

Cultural Differences In On-Line Learning Motivation: A Cross-Sectional Survey Among Chinese And South Asian Undergraduate Medical Students

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Abstract

Background: During the COVID-19 pandemic the requirement for On-line learning in the modern world of education has become clear. On-line education provides one such avenue by creating new opportunities for students, faculty, regulators of education, and educational institutions. Cultural diversity has become a defining characteristic of the students bodies. The current study aims to analyse differences in motivation on on-line learning and the impact of their culture.

Methods: A cross-sectional survey was conducted from 2021.04.04 to 2021.05.03 among the undergraduate Chinese and South Asian students from 5 classes of Chinese students and 6 classes of South Asian students with major of Clinical Medicine at Dali University, Dali, China. The study used a questionnaire which were identical both in Chinese and English language. Platforms of Wen Juan Xing (WJX) and Ding-talk were used to distribute the questionnaire.

Results: Based on the statistical analysis results, the structural validity of the bilingual questionnaire was confirmed, the reliability was found to be satisfactory. A total of 433 students questionnaire data from class of 2018 and 2019 were collected, including 173 males (40.00%), 260 females (60.00%), 216 Chinese (49.88%), 99 Indians (22.86%), 51 Nepalese (11.78%), 48 Pakistani (11.09%), 19 from Laos and Cambodia (4.39%) respectively. The total score of Chinese students was highest with Pakistani students showing the lowest. It was found that there were significant differences in score for the dimensions of reinforcement, Affects & emotion, interest and self-efficacy in between Chinese and South Asian students. Multiple linear regression analysis showed that nationality as the key factor influencing the on-line learning motivation of the undergraduate medical students from China and South Asian countries.

Conclusions: The results provides with the evidence on the feasibility, as well as information about the potential barriers and the cultural impact to on-line learning in medical education among Chinese and South Asian undergraduate students.

Introduction

The corona-virus disease 2019 (COVID-19) pandemic presents a huge challenge to the education system worldwide, which national education system has never faced before. This COVID-19 pandemic has disturbed the lives of the students in various aspects, depending not only their level and course study, but also on the point they have reached in their program [1]. Moreover, as a result of social distancing, the most effective preventive strategy since the emergence of COVID-19 [2], medical education has been profoundly disturbed as it involves in-person didactic lectures and tutorials, clinical rotation exposures, laboratory experiences, observing and assisting relevant medical and surgical procedures [3]. During this crisis, the requirement for On-line learning in the modern world of education has become clear. Various institutions, along with teachers and students, have found new avenues to repair the damage cause and to continue their learning process in digital format. On-line education provides one such avenue by creating new opportunities for student, faculty, regulators of education, and educational institutions [4]. Since the emergence of the internet, it has become an important medium of communication, as well as a research tool for learning and information [5]. On-line learning refers to the use of internet technologies to deliver a broad array of solutions that enhances knowledge and performance [6]. E-learning is "an approach to teaching and learning, representing all or part of the

educational model applied, that is based on the use of electronic media and devices as tools for improving access to training and communication and interaction and that facilitates the adoption of the new ways of understanding and developing learning” [7].

“On-line learning” can be broadly referred to almost any learning environment in which electronic media such as computers are used as a component of an instructional delivery system. The benefits of on-line learning are that learners have a control and responsibility for the learning, and the content can be taken whenever a learner has access allowing more flexibility and large amounts of content are broken down into smaller manageable modules. On-line learning offers a means of self-directed education with improved learning through interactivity [8].

The inter-cultural research most focused on motivational to successful learning and related learning [9]. There are a variety of ways individuals from different cultures are motivated to learn, which are supported by various researches. It is being noted that the students from Asian countries those of Confucian heritage culture (CHC) have been outperforming students from western countries both in studies making comparisons across nations as well as where Asian students have studied in Western countries, as migrants or as international students. The countries of “Confucian- heritage cultures” includes mainly China, Taiwan, Singapore, Hong Kong, Korea and Japan [10]. Cultural diversity has become a defining characteristics of students’ bodies [11].

