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MEDIATING EFFECT OF INTRINSIC MOTIVATION BETWEEN CROSS- CULTURAL ADAPTATION AND INTERNATIONAL STUDENTS' ACADEMIC ADAPTATION IN CHINA

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ABSTRACT

In China, an increasing number of international students experience the issue of academic adaptation which has attracted a great deal of scholars to conduct related studies to decrease that academic problem. The current research was conducted to analyze the influencing factor for the issues of academic adaptation by examining the relationship between cross-cultural adaptation and international students' academic adaptation and investigate the mediating effect of intrinsic motivation between cross-cultural adaptation and international students' academic adaptation. In this study, 259 international students learning in Beijing, Wuhan and Haikou participated. To examine the relationship and mediator function of intrinsic motivation, SPSS analysis and AMOS was applied in current study. The results show that psychological adaptation has a direct positive influence on international students' academic adaptation, but sociocultural adaptation has an indirect influence on international students' academic adaptation. Intrinsic motivation has an essential mediator role between cross-cultural adaptation and international students' academic adaptation. Findings from this research provide a guideline for colleges and universities to improve academic adaptation of international students, by enhancing their psychological adaptation, together with improving their intrinsic motivation. In future, conducting longitudinal studies will also be needed to track how cross-cultural adaptation influence international students' academic adaptation in different adaptation stages to optimize the model shown in this research.

Keywords: Psychological Adaptation, Sociocultural Adaptation, Intrinsic Motivation, Academic Adaptation, International Student



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INTRODUCTION

In various countries worldwide, policymakers and educational administrators in higher education institutions are actively seeking ways to promote student mobility and enhance internationalization. UNESCO (2017) provided data which indicated that the global count of internationally mobile students reached 4.6 million in 2015 (Jung & Kim, 2018). Meanwhile, the problem of international students' academic adaptation became obvious and the dropout rate of international students in different countries still remains high. Specifically, in Germany, the dropout rate was (Bachelor's: 29%; Master's: 15%) in 2014 (Kercher, 2018); in Korea, the dropout rate in undergraduate was 4.31 percent in 2015 (Jung & Kim, 2018), and about an estimated 50.1% of doctoral students dropped out all over the world (Laufe & Gorup, 2019). Cross-cultural adaptation has emerged as a crucial area of research in the educational field as it often influences and regulates international students' academic behavior. Extensive evidence has demonstrated the influencing factors on international students' academic adaptation (Smith & Khawaja, 2011; Zhang & Goodson, 2011; Yu & Wright, 2016; Clinciu, 2013; Ward et al., 2001; Buddington, 2002; Jie, 2020). Within this body of research, cross-cultural adaptation is divided into psychological adaptation and sociocultural adaptation, both have been regarded as a key related to international students' academic adaptation (Ward & Masgoret, 2006; Butcher & McGrath, 2004).

Yet, most of these studies analyzed the association between either psychological or sociocultural adjustment and international students' academic learning, whereas limited attention is given to both psychological and sociocultural aspects of international students' academic adaptation. In addition, according to the self-determination theory, a body of studies in educational area was conducted to explore intrinsic motivation's important mediation role (Liu, et. al, 2018, Luther et. al, 2016; Van Den Berg, 2011; Areepattamannil, 2012). For example, motivation may act as a mediator between the autonomy support provided by teachers and the changes in perceived academic competence (Guay et al., 2001), can be a significant mediator between transformational leadership and sports performance (Charbonneau, 2001) and be essential mediator between school self-concept and school achievement (Areepattamannil, 2012). To thoroughly examine the ongoing challenges faced by international students in their academic adaptation, it is crucial to utilize intrinsic motivation as a mediating factor to facilitate the relationship between cross-cultural adaptation and the academic adaptation about international students. This requires a deeper analysis of the persisting problems associated with foreign students' academic adaptation.

Within the context of China, after the open-door policy was introduced, the quantity of international students experienced a huge increase. Until now, there were 492185 overseas students from 196 countries (Ministry of Education of the People's Republic of China, 2018) came to China to learn since 2018. Native scholars are increasingly focusing on the adaptation of international students to local environments, specifically sociocultural and psychological aspects (Guo, 2021) and some researchers have also explored the psychological challenges and intrinsic motivation (Huang, 2016). These studies offer valuable insights for enhancing international education and shedding light on the diverse difficulties faced by international students in China. In China, the analysis on international students' academic adaptation may provide more thoughts to decrease the ratio of dropout and perfect international education (Javad, 2020). However, analyzing the influence of both psychological and sociocultural aspects on overseas students' academic adaptation in a model is comparatively less (Li, Wang, Liu, Xu & Cui, 2017) and the mediator of intrinsic motivation in international educational events are yet to receive sustained attention (Ward & Masgoret, 2008; Butcher & McGrath, 2004).

