English language proficiency and teaching ability, adding writing workshops or centers as part of the language support services, and curricula with blended language and content learning goals (Dearden, 2016). Similarly, establishing a collaborative learning culture by offering group work and peer-to-peer interactions opportunities can assist the students in gaining linguistic and academic skills (Airey, 2016). These are essential in terms of ensuring that EMI programmes do not only open access to global knowledge but also prepare students in terms of acquiring linguistic skills to use in global academic and working contexts.

Additionally, the legitimacy of EMI programmes has also been called into question since the learning of the language and professional content at the same time by the students can result in difficulties in adapting to the EMI

setting (Muttaqin & Chuang, 2022). Further studies on the effects of EMI programmes on the learning outcomes and overall learning experience of the students are therefore required. Sino-foreign cooperative education programmes and EMI programmes can better fulfill their role in delivering high-quality, internationally recognized education to Chinese students by solving these issues and streamlining implementation strategies.

2.3. Learning Motivation

Motivation refers to the degree to which one intends to participate in an activity (Marcus & Forsyth, 2002). One of the success-determining factors for any education initiative including EMI initiatives is motivation. Either intrinsic or extrinsic motivation can be present. Both serve as essential functions of being indicators of students' well-being (Jafar et al., 2025) dropouts (Hashim, Lim, Jafar, Suppiah Shanmugam, & Bukhari, 2024) and engagement (Awang-Hashim, Kaur, & Noman, 2015; Awang Hashim & Murad Sani, 2008). Intrinsic motivation is the inherent interest and passion for learning whereas extrinsic motivation is motivated by reasons external, for example, grades or rewards. Student motivation towards EMI programmes has been shown by research to be affected by a host of factors like students' linguistic ability (Tran et al., 2020; Tran, Burke, & O'Toole, 2021), students' country of origin (Johnson, 1981) and general learning environment (Tsou & Kao, 2017).

The English proficient students have higher possibilities of being motivated to learn EMI courses since they possess the language capacity necessary to comprehend and keep pace with the course. The other students with lower levels of English proficiency may not be in a position to keep pace with the course and thus get demotivated (Chen & Kraklow, 2015). Additionally, there may also be cultural variation in student motivation in EMI programmes. For example, collectivist students from cultures like China would be more concerned about preserving group harmony and would not easily speak or ask questions in classes, thereby damaging their learning process (Wen & Clément, 2003).

To optimize the performance of students in EMI programmes, these motivation issues need to be grasped and tackled by teachers. This can be achieved through the provision of more linguistic support to lower language proficient students, the establishment of a friendly and positive classroom environment, and the use of culturally responsive teaching (Jafar, Yaakob, Awang, Zain, & Kasim, 2022).

Teachers can get their students engaged in the EMI classroom activities. China's L2 medium of instruction policy has been confronted with a lack of language support and low English-proficient students (Macaro & Han, 2020). These have called into question the validity and effectiveness of EMI programmes in China, more so in Sino-foreign collaborative universities.

2.4. Music Model of Motivation

The MUSIC model of academic motivation by integrating theory and research from related fields, education, and psychology (Jones, 2017). The model is built on a social-cognitive theory of how the internal mental processes and the external environmental forces work on motivation (Bandura, 1986). By integrating these five factors, teachers can build courses that are not only achieving academic goals but also nurtured with caring and stimulating learning environments. For example, a teacher can inform students by selection of assignment, make the material significant by practical application, build achievement by step-by-step assignments, challenge interest by challenging material and demonstrate caring by frequent contact and individualized feedback.

The MUSIC model goal was to develop an effective, evidence-based model teachers could use to increase student motivation and engagement in school. Five components are promoted by the model empowerment, usefulness, success, interest, and caring—that are grounded in sound psychological theory and constructed to meet the complexity of student motivation. These factors create a positive and motivational climate in which students are more likely to be actively engaged in learning.