There are various impacts of culture on learning style preferences. Yu-Chih et al. Conducted a review of literature in order to compile results of earlier research, such as Hofstede’s cultural dimension, which pertains to the impacts of culture on learning style preferences. With advancement in the studies conducted in the field of learning, it has become evident that the teaching quality is positively associated with the characteristic of students, teaching styles, as well as the teaching environment. Also, when a student is transferred from an unsuitable learning environment to a suitable one, there is resulting improvement in academic performance [12].

Studies have shown that teaching methods and style do not threaten the socio-cultural backgrounds of the learners. Indeed, teaching methods can vary significantly. There are teachers who want to focus on instructions, while there are also those who make learners significantly engage with their peers. Other teachers also encourage learners to look for their own resources however studies also attest that certain cultural barriers prevent effective interaction between teachers and learners [13].

When it comes to learning, motivation is relevant to learning, because learning is an active process which requires conscious and deliberate activity. For students to derive maximum benefits from school, educators must provide a learning context in which students are motivated to engage actively and productively in learning activities [14]. Functional definition of motivation is to understand “its as a natural human process for directing energy to accomplish a goal” [15].

On-line learning offers a means of self-directed education with improved learning through interactivity. The most concentrated cross-cultural research on learning pertains to achievement motivation and related learning. The current study aims to analyse differences in motivation on on-line learning and the impact of their culture through a survey conducted in a Chinese University with splendid experience in international education.

Methods

2.1. Study Objective

The purpose of this study is to analyse whether there are differences in between Chinese university students and South Asian university students studying in a Chinese University (hereinafter referred to as "South Asian students") in their motivation for their on-line learning, and their cultural influence on it. The study was designed by keeping in mind to make it completely voluntary for participation and was approved by the Ethics Committee of Medical Research of Dali University (Registration Number- 2020 – 171).

2.2. Survey Tool

A questionnaire was designed based on the literature available, which evaluate students learning motivation in five dimensions. At the beginning, the questionnaire consisted of the informed consent, which indicates that if the participant completed and submitted the questionnaire, s/he gave their consent to participate in the survey. The questionnaire consists of three parts: the first part is the demographic data of the participants; the second part is the evaluation of the participants which is based on ARCS (Attention, Relevance, Confidence, Satisfaction) model of motivational design [16] and Dick & Carey's systems approach [17] which include five dimensions, the third part includes one open question, mainly for a more comprehensive understanding of students view on on-line learning. The above mentioned five dimensions are - reinforcement (question number: 15, 17, 18), affects and emotions (question number: 3, 6, 7, 13), interest (question number: 1, 2, 4, 5, 8, 9, 10, 11, 12, 14, 16), self-efficacy (question number: 22, 22, 26, 26, 28, 29, 30, 31) and barriers for on-line learning (question number: 19, 21, 32, 33). The five dimensions were evaluated on Likert 5-point evaluation scale (1 = strongly disagree 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree) [5]. .

After a pretest, the questionnaire was distributed which were identical but in two languages including Chinese and English to above mentioned two groups by WJX (微信) and Ding-talk (钉钉) respectively. The duration for collection of on-line survey was of one month starting from 2021.4.04 to 2021.05.03.

2.3. Study Participants

The subjects of this study were undergraduate students who took on-line courses during the covid-19 pandemic for the academic year 2020–2021, which included three semester in our University. Cluster sampling was applied to recruit subjects which include 5 classes of Chinese students and 6 classes for South Asian students. Among them 433 participants data was collected, out of which 173 (40.00%) were from male and 260 (60.00%) from female participants respectively, 216 (49.88%) were Chinese and remaining South Asian with, 99 (22.86%) from India, 51 (11.78%) from Nepal, 48 (11.09%) from Pakistan and 19 (4.39%) from other countries including Laos and Cambodia.