Drawing on previous research and relevant theoretical perspectives, the limited existing literature highlights the need for this research. Specifically, this study chooses international students learning in Beijing, Wuhan and Haikou, China as respondents and the quantitative research method was used to collect data to provide valuable insight. Following that, the current study aims to: i) investigate the impact of psychological adaptation and sociocultural adaptation on the academic adaptation of international students; and ii) analyze the mediator role of intrinsic motivation. For this purpose, 7 hypotheses are proposed:



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

H₁. There is a positive relationship between sociocultural adaptation and international students' academic adaptation.

H₂. There is a positive relationship between psychological adaptation and international students' academic adaptation.

H₃: There is a positive relationship between sociocultural adaptation and intrinsic motivation.

H₄: There is a positive relationship between psychological adaptation and intrinsic motivation.

H₅: There is a positive relationship between intrinsic motivation and international students' academic adaptation.

H₆: There is a significant mediator role of intrinsic motivation between psychological adaptation and international students' academic adaptation.

H₇: There is a significant mediator role of intrinsic motivation between sociocultural adaptation and international students' academic adaptation.

LITERATURE REVIEW

Cross-cultural Adaptation and International Students' Academic Adaptation

For foreign students, academic adaptation is mainly about both academic system and social system (Zhu Guohui, 2011; Tinto, 1975). Specifically, the academic system emphasizes students' academic performance and intellectual growth, while the social system encompasses peer-group interactions and teacher-student communication. Drop out will happen when international students fail to carry the integration of academic system and social system. Under the umbrella of cross-cultural adaptation theory, psychological adaptation and sociocultural adaptation are two important influential factors to impact international students' academic adaptation (Ozer, 2015; Ward & Kennedy, 1994; Searle & Ward, 1990; Li, et al., 2010). In general, sociocultural adaptation focuses on the behavioral dimension of cross-cultural engagement and views social interaction as a collaborative and proficient behavioral expression, such as understanding cultural knowledge (Ward & Kennedy, 1999), communication ability, language fluency (Brisset, et al., 2010); Psychological adaptation pertains to the experience of positive emotions and contentment during periods of transition (Ward & Searle, 1991; Ward & Rana-Deuba, 1999). Therefore, psychological and sociocultural adaptation can be used in this research to analyze international students' academic adaptation (Yu & Wright, 2016; Javad, 2020).

Sociocultural Adaptation and International Students' Academic Adaptation

Within the realm of cross-cultural education, the successful integration of international students into the native social culture is likely to contribute to a smoother learning experience in foreign universities (Brisset et al., 2010; Ward & Rana-Deuba, 2000; Ward & Searle, 1991). Previous literatures have consistently shown that sociocultural adaptation plays a significant role in shaping international students' academic adaptation (Yu & Wright, 2016; Poyrazli et al., 2002). For instance, Yu and Wright (2016) conducted an empirical study on international students (including Chinese students) studying in Australia and proposed that effective interaction among international students and receiving support from supervisors could enhance their academic adaptation. However, it remains necessary to further investigate whether the relationship b holds true for oversea students studying in China.

Psychological Adaptation and International Students' Academic Adaptation

Psychological adaptation exerts important influence on international students' academic adaptation. When foreign students experience psychological adaptation, they experience enjoyment and exciting emotionally (Ward et al., 2020; Ozer, 2015), they feel energetic enough to be capable to deal with their academic issues. For instance, Wan et al. (1992) illustrated that for international students, anxiety and stress are still the main and inevitable psychological obstacle. Specifically, international students frequently face challenges related to excessive information (Javad, 2020), their school achievement have significant inverse correlation with stress and anxiety (Ying & Liese, 1991; Buddington, 2002), Clinciu (2013) conducted empirical research on international students and proved that academic problems were associated with anxiety, depression and mental illness.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

Sociocultural Adaptation and Intrinsic Motivation

In accordance with the principles of self-determination theory, sociocultural adaptation has been shown to enhance intrinsic motivation and contribute to improved work and learning outcomes (Hidi, 2006; Larson & Rusk, 2011). In the context of this study, it can be proposed that it is more likely for to develop intrinsic motivation during the process of sociocultural adaptation. This aligns with the tenets of cognitive theory of motivation (Deci, 1975). Taking a cognitive perspective on motivation, sociocultural adaptation involves acquiring effective communication and social interaction skills (Berry, 2005). It encompasses the development of the necessary social and cultural competencies to navigate daily social situations and meet the expectations of the prevailing cultural milieu (Ryan & Deci, 2000; Ward & Rana-Deuba, 1999). For international students, the process of sociocultural adaptation plays a crucial role in fostering their intrinsic motivation (Ward, 1998) and facilitating their successful integration into local learning environments in foreign countries.