The first dimension, empowerment comes from the self-determination theory in which autonomy is described as one of the basic psychological needs (Deci & Ryan, 2000). The dimension assesses the degree to which students feel they can control their learning process. When students feel they can make authentic decisions over their learning, they will be inclined to be intrinsically motivated and active in their learning achievements. For instance, enabling students to choose project themes or establish personal learning objectives can give them a sense of control.

The second variable, usefulness is derived from expectancy value theory which predicts that students will be more likely to do tasks that they perceive as being useful to their own or work objectives (Wigfield & Eccles, 2000). This scale indicates whether students perceive that course content will be helpful to them in achieving their short-term or long-term goals. When teachers are definite about how coursework applies to real-world uses or future career opportunities, students tend to understand its usefulness and remain engaged.

The third element, success is informed by self-efficacy theory which puts emphasis on students' beliefs in themselves that they can succeed (Bandura, Freeman, & Lightsey, 1999). This construct measures whether or not students feel that they can succeed in the class if they work hard. This feeling of success can be encouraged through teachers conveying high expectations, providing constructive feedback and allowing students to have mini-successes along the way during the course.

The fourth, interest includes situational interest and individual interest. Situational interest is triggered by stimulating teaching techniques or fascinating topics whereas individual interest is a student's long-term interest in a topic (Hidi & Renninger, 2006). Teachers can build interest and maintain students' curiosity in the long run by means of interactive practice, relevance to everyday life, and providing opportunities for exploration. Lastly, the caring element is predicated on the assumption that supportive relationships are fundamental to motivation. Its foundation lies in attachment theory (Cassidy & Shaver, 1999) and self-determination theory both of which highlight the role supportive relationships play in developing intrinsic motivation and emotional wellness (Deci & Ryan, 2000). When teachers show empathy, caring, and dedication to student development, they establish a secure and supportive climate that promotes risk-taking, questioning, and resilience (Noddings, 2005; Wentzel, 1997). This component looks at whether students believe their teachers really care about their success and well-being. Studies have concluded that students who perceive their teachers as caring and available are most likely to participate actively in the learning process and defy quitting despite encountering setbacks (Freeman, Anderman, & Jensen, 2007).

MUSIC model of academic motivation bridges the theory-practice gap by proposing teacher practical applications in the construction of motivating learning environments. In contrast to other models that emphasize one element of motivation, the MUSIC model is a comprehensive model that deals with a number of facets of the learning environment. Studies have found that students will learn more profoundly persevere through challenges, and reach their potential. Learn academically better and build a life-long love of learning when the elements of MUSIC are enacted effectively.

3. METHODOLOGY

The present study was an attempt to provide evidence of the reliability and validity of a version of the MUSIC model of motivation inventory self-report measures of motivational constructs in the EMI context by examining the convergent validity of the MUSIC motivation and examining the discriminant validity of the MUSIC motivation in EMI context. The study was designed to test the cross-cultural validity of MUSIC model of motivation inventory in Chinese college undergraduates studying in Sino-foreign cooperatively funded study programmes.

3.1. Data

There was a cross-sectional quantitative study among university undergraduates in Southern China. Three universities' Sino-foreign major students in Guangxi Autonomous Region from year one to four were chosen. The Sino-foreign majors include engineering, automobiles and electronic information. The students were administered a bilingual Chinese-English MUSIC model of inventory questionnaire with 26 questions (Jones, 2017). For validation, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) validation were used. The EFA used SPSS version 27 and Structural Equation Modeling (SEM) with AMOS version 26 to examine the relationships between hypotheses.

3.2. Participants

Stratified random sampling was employed in the present study. A total of 1113 Sino-foreign cooperative students were in the sample group and the current study picked 350 students who learnt their professional courses in the EMI teaching and learning environment. Three out of five Sino-foreign cooperative major students were selected and they were studying in the mechanical engineering, electronic information, and automotive engineering courses. The professional degrees were conducted in the EMI pedagogy, and "double degree", "double student status" and "4+0" model was used to foster engineering and related disciplines' scientific and technological personnel with a global perspective and international competitiveness.