2.4. Statistical Analysis

The performance of the participants were expressed as Mean \pm Standard deviation of total scores and each dimension. Confirmatory factor analysis was conducted on the questionnaire to verify its structural validity. Cronbach's Alpha coefficient, Kaise-Meyer-Olkin (KMO) value and Bartlett spherical test were used for reliability and validity evaluation .

One way analysis of variance (ANOVA) was applied to explore the differences among the demographic data of the participants. Multiple linear regression analysis was conducted to investigate the factors influencing the

participants for their on-line learning motivation. All the statistical analysis was done through SPSS 25.0.

Results

3.1. Participants demographic data

The study participants include 216 Chinese students (49.88%) and 217 South Asian students (50.11%). Among South Asian students, Indian students accounted for about 45.8%, followed by Nepalese students with 23.60%, and Pakistani students accounted for 22.2% (Figure-1). Among the Chinese students who participated in the survey were 47 male (10.39%) and 169 female (39.03%) whereas total of 217 South Asian students participated in the survey, 126 male (29.10%) and 91 female (21.02%) respectively. Compared with the students with a Major in Clinical Medicine in this University, study participants shows the same gender distribution. Meanwhile there is a significant difference for the gender distribution for Chinese and South Asian students ($P < 0.001$) (Figure-2). The participants who were included in the survey, were from three grades (Table-1).

Table 1
Gender and Grade for study participants.

		China	Nepal	India	Pakistan	Others	Total
Gender	male	47	39	48	30	9	173
	female	169	12	51	18	10	260
Grade	2018	129	18	66	10	10	233
	2019	87	33	33	38	63	200
Fail in exam	yes	42	3	19	4	69	
	no	174	48	80	47	15	364
Total		216	51	99	48	19	433

3.2. Quality assessment of questionnaire

The reliability and validity for the Chinese and English version of the questionnaire was evaluated separately. Cronbach's α coefficient, the indicator for internal consistency, was used for reliability evaluation. According to the results of factor analysis, the questionnaire structure was found to be consistent with the theoretical one.

3.2.1. Reliability evaluation:

The overall Cronbach's α of Chinese questionnaire was 0.953, and along with the Cronbach's α of each dimension was all greater than 0.8, suggesting that the Chinese questionnaire was reliable. The value for Cronbach's α of the English questionnaire is 0.924, with Cronbach's α of each dimension greater than 0.7, indicating that of the English questionnaire is acceptable (Table 2).

Table 2
Evaluation of reliability and validity of scales for Chinese and South Asian students

Dimensions	No.of Questions	South Asian students			Chinese students		
		Cronbach'α	KMO	Bartlett.Sig.	Cronbach'α	KMO	Bartlett.Sig.
Reinforcement	3	0.776	-	-	0.681	-	-
Affects&Emotion	4	0.926	-	-	0.903	-	-
Interest	14	0.955	-	-	0.948	-	-
Self-efficacy	9	0.919	-	-	0.939	-	-
Barrier to on-line learning	4	0.745	-	-	0.763	-	-
Total	33	0.924	0.938	0.000	0.953	0.950	0.000

3.2.2. Validity evaluation:

The overall KMO value of Chinese questionnaire was found to be 0.950, and the value of each dimension was greater than 0.7. The *P* values of Bartlett test of the whole questionnaire along with each dimension were all less than 0.001 (Table 2), which suggest that the structure of questionnaire perhaps meet the design of study and therefore confirmatory factor analysis was applied to elucidate its structure (Table 3).

The overall KMO value of English questionnaire was 0.924, and the value of each dimension is greater than 0.7. The *P* values of Bartlett test of the whole questionnaire along with each dimension is less than 0.001 (Table.2) which indicate that the structure of questionnaire meets the design and therefore confirmatory factor analysis was applied (Table 3).