Psychological Adaptation and Intrinsic Motivation

Except the influence of sociocultural adaptation on intrinsic motivation, the effect of psychological adaptation on intrinsic motivation also is proved by previous research and supported by related theory. Psychological adaptation encompasses the emotional response to acclimating to a novel cultural milieu, encompassing assessments of anxiety, depression, self-esteem, and life satisfaction (Ward & Kennedy, 1999; Kim, 2017). When the change of environment, it is inevitable for people to suffer from psychological issues (Kim, 2017). Studies offer empirical support for the idea that high level psychological adaptation can enhance intrinsic motivation. Within the intrinsic motivation studies, Huang (2016) proposed the negative relationship exists between intrinsic motivation and anxiety, this finding is consistent with Weinstein & Ryan (2010). In addition, self-determination theory can push our understanding about the influence of psychology on intrinsic motivation. More specifically, Reeve & Sickenius (1994) illustrates that intrinsic motivation arises from meeting psychological needs (Weinstein & Ryan, 2010; Deckers, 2018) which can embody psychological adaptation (Reis and coresearchers, 2000). When international students experience the process of psychological adaptation, competence in psychological aspect (the ability to deal with psychological stress) can promote their intrinsic motivation. Prior studies have established a strong relationship between psychological adaptation and intrinsic motivation.

Intrinsic Motivation and International Students' Academic Adaptation

Educators and psychologists acknowledge the significance of motivation in fostering active student participation and engagement in learning process among students learning internationally (Raufelder, et al, 2013), intrinsic motivation referring to interests (Deci & Ryan, 1985; Lucas et. Al, 2010) and basic psychological needs (Schunk et al., 2012) has been established as a key factor related to students' academic adaptation. Existing research focusing on their academic adaptation has consistently demonstrated a wide range of positive outcomes associated with high levels of intrinsic motivation (Elliot & Dweck, 2005). This finding aligns with self-determination theory, and states that intrinsic motivation is a key factor in enhancing students' academic performance (Deci & Ryan, 2000). Consequently, there is potential for colleges and universities to promote international students' academic adaptation by fostering their intrinsic motivation (Elliot & Dweck, 2005; Vansteenkiste et al., 2005; Bailey & Phillip, 2016). This theoretical framework for understanding motivation has resulted in a significant body of research in the field of education and has been extensively applied to gain deeper insights into educational outcomes (Ryan & Deci, 2009). For instance, Jang et al. (2009) conducted a study among adolescents in South Korea with self-determination theory, the result shows that intrinsic motivation at high levels. were associated with enhanced school outcomes (Santana-Monagas & Núñez, 2022; Ryan & Deci, 2020). The findings further verify the positive relationship between intrinsic motivation and international students' academic adaptation.



The Mediator Role of Intrinsic Motivation

According to the findings of Kim (2001), students who possess high levels of intrinsic motivation demonstrate a greater interest in learning and are actively engaged in seeking solutions to achieve academic adaptation. Consistent with self-determination theory, numerous studies highlighted the crucial mediating function of intrinsic motivation existing in various domains. For example, mediating the relationship between psychology and work variety by intrinsic motivation has been found in the labor market (Van Den Berg, 2011), as well as between cognition and behaviors (Luther et al., 2016). Moreover, scholars have explored intrinsic motivation's mediating role within the field of education, drawing upon self-determination theory to gain a comprehensive understanding of this mediation process. For instance, Areepattamannil (2012) conducted a study with self-determination theory and revealed that the positive influence of adolescents' perception of academic self-determination on their intrinsic motivation was found to contribute to improved academic achievement. Most important of all, psychological adaptation and sociocultural adaptation can produce intrinsic motivation (Larson & Rusk, 2011; Huang, 2016), and intrinsic motivation is connected to the increase of international students' academic adaptation (Deci & Ryan, 2000). From the above previous literatures, intrinsic motivation can play a significant role of mediator in current study. Based on these findings, to improve oversea students' academic adaptation, colleges and universities should improve international students' intrinsic motivation by regulating sociocultural activities and psychological condition (Larson & Rusk, 2011).

In conclusion, based on cross-cultural adaptation theory and numerous previous literatures, the association between cross-cultural adaptation (psychological adaptation and sociocultural adaptation) and international students' academic adaptation has been obvious. And with the support of cognitive theory of motivation, self-determination theory, the mediate effect of intrinsic motivation between cross-cultural adaptation and international students' academic adaptation is feasible. However, the existing literature on this topic is fragmented and lacks a comprehensive analysis within a model framework. Therefore, the current investigation aims to address the identified gap by proposing and examining seven research hypotheses that explore the relationships between cross-cultural adaptation (sociocultural adaptation and psychological adaptation) and international students' academic adaptation, while also considering the mediator of intrinsic motivation in these relationships. According to above discussion, conceptual framework (Figure 1) is proposed:

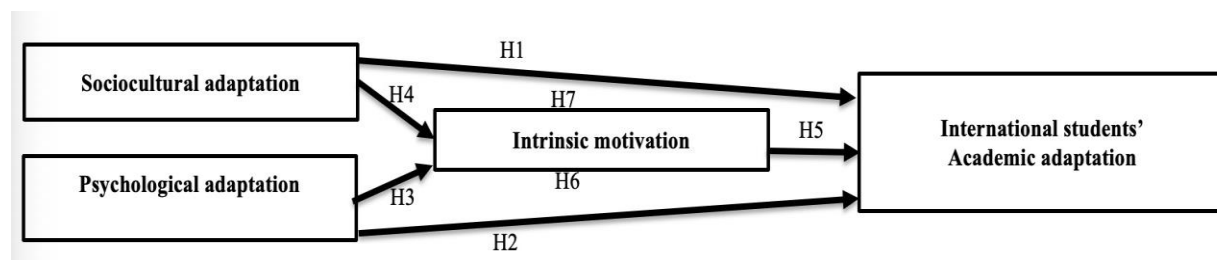


Figure 1: *Conceptual Framework*

METHODOLOGY

Research Design

From the conceptual framework, this research is mainly to identify not only the relationship between cross-cultural adaptation (psychological adaptation and sociocultural adaptation) and international students' academic adaptation, but also analyze the mediator role of intrinsic motivation between that relationship. According to (Ward, 1999; Brisset, 2010; Ward, 1990), cross-sectional survey method is the suitable survey design to be utilized to analyze the international students' academic adaptation in cross-cultural environment (Yang Junhong, 2005). Additionally, data will be collected by using quantitative techniques. Previously developed instruments have been taken as reference to identify the current status of these variables.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

Population and Sampling

The target population consisted of international students of China (definitely having the learning experience in China) who are 18 years old or older. A sample size of at least 220 respondents was targeted in line with Wu Minglong (2010) utilizing the main data analysis technique SPSS.23 and AMOS.24 in this study. There is a substantial presence of overseas students pursuing education in China, these international students are distributed in different universities locating in different cities, based on the above analysis, multi-stage cluster sampling is more suitable for this research. Therefore, multi-stage cluster sampling is currently employed for data collection. More specifically, in the first stage, researcher classified the cities into three parts according to the locations (North, Middle, South part of China) and choose the representative cities in the three parts respectively, and then in the second stage, the universities and colleges were picked out in the three fixed representative cities according to the number of international students. To investigate proposed conceptual framework, data was from international students learning in 16 chosen universities which were located in Beijing (Eight universities), Wuhan (Six universities), Haikou (Two universities).

All questionnaires were filled in online. Because Wen Juanxing (which is an online questionnaire platform) 's services have covered over 3 million businesses and 90% of domestic universities in China, making it a trusted online survey platform for renowned brands in various industries (<https://www.wjx.cn/>), so researcher edited the questionnaire online by Wen JuanXing. After editing, researcher sent the QR code and the link shaping from Wen JuanXing to the responsible international students and they send QR code and the link to their classmates' group in WeChat which is the most popular communication software in China. Data were collected during (May 2022 to July 2022), questionnaires were randomly distributed to international students who learning in the targeted 16 universities, the interviewer provided a brief explanation of the study, in order to minimize possible bias, the participants were told that their partaking was voluntary and anonymous which could encourage international students to state their personal opinion as truthfully as possible. Finally, there were about 259 international students to help to fill this questionnaire.

Research Instrument

The questionnaire consisted of five main parts, the first aimed to obtain basic personal information, the second section aimed to indicate sociocultural adaptation by using 5-Likert scale (extreme difficulty/ great difficulty/ moderate difficulty/ slight difficulty/ no difficulty), the items were derived from past studies on international students' cross-cultural adaptation (Furnham & Bochner, 1982), the content of this questionnaire mainly focuses on learning sociocultural knowledge and skills of the host country, along with the ability to effectively communicate with its members (Zhu Guohui, 2011; Ozer, 2015). The third section of the questionnaire captured international students' psychological adaptation, this part questionnaire is made by taking Zung (1965) Self- rating Depression Scale (ZSDS) as reference to evaluate psychological adaptation, international students' psychological adaptation was measured by 5 items adopted from previous studies by using 5-Liker Scale (no / slight/ moderate / great / extreme). This part of the questionnaire mainly concentrates on psychological well-being or satisfaction (Ward, Bochner & Furnham, 2020) and evaluation of self-esteem, satisfaction with life, and so forth (Ozer, 2015). The fourth section is about intrinsic motivation with 5 items. This questionnaire takes Academic Amotivation Inventory (McAuley & Duncan, 1989) as reference, all are proved to have good validity and reliability. This part questionnaire uses 5-Liker scale (very disagree / disagree / not sure / agree/ very agree) and is mainly about students' performance on study for the pleasure and need satisfaction which includes competence, autonomy, relatedness while learning something new (Ryan & Deci, 2000; Ryan & Deci, 2000). In the fifth section, international students' academic adaptation was measured by 6 items including the course arrangement of international students, learning content, learning method, learning comment, the students-teachers relationship, extracurricular activities and rules and regulation of universities (Zhu Guohui, 2011). This part questionnaire uses 5-Liker scale (very disagree /disagree/ not sure / agree/ very agree).