3.3. Instruments

The tools used in this research were selected for their correspondence with revised factors of the MUSIC model and comparability to those used in previous research conducted. The 26-item self-report inventory was adapted from the MUSIC model of inventory (college student version). The items included five scales of the MUSIC model component constructs and included 26 items: empowerment (five items), usefulness (five items), success (four items), interest (six items), and caring (six items) (Jones, 2017).

A survey questionnaire was made bilingual with English and Mandarin versions. English was derived from the MUSIC® inventory (college student version) and Chinese was derived from the MUSIC® inventory (Chinese translation of the college student version) (Jones, 2017).

The MUSIC model instrument has previously been validated in Chinese (Jones, Li, & Cruz, 2023) but there are good reasons to revalidate it, particularly in the English Medium Instruction (EMI) setting. Among the main reasons are cultural and linguistic differences that could influence the interpretation and usage of the items on the instrument. Although the validation mentioned above might have ascertained its validity and reliability in a general Chinese context, there are some special challenges and nuances in the EMI setting. English is the medium of instruction. This might affect students' behavior and response to the instrument dimensions, e.g., empowerment and caring because of possible language problems or cultural assumptions in English-speaking university settings. Additionally, revalidating the instrument allows room for accommodating any changes or improvements made to the original instrument so that the instrument is still effective in assessing student motivation amidst changing educational environments.

Since the context of each course varied, the wording of the items differed slightly in some instances. The word 'course' in the Sino-cooperative major course was substituted with "EMI course" to clarify to students that the questions were focused on the EMI pedagogy of the course, not just the lecture component. In the Chinese version, the course "College English" was replaced with "EMI courses" (see Table 1).

Table 1. Adapted survey.

Variable/ Dimension	Jones (2017) **User guide for assessing the components of the MUSIC® Model of Motivation.**	**Items (Revised)**
Empowerment	2. I have the opportunity to decide for myself how to meet the course goals. 8. I have the freedom to complete the coursework my own way. 12. I have options how to achieve the goals of the course. 17. I have control over how I learn the course content. 26. I have flexibility in what I am allowed to do in this course.	2. I have the opportunity to decide for myself how to meet the EMI course goals. 8. I have the freedom to complete the coursework my own way. 12. I have options in how to achieve the goals of the EMI course. 17. I have control over how I learn the EMI course content. 26. I have flexibility in what I am allowed to do in this EMI course.
Success	7. I am confident that I can succeed in the coursework. 10. I feel that I can be successful in meeting the academic challenges in this course. 14. I am capable of getting a high grade in this course. 18. Throughout the course, I have felt that I could be successful on the coursework.	7. I am confident that I can succeed in the EMI coursework. 10. I feel that I can be successful in meeting the academic challenges in this EMI course. 14.I am capable of getting a high grade in this EMI course. 18. Throughout the course, I have felt that I could be successful on the EMI coursework.
Caring	4. The teacher is available to answer my questions about the coursework. 16. The teacher is willing to assist me if I need help in the course. 20. The teacher cares about how well I do in this course. 21. The teacher is respectful. 24. The teacher is friendly. 25. I believe that the teacher cares about my feelings.	4. The EMI teacher is available to answer my questions about the coursework. 16. The EMI teacher is willing to assist me if I need help in the course. 20. The EMI teacher cares about how well I do in this course. 22. The EMI teacher is respectful. 24.The EMI teacher is friendly. 25. I believe that the EMI instructor cares about my feelings.
Usefulness	3. In general, the coursework is useful to me. 5. The coursework is beneficial to me. 19. I find the coursework to be relevant to my future. 21. I will be able to use the knowledge I gain in this course. 23. The knowledge I gain in this course is important for my future.	3. In general, the EMI coursework is useful to me. 5. The EMI coursework is beneficial to me. 19. I find the EMI coursework to be relevant to my future. 21. I will be able to use the knowledge I gain in this EMI course. 23. The knowledge I gain in this EMI course is important for my future.
Interest	1. The coursework holds my attention. 6. The instructional methods used in this course hold my attention. 9. I enjoy the instructional methods used in this course. 11. The instructional methods engage me in the course. 13. I enjoy completing the coursework.	1. The EMI coursework holds my attention. 6. The instructional methods used in this EMI course hold my attention. 9. I enjoy the instructional methods used in this EMI course. 11. The instructional methods engage me in the EMI course. 13. I enjoy completing the EMI coursework. 15. The EMI coursework is interesting to me.