The results of confirmatory factor analysis on the 33 questions of the Likert 5-point evaluation scale for all the 433 questionnaire verified the design, based on the five factors extracted from the questionnaire and corresponding factor loadings of each questions to factor (Table-3). In addition, Question 16 because of language expression issue faced by the Chinese participants it has an overlap between dimension of interest and self-efficacy.

Table 3
Factor loadings of Confirmatory Factor analysis on the questionnaire.

Dimensions of original design	Question Number	Factors extracted from confirmatory analysis				
		1	2	3	4	5
Interest	1.	0.770	0.029	0.077	-0.130	0.146
Interest	2.	0.816	0.249	-0.057	0.060	0.070
Interest	4.	0.771	0.225	-0.037	-0.072	0.255
Interest	5.	0.573	0.397	-0.144	0.287	0.308
Interest	8.	0.607	0.448	-0.132	0.108	0.159
Interest	9.	0.689	0.325	-0.042	0.043	0.233
Interest	10.	0.810	0.307	-0.111	-0.013	0.036
Interest	11.	0.801	0.241	-0.038	-0.012	0.129
Interest	12.	0.796	0.288	-0.068	-0.062	0.003
Interest	14.	0.711	0.394	-0.075	0.027	0.226
Interest	16.	0.444	0.322	0.114	0.289	0.227
Self-efficacy	22.	0.311	0.753	-0.075	0.162	0.131
Self-efficacy	25.	0.376	0.696	-0.001	0.011	0.279
Self-efficacy	26.	0.170	0.776	-0.013	0.172	0.166
Self-efficacy	27.	0.239	0.640	0.120	0.075	0.104
Self-efficacy	28.	0.499	0.709	-0.084	0.003	-0.013
Self-efficacy	29.	0.517	0.678	-0.099	-0.079	0.059
Self-efficacy	30.	0.433	0.627	0.002	-0.112	0.193
Self-efficacy	31.	0.396	0.697	-0.051	-0.044	0.171
Barrier to online learning	19.	-0.055	0.005	0.764	0.000	-0.002
Barrier to online learning	21.	-0.167	-0.004	0.659	0.201	0.266
Barrier to online learning	32.	-0.108	-0.005	0.746	0.229	0.018
Barrier to online learning	33.	0.158	-0.072	0.737	0.096	-0.126
Affects & Emotion	3.	0.328	0.128	-0.020	0.636	0.078
Affects & Emotion	6.	-0.200	0.115	0.314	0.743	-0.112
Affects & Emotion	7.	-0.316	-0.084	0.376	0.578	0.099
Affects & Emotion	13.	-0.102	0.029	0.396	0.557	0.040

Dimensions of original design	Question Number	Factors extracted from confirmatory analysis				
		1	2	3	4	5
Reinforcement	15.	0.390	0.399	0.009	0.130	0.552
Reinforcement	17.	0.363	0.453	0.065	0.097	0.518
Reinforcement	18.	0.209	0.273	0.105	-0.033	0.739

Extraction method: principal component analysis.

Rotation method: Caesar normalization maximum difference method.

a. The rotation has converged after 7 iterations.

3.3 Participants results on Likert 5-point evaluation scale

The result demonstrates that Chinese students have the highest motivation level among all the participants, which when compared with participants from India and Pakistan showed a significant difference in motivation level at $P < 0.05$.(Table-4)

3.3.1. Comparison of different dimensions of on-line learning motivation between Chinese and South Asian Participants:

Under the design of this bilingual questionnaire, the respondent with highest motivation would get the full score of 165, which consist of Reinforcement with a score 15 accounting for 9.09%, Affects and Emotion score 20 accounting for 12.12%, Interest score for 70 which makes 42.42%, Self-efficacy score for 40 accounting for 24.24% and Barrier to on-line learning score for 20 which accounts for 12.12%. Comparing the proportion of each dimension to the total score for individual country, it was found that in Affects and emotion participants from Pakistan and Nepal expressed higher proportions than others, meanwhile participants from Cambodia and Laos have highest proportions for Reinforcement. Participants from China demonstrated the highest proportion for dimension of Interest and Self-efficacy showed highest proportions for participants from Nepal, India and Pakistan, lastly dimension of Barrier to on-line learning have the highest proportion showed by participants from Cambodia and Laos.