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

This questionnaire was written in English. Three experts specializing in relevant educational fields were enlisted to review the questionnaire to assess content validity of instrument. Participants were also requested to provide feedback on the appropriateness and clarity of the items, as well as offer suggestions for any potentially missing key items. No modifications were made to the number of items measuring these variables. Subsequently, 102 international students filled in questionnaire in pilot study. Minor adjustments were made to the questionnaire based on their feedback, leading to the final version.

Validity and Reliability

To develop a reliable survey instrument, the data collection process followed established procedures. Initially, relevant items from existing literature were selected to assess each variable. To ensure content validity, a panel of three experts carefully reviewed the instrument. Additionally, a pre-test was conducted in three cities in China (Beijing, Wuhan, Haikou) with 259 participants to measure validity of the items. Exploratory factor analysis (EFA) was conducted, and factors with factor loadings below 0.4 was eliminated. The reliability coefficients for each construct, as shown in Table 1, exceeded the threshold of 0.7.

Table 1: *Factor Analysis*

Factor				
	SA	ISAA	IM	PA
In public place, I can obey the queue	.882			
I can follow the rules and regulations	.876			
I can adapt to the accommodation of the university	.874			
I can relate to members of the same sex	.822			
I can be able to see two sides of an inner-cultural issue	.797			
I can live away from family members in China	.795			
I can understand the context which teacher teach to me		.776		
In China, I can adapt to Chinese teaching style		.765		
I can establish rapport relationship with Chinese teachers		.750		
I can take notes in class		.749		
I can express my ideas in class		.725		
I can catch up with the speed of the teaching		.723		
It was important to me to do well in learning			.795	
Learning in China is a happy thing			.792	
I think I am pretty good at learning in cross-cultural environment			.769	



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

I would describe learning in China as very interesting	.759	
In China, I put a lot of effort to study	.755	
I have been happy with my life		.829
I feel hopeful about my life		.791
I feel active		.784
I find it easy to do the thing I used to		.762
I feel hopeful about the future		.711

Note: SA: sociocultural adaptation, PA: psychological adaptation, IM: intrinsic motivation, ISAA: international students' academic adaptation

In this study, existing scales were utilized as a reference to evaluate the four constructs outlined in the conceptual framework. All scales employed a five-point rating system. The reliability of the questionnaire was assessed through Cronbach's α , which yielded values of 0.938 for sociocultural adaptation, 0.861 for psychological adaptation, 0.906 for intrinsic motivation, and 0.903 for international students' academic adaptation. These results indicate that the questionnaire demonstrated satisfactory reliability (Cronbach's $\alpha > 0.70$).

Data Analysis

After reviewing the characteristics of the sample, the analysis approach was divided into three stages. Firstly, an assessment was performed to determine dimensionality of the constructs in model. To test unidimensionality of perceived impacts and support for international students' academic adaptation, confirmatory factor analysis (CFA) was utilized. Secondly, the model's reliability and validity were assessed. Lastly, the study examined the structural relationship between cross-cultural adaptation and international students' academic adaptation, as well as in this relationship, intrinsic motivation plays a mediating role.

FINDINGS

Demographic Profiles

Table 2 presents the demographic characteristics of the participants. The respondents were fairly evenly distributed by gender, with a significant proportion falling within the 21-30 age range (85.7%). In terms of the duration of their studies in China, 21.6% had been studying for one year, 37.8% for two years, and 22.4% for three years. Undergraduate students constituted the largest proportion (41.3%), followed by postgraduate students (39%). Regarding their familiarity with China, the majority of students had a moderate (37.5%) to high (39.8%) level of understanding, and they had a certain degree of proficiency in speaking Chinese.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

Table 2: Demographic Profiles of Respondents

Basic Condition	Category	Frequency	Percentage (%)
Gender	male	140	54.1
	female	119	45.9
Age	≤20	13	5.0
	21-30	222	85.7
	31-40	22	8.5
	41-50	1	.4
	> 50	1	.4
	1-4 month	2	.8
The time learning in China	4-6 month	7	2.7
	6-12 month	23	8.9
	one year	56	21.6
	two years	98	37.8
	three years	58	22.4
	other	15	5.8
Education Background	an undergraduate student	107	41.3
	a postgraduate student	101	39.0
	doctoral student	36	13.9
	a Chinese training student	5	1.9
	a language student	5	1.9
	a short-term student	3	1.2
	other	2	.8
Understanding about China	Very much	29	11.2
	much	103	39.8
	moderately	97	37.5
	little	22	8.5
	very little	8	3.1
The level of Chinese language	Very good	36	13.9
	good	97	37.5
	moderate	107	41.3
	poor	14	5.4
	very poor	5	1.9