3.4. Procedure

The data collection and analysis were approved by the office of the university president. All participants were required to provide informed consent before participating in the study. Students filled in an online questionnaire which was distributed at the end of the course on the online survey platform Wenjuanxing.

The data was screened for outliers and missing values prior to analysis. 23 were excluded through data screening. The EFA produced a five-factor solution that explained 64.18% of the total variance.

The CFA was conducted by employing the maximum likelihood estimation procedure using the AMOS 26.0 software. The CFA is a multivariate factor analysis technique that assesses its fit employed to verify a theoretical

model. Model fit is the extent to which the empirical data correspond to the hypothesized relationships as described in the hypothesized model (Awang Hashim & Murad Sani, 2008). The Maximum Likelihood Robust (MLR) approach with maximum likelihood estimation with robust standard errors was utilized in testing the hypothesized model that would render more stable estimations in instances where data distribution was not normal (Brown, 2006).

Table 2. Descriptive statistics and reliability (Internal consistency).

Variable/ Dimension	M	SD	Skewness	Kurtosis	α	N of items
Empowerment	3.40	1.19	-0.41	-0.70	0.88	5
Usefulness	3.29	1.18	-0.28	-0.84	0.89	5
Success	3.59	0.95	-0.47	-0.47	0.88	4
Interest	2.88	0.95	0.19	-0.37	0.87	6
Caring	3.32	1.18	-0.23	-0.84	0.91	6

4. FINDINGS

The questionnaire's internal consistency was assessed by testing the reliability of each part of the scale individually. The results of the test are as displayed in Table 2.

Based on Table 2, the scale's Cronbach's alpha was greater than 0.7 (Taber, 2018) suggesting that the questionnaire had demonstrated a relatively high level of internal consistency. Therefore, it can be utilized as a research instrument in this study. According to the results in Table 2, both Cronbach's alpha and Cronbach's alpha coefficients for every latent variable were above the minimum threshold of 0.7 with most of them exceeding 0.8. The questionnaire utilized in this study exhibited excellent reliability.

Table 3. Factor correlations and convergent validity of variables.

Variable/ Dimension	1	2	3	4	5	CR	AVE
1.Empowerment	-					0.87	0.58
2. Usefulness	0.44**	-				0.89	0.62
3. Success	0.51**	0.47**	-			0.89	0.66
4. Interest	0.26**	0.21**	0.21**	-		0.88	0.54
5. Caring	0.53**	0.52**	0.47**	0.31**	-	0.91	0.63

Note: **P<.01(two-tailed), the correlation is significant.

Table 3 composite reliabilities (CR) exceeded 0.8 above the conventional cut-off of 0.7 indicating that the observed variables for each dimension satisfactorily represented their constructs (Fornell & Larcker, 1981). Convergent validity was examined by the average variance extracted (AVE), an indicator of the extent to which a latent variable explains variance in its observed variables compared to measurement error. AVE more than 0.5 is typically acceptable since it clarifies that the latent variable accounts for considerable variance in its indicators (Shrestha, 2021). As evident from Table 2, all AVEs were more than 0.5 supporting the fact that the scale used in this study has good convergent validity. Factor correlations were below 0.9 suggesting that the five variables are distinct (Henseler, Ringle, & Sarstedt, 2015).