Participants from Pakistan performed lowest in terms total scores and scores of each dimensions. Chinese participants showed highest scores in total as well as dimensions of Interest and Affects & emotions, Nepal participants demonstrated highest scores in dimensions of Reinforcement and Self-efficacy, meanwhile participants from Cambodia and Laos expressed their highest score for Barrier for on-line learning. Individual t -test for the comparison of Chinese and South Asian participants on each dimensions illustrate significant differences existing in reinforcement, affects & emotion, interest (Table-4).

Table 4
Total and sub- total scores from Likert 5-point evaluation scale

	Dimensions	China	Nepal	India	Pakistan	Others
Average scores	Reinforcement	10.36 ± 2.63	10.63 ± 3.48	9.86 ± 3.34	8.31 ± 3.35*	9.42 ± 4.62
	Affects & Emotion	11.46 ± 2.82	10.06 ± 2.98*	9.69 ± 3.66*	8.33 ± 2.68*	10.84 ± 4.98
	Interest	40.75 ± 10.68	30.49 ± 13.35*	32.53 ± 13.00*	25.81 ± 11.85*	31.79 ± 16.63*
	Self-efficacy	22.98 ± 7.45	24.45 ± 9.13	22.96 ± 8.41	18.71 ± 8.84*	21.26 ± 12.78
	Barrier to on-line learning	11.36 ± 3.83	11.65 ± 4.59	11.16 ± 5.09	10.06 ± 4.41	13.63 ± 5.66
	Total	96.89 ± 20.07	91.27 ± 23.87	86.19 ± 26.33*	71.23 ± 24.10*	86.95 ± 37.48
*Compared with Chinese students $P < 0.05$						

By analysing the scores of five dimensions in different South Asian countries, it was found that the differences of total scores and the following 4 dimensions Reinforcement, Affects & Emotion, Interest, Self-efficacy among the South Asian countries were statistically significant (Figure-4). Based on the post-hoc test results, the difference between India and Pakistan was statistically significant, and the difference between Nepal and Pakistan were also proved statistically significant.

3.3.2. Comparison of different dimensions of on-line learning motivation among different genders :

According to *t*-test results for different dimensions of on-line learning motivation among different genders irrespective of the nationalities there was no statistical significance found among the five dimensions. For participants from different countries, there were no notable differences between male and female.

3.4. The factors influencing on-line learning motivations among all the participants:

Multiple linear regression analysis was performed to explore potential factors influencing on-line learning motivation for Chinese and South Asian students with a major in Clinical Medicine. Nationality as a dummy variable, Gender, any exam failure and Grades were treated as independent variables for model fitting. However, the final model showed only nationality as statistically related to participants on-line learning motivation (Table-5).

Table 5
Multiple linear regression analysis for on-line learning motivation

<i>Factors</i>	β	<i>t</i>	<i>P</i>	<i>95%CI</i>
Intercept	105.745	14.074	0.000	90.977 ~ 120.513
Nepal	-9.125	-2.270	0.024	-17.025 ~ 1.224
India	-12.010	-4.107	0.000	-17.757~-6.262
Pakistan	-29.578	-6.817	0.000	-38.106~-21.051
Others	-11.634	-2.053	0.041	-22.769~-0.498

Discussion

On-line learning as a teaching tool of medical education can offer an effective alternative to the traditional in class teaching and help solve the problem of shortage of health care givers and educators [18, 19].

The combination of self-efficacy and learning motivation theory [20], motivation is not the ultimate goal, which can effectively maintain learners' learning motivation and allow learners to experience learning satisfaction and thus promote learners learning migration. The level of motivation of learners is an important factor in self-learning.

The five dimensions included in the questionnaire well explained and represented the theoretical framework of the self-efficacy and learning motivation.