Measurement Model

Before testing the hypotheses, a two-step approach was followed to establish the reliability and validity (convergent and discriminant) of the study constructs. For the measurement model, a confirmatory factor analysis (CFA) was performed for the measurement model. Composite reliability (CR) estimates for all constructs, as presented in Table 2, surpassed the recommended threshold of 0.70, indicating satisfactory reliability (Bagozzi & Yi, 2012). Factor loadings and Average Variance Extracted (AVE) were employed to evaluate convergent validity, which measures the convergence between the items and latent constructs, following the approach outlined by Anderson and Gerbing (1988). Factor loadings for each construct varied from 0.60 to 0.91 and were all statistically significant ($p < 0.001$). Additionally, all AVE values exceeded the critical threshold of 0.50, indicating acceptable convergent validity (Fornell & Larcker, 1981). Discriminant validity was assessed by comparing the square root of the Average Variance Extracted (AVE) for each construct with the correlations among the latent variables. This analysis aimed to examine the distinctiveness of each construct from others (Hair et al., 2014). The findings (Table 3) indicated that discriminant validity was established as the diagonal elements exceeded the off-diagonal elements (Fornell & Larcker, 1981). In summary, the analysis indicates a satisfactory fit for the measurement model.

Table 3: Reliability and Validity Test of Scale

Indicators	Un.Estd	S.E.	Z-value	P-value	Estimate	Cronbach's α	CR	AVE
Sociocultural Adaptation (SA)								
In public place, I can obey the queue	1				0.903	0.938	0.939	0.720
I can be able to see two sides of an inter- cultural issue	0.827	0.046	17.851	***	0.812			
I can live away from family members in China	0.881	0.05	17.719	***	0.809			
I can relate to members of the same sex	0.793	0.046	17.131	***	0.795			
I can adapt to the accommodation of the university	0.903	0.043	21.214	***	0.88			
I can follow the rules and regulations	1.012	0.047	21.47	***	0.884			



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

Intrinsic Motivation (IM)

I would describe learning in China as very interesting	1				0.84	0.906	0.907	0.66
It was important to me to do well in learning	0.995	0.065	15.283	***	0.81			
In China, I put a lot of effort into study	0.991	0.069	14.345	***	0.776			
I think I am pretty good at learning in cross-cultural environment	1.01	0.068	14.832	***	0.794			
Learning in China is a happy thing for me	0.985	0.061	16.116	***	0.841			

Psychological Adaptation (PA)

I feel active	1				0.776	0.861	0.864	0.562
I have been happy with my life	0.982	0.077	12.814	***	0.798			
I feel hopeful about my life	1.071	0.082	13.045	***	0.812			
I feel hopeful about the life	0.839	0.083	10.154	***	0.644			
I find it easy to do the thing I used to	1.029	0.092	11.219	***	0.705			

Academic Adaptation (AA)



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

I can establish rapport relationship with Chinese teachers	1					0.749	0.903	0.901	0.61
I can catch up with the speed of the teaching	0.976	0.078	12.534	***		0.778			
I can understand the context which teacher teach to me	1.048	0.078	13.377	***		0.827			
In China, I can adapt to Chinese teaching style	1.073	0.084	12.832	***		0.795			
I can express my ideas in class	1.003	0.082	12.173	***		0.758			
I can take notes in class	0.99	0.079	12.511	***		0.777			

Note: ***p < 0.001 level; CR=composite reliability; AVE=average variance extracted

Table 4: Correlations and Average Variance Extracted

Construct	Mean	SD	AA	PA	IM	SA
Academic Adaptation (AA)	4.097	0.736	0.781			
Psychological Adaptation (PA)	3.870	0.811	0.428	0.75		
Intrinsic Motivation (IM)	4.038	0.743	0.748	0.304	0.812	
Sociocultural Adaptation (SA)	4.251	0.960	0.397	0.401	0.424	0.849

Note: The bold elements are the square roots of each AVE; construct correlations are shown off-diagonal

Structural Model

The structural equation model (SEM) in AMOS 24 was employed to test the hypothesized model. SEM assesses the entire hypothesized model, allowing for evaluation of variables based on available data (Jöreskog and Sörbom, 1982). Where variables exhibited poor fit, adjustments were made by excluding items that lacked unidimensionality. Multiple fit indices were utilized to examine the quality of measurement model. Based on Brown (2015), while the chi-square (χ^2) test is susceptible to sample size, an acceptable overall fit for a confirmatory factor analysis (CFA) solution can be indicated by a χ^2/df ratio of less than 3, in combination with other fit indices. These fit indices include TLI, CFI, RMSEA, and SRMR. As depicted in Table 4, the results revealed a χ^2/df ratio of 1.413, SRMR of 0.04, RMSEA



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

of 0.0396, GFI of 0.911, AGFI of 0.889, IFI of 0.975, CFI of 0.978, and TLI of 0.975 (Bagozzi & Yi, 2012). With the exception of AGFI, which is close to 0.9, all other indices surpassed the suggested cut-off values. Therefore, the hypothesized model demonstrated a strong fit (Hu & Bentler, 1998).