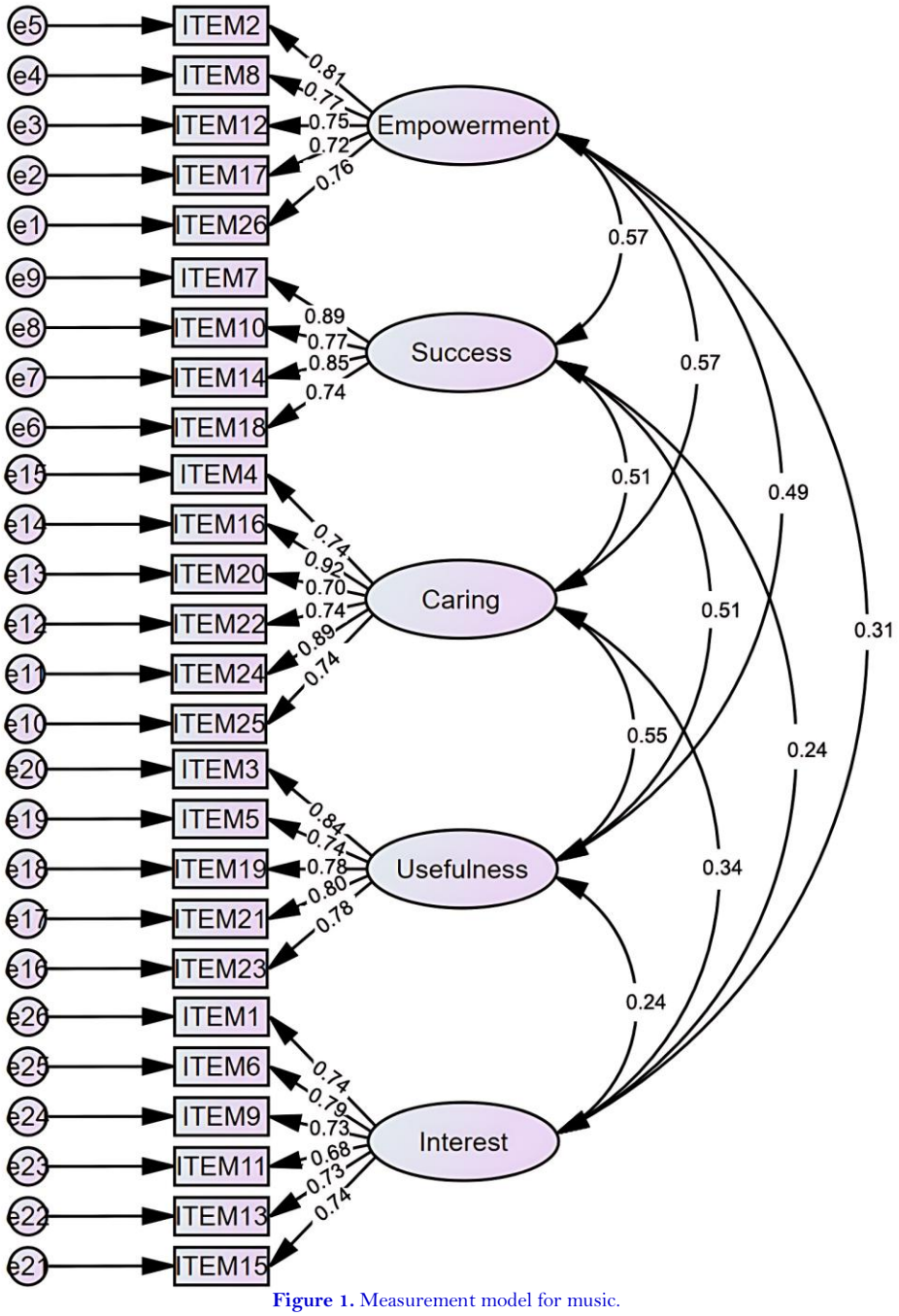

Figure 1. Measurement model for music.

Note: (χ^2 /df =1.53; CFI=0.91; TLI =0.89; RMSEA=0.07).

Figure 1 shows the factor loadings of empowerment, success, caring, usefulness and interest. All standardized factor loadings for the question items under each variable exceeded 0.5 indicating that each observed variable significantly explained its corresponding latent variable (Hair, Risher, Sarstedt, & Ringle, 2019).