Table 5: Fit Index of Structural Model

Fit Indices	χ^2/df	SRMR	RMSEA	GFI	AGFI	IFI	CFI	TLI
Reference	≤ 3	< 0.08	< 0.08	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9
Measurement Model	1.413	0.04	0.0396	0.911	0.889	0.975	0.978	0.975

Note: TLI: Tucker-Lewis index; CFI: Comparative fit index; RMSEA: Root mean square error of approximation; SRMR: standardized root mean square residual

As shown in Table 6, correlation coefficients indicated that except H1 which was rejected, other proposed hypotheses (direct effects) are supported, and the output of model is showed in Figure 2. This research uses percentile bootstrapping with 1000 bootstrap samples and bias-corrected percentile at a 95% confidence interval to examine indirect effects (Taylor, et al, 2008). In accordance with Preacher and Hayes (2008), calculating the lower and upper bounds of the confidence interval was essential to determine the significance of the indirect relationship. As presented in both Table 7 and Table 8, the results from Bootstrap ensured the significant mediating effect of intrinsic motivation for sociocultural adaptation and international students' academic adaptation, and there is significant mediating effect for intrinsic motivation for psychological adaptation and international students' academic adaptation. Hypotheses 6 and 7 were supported. Hence, all of the proposed hypotheses were accepted except H1, and their implications are discussed in the following section.

Table 6: Results of Hypothesis

Hypothesis	Path analysis	Un.std.	S.E.	Z-value	P-value	Std.	Result
H1	Sociocultural Adaptation → Academic Adaptation	0.025	0.034	0.734	0.463	0.019	Nonsupport
H2	Psychological Adaptation → Academic Adaptation	0.187	0.047	3.972	***	0.122	Support
H3	Sociocultural Adaptation → Intrinsic Motivation	0.159	0.063	2.538	0.011	0.178	Support
H4	Psychological Adaptation → Intrinsic Motivation	0.616	0.065	9.511	***	0.450	Support
H5	Intrinsic Motivation → Academic Adaptation	0.262	0.046	5.744	***	0.565	Support

Note: *** P<0.001, H: Hypothesis

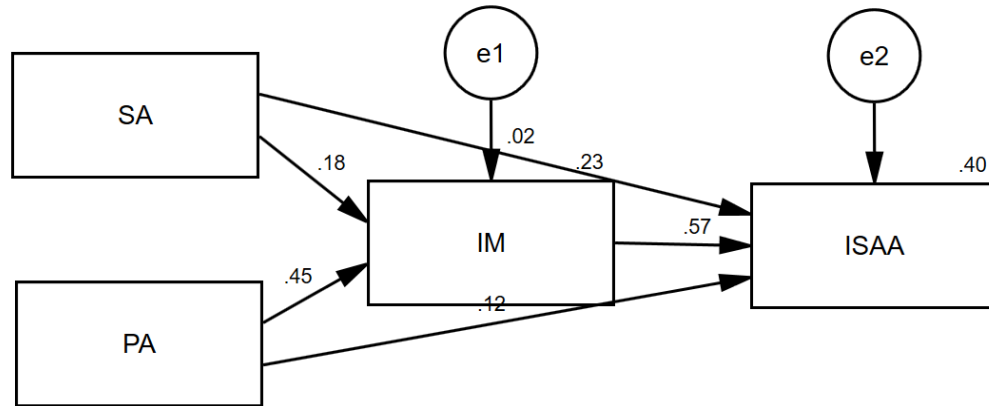


Figure 2: *The Output of the Model*

Note: SA: sociocultural adaptation, PA: psychological adaptation, IM: intrinsic motivation, ISAA: international students' academic adaptation

Table 7: *The Mediating Effect of Intrinsic Motivation between Sociocultural Adaptation and International Students' Academic Adaptation*

path relationship	Point estimate	product of coefficient		Bootstrapping 1000 times 95% CI					
		SE	Z-value	Bias-corrected			Percentile		
				Lower	Upper	P	Lower	Upper	P
Indirect Effect									
Sociocultural Adaptation → Intrinsic Motivation → Academic Adaptation	0.196	0.056		0.092	0.320	0.002	0.092	0.321	0.002
Direct Effect									
Sociocultural Adaptation → Academic Adaptation	0.064	0.056		-0.043	0.185	0.206	-0.053	0.166	0.299
Total Effect									
Sociocultural Adaptation → Academic Adaptation	0.259	0.061		0.157	0.407	0.001	0.143	0.399	0.002



Table 8: *The Mediating Effect of Intrinsic Motivation between Psychological Adaptation and International Students' Academic Adaptation*

path relationship	Point estimate	product of coefficient		bootstrapping 1000 times 95% CI					
				Bias-corrected			Percentile		
		SE	Z-value	Lower	Upper	P	Lower	Upper	P
Indirect Effect									
Psychological Adaptation→ Intrinsic Motivation→ Academic Adaptation	0.184	0.062		0.090	0.338	0.002	0.09	0.335	0.002
Direct Effect									
Psychological Adaptation→ Academic Adaptation	0.198	0.081		0.051	0.376	0.005	0.037	0.361	0.008
Total Effect									
Psychological Adaptation→ Academic Adaptation	0.382	0.078		0.25	0.576	0.001	0.233	0.555	0.002

DISCUSSION

Overall, this study established and examined a model integrating cross-cultural adaptation theory, self-determination theory and cognitive theory of motivation. In cross-cultural contexts, the current research is groundbreaking as it examines the direct and indirect effects of psychological adaptation and sociocultural adaptation on international students' academic adaptation. The major contribution is the formulation of a novel model that provides a solid theoretical framework for evaluating the influence of psychological and sociocultural adaptation on international students' academic adaptation in China. Meanwhile, the findings of this empirical research aid the conclusion of previous research that psychological adaptation and sociocultural adaptation have significant effects with regard to enhancing international students' academic adaptation (Yu & Wright, 2016; Ying & Liese, 1991; Buddington, 2002; Clinciu, 2013).

Furthermore, the results show that psychological adaptation and intrinsic motivation are both related to increase academic adaptation, in which intrinsic motivation can mediate the relationship between psychological adaptation



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

and international students' academic adaptation. As predicted, the findings reveal that improving international students' psychological adaptation can enhance their intrinsic motivation, the findings also show that if international students can be made to feel that they are competent enough to engage their learning, then their academic performance and inter-communication with teachers can be improved (Clinciu, 2013; Buddington, 2002; Ozer, 2015; Zhang, Goodson, 2011). Contrary to previous studies, sociocultural adaptation is not directly related to the increase in academic adaptation but is indirectly related to academic adaptation through intrinsic motivation. This finding can be explained by Hassan, Jamaludin, Sulaiman & Baki (2010), and it is found that international students can shape their own lifestyle, for instance, international students having more independent lifestyle is hard to be influenced by sociocultural contexts, but they can be influenced by intrinsic motivation such as encouragement. In addition, this result is in line with self-determination theory proposing that sociocultural environment such as different cultural contexts can promote or undermine students' academic adaptation by stimulating their intrinsic motivation (Liem & McInerney, 2018, P24).

Finally, the findings of this research extended Ryan & Deci (2009) and Ryan & Weinstein (2009)'s work by examining intrinsic motivation as a mediator to mediate the relationship between cross-cultural adaptation and international students' academic adaptation. Results of this research are consistent with self-determination theory about mediating function of intrinsic motivation (Deci & Ryan, 1985, Edward Burkley, 2020, P60), and proposed that intrinsic motivation can be produced by the process of psychological and sociocultural adaptation and then produced intrinsic motivation can bring good academic adaptation for international students. Finally, the results contributed to the literature by treating intrinsic motivation as important variable that connect cross-cultural adaptation theory, self-determination theory and cognitive theory of motivation in cross-cultural education contexts.

CONCLUSION

The findings of the present study contribute to theoretical and managerial implications. First of all, current research is helpful to theoretical advancement for cross-cultural adaptation and makes a significant input by integrating cross-cultural adaptation theory, self-determination theory, and cognitive theory of motivation. It conceptually and empirically links these theories by incorporating variables such as psychological adaptation, sociocultural adaptation, intrinsic motivation, and international students' academic adaptation into an integrated model. This contribution can provide greater theoretical understanding of the direct and indirect influence. Besides, the positive association between psychological adaptation and international students' academic adaptation has been proved, as the results are in line with many previous findings such as (Buddington, 2002; Clinciu, 2013). However, the insignificant relationship between sociocultural adaptation and international students' academic adaptation is contrary to previous findings, in which the indirect impact through intrinsic motivation has been proved in current research. The current study contributes to the theory development by considering students' difference and different international educational management model in different countries to enhance international students' academic adaptation.

Universities have the responsibility to ensure the graduation of international students (Li, Chen & Duanmu, 2010). This research provides the authorities such as colleges, universities and other higher education institutions, more ways to strengthen international students' academic adaptation in China. Also, this research informs administrators and teachers to understand various factors influencing international students' academic adaptation that is important for them to successfully graduate (Hussain & Shen, 2019).

Conducting a longitudinal survey on international students in China will be needed in future. Cross-cultural adaptation is a dynamic process (Lysgaard, 1955), the cross-cultural adaptation curve model is represented by a U-shaped cultural adaptation curve by Lysgaard (1955), dynamic process is according to different stages. Therefore, the researcher recommends that it is meaningful to conduct longitudinal survey in future to propose more useful theories to optimize international education management system in China.



MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

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