Table 4. Discriminant validity results.

Variables	AVE	(1)	(2)	(3)	(4)	(5)
1)Empowerment	0.58	0.76				
2)Usefulness	0.63	0.49	0.79			
3)Success	0.66	0.57	0.51	0.81		
4) Interest	0.54	0.31	0.23	0.24	0.74	
5) Caring	0.63	0.57	0.55	0.51	0.34	0.79

Table 4 demonstrating good convergent and discriminant validity (Fornell & Larcker, 1981). This shows that variables within the scale are capturing distinct constructs and are highly correlated within each factor, confirming the scale's ability to differentiate between the desired constructs of interest, usefulness, success, interest, and caring (Hair et al., 2019). The findings show the scale to be reliable and valid for assessing the constructs as stipulated in this study.

5. DISCUSSION

The research verified the reliability and validity of the MUSIC model of academic motivation in the context of Chinese English as a Medium of Instruction (EMI) for students in Sino-foreign cooperation education programs. The results highlight the usability of the model in describing and improving student motivation in EMI classes which are widely applied in global higher education. The research supported that the adopted instruments indeed measured the five facets of MUSIC— empowerment, usefulness, success, interest, and caring validating their application to the EMI setting through the utilization of Confirmatory Factor Analysis (CFA). Empirical proof for the cross-cultural generalizability of the MUSIC model facilitates motivational issues within various teaching-learning environments (Jones, 2017).

Table 3 indicates the distinctiveness of the MUSIC (empowerment, usefulness, success, interest, and caring) five factors, i.e., the convergent validity is good. Figure 1 shows the result of the CFA that it was reported the loadings for all dimensions to the construct of resilience and all items to the sub-construct were high with .70-.89 values. This is evidence of convergent validity. At the same time the discriminant validity was also established because the loadings were less than 0.90.

The findings highlight the importance of cultural and contextual sensitivity in applying motivational models such as the MUSIC model. The study also realized subtleties in students' attitude and response to motivational interventions, which have suggested that teachers should be flexible in their practice in order to adjust to the dominant local cultural norms and pedagogical practice. For example, the caring component of student-teacher relationships can call for a unique emphasis in collectivist nations such as China where relationships between people have a significant impact on student motivation and persistence (Arrindell, 2003).

Implications of the findings for universities and teachers wishing to support motivation and learning of EMI students. Finally, the research not only validates the applicability of the MUSIC model to EMI classes but also provides suggestions for future research. Future research can explore how the five dimensions of MUSIC interact with each other and affect specific aspects of student engagement, like participation, persistence, and academic achievement.

Apart from this, the study suggests that the MUSIC model can also be applied in demotivation therapy for EMI students because it is a systematic procedure for designing motivational learning environments. The teachers can use the components of the model to make their EMI courses inclusive and effective, therefore, enabling the students to build their entire potential. This research will be a great addition to the literature and can offer further evidence for cross-validation of the model in other countries and cultures.

The findings indicated that there was strong support for the hypothesized factor structure with high factor loadings and significant path coefficients. Empowerment to success, caring, success to caring, usefulness, caring to usefulness all have a value of greater than.5, indicating that a strong factor structure exists. The findings also indicated that the MUSIC model possesses adequate internal consistency and construct validity in the Chinese EMI context.

6. CONCLUSION

The current research carries important implications for the sustainable development of EMI in Chinese higher education because it has shown that there is a need to be responsive to the motivation of students within the frame

of the MUSIC model to ensure that EMI programmes are a success. It also carries potential implications for other nations and institutions that plan on adopting EMI programmes by analogy with the unique cultural context of each country (Pun & Curle, 2021). The universities will be able to assist EMI students more and enable them to achieve academic success, thereby contributing positively to society through the successful application of culturally responsive EMI pedagogy by comprehending and dealing with the problem of student motivation in cross-cultural settings.

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Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
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Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

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