In this study, Chinese participants had better overall feedback on on-line courses during the spring 2020 outbreak of COVID-19, and has scored higher than South Asian students in terms of interest and affects & emotion. Chinese and South Asian participants had statistically significant differences in reinforcement, affects & emotion and interest. Among the countries of South Asia, Pakistan's shows a differences in total scores and among the dimensions of reinforcement, interest and self-efficacy. To the most extent the participants from Cambodia and Laos showed highest score on dimension of Barrier to on-line learning which suggest through the open question analysis that it comes from the aspect of internet and equipment facilities faced in their home country respectively.

Combined analysis of open question and Likert 5-point questions, its was found that Chinese undergraduate medical students demonstrated more attention towards on-line courses, because it can be easily and more directly recognized by teachers and fellow classmates help, which provides better experience for Chinese students when compared to South-Asian students with certain language barriers for communicating with teachers and fellow peers. Further more, the function of playback videos provided by on-line teaching methods can prove supportive in improving learning efficiency.

The psychological effect which is brought about by on-line learning have a greater impact on South Asian students, who feel depressed and irritable because they perceive the instability of internet connections, and the time differences between China and their home country, which make them feel difficult and less motivated to study on-line courses. This also describe itself as indicator for the dimension of Barrier to on-line learning.

In terms for dimension of interest, Chinese students with CHC tend to express their attitude with more positivity, towards different teaching methods, and learning patterns, while South Asian students express their negative feedback towards on-line courses more directly through open-ended question.

Dimension of self-efficacy, proved for the students from Pakistan, among the other South Asian countries and Chinese students with the least score, which indicate that the students from Pakistan show least involvement in on-line learning when compared to rest of the countries.

Strength And Limitation Of The Study

This study and its design has several strengths and limitations. The major strength of this cross-sectional study was its relevance with the current pandemic situation, its sizeable sample and its representativeness of medical students from different countries, timely information collection, all of these allowed prompt feedback for the making necessary changes in continues on-line teaching and learning.

However, there were some limitation. Firstly, in our questionnaire, all dimensions had their own questions but there was one question in Chinese version of questionnaire which fitted itself in two dimensions of Interest and Self-efficacy because of students perception of the question. Secondly, the findings in our study calls for further validation with more studies like case control study and/or intervention study to explore the fundamental cultural impact on medical education for undergraduate medical students.

Conclusions

In this study, the bilingual questionnaire on on-line learning motivation was designed based on self-efficacy and motivational theory. The validity and reliability evaluation ensured the questionnaires of both Chinese and English versions with high standards. Chinese students with Confucius heritage culture showed highest motivation in total as well as the dimensions of Interest and Affects & emotion. Through the analysis of the data, certain differences were observed, although there were less differences among groups of Chinese and South Asian participants exhibited in this survey than what was previously thought, which might be a result of keeping increased globalization and the experience of the study subjects' of studying in China prior to COVID-19 pandemic emerged. The results provides with the evidence on the feasibility of, as well as information about the potential barriers and the cultural impact to on-line learning in medical education among Chinese and South Asian undergraduate medical students.

Abbreviations

ANOVA: Analysis of Variance; ARCS: Attention, Relevance, Confidence, Satisfaction; CHC: Confucian Heritage Culture; COVID-19: Corona virus disease- 2019; KMO: Kaise-Meyer-Olkin; WJX: Wen Juan Xing platform.

Declarations

Ethics approval and consent of participate

All subjects were given informed consent and all participation was voluntary. The study was approved by the Ethics Committee of Medical Research of Dali University (Registration Number- 2020-171).

Consent for Publication

The authors provided consent for publishing this article.

Availability of data and material

The datasets used and/or analysed during the current study are in bilingual - Chinese and English and are available from the corresponding author on reasonable request but will require translation in English.

Competing Interests

We declare no competing interests.

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Authors' contributions

MKV designed and carried out the study, prepared the English questionnaire, recruitment of participants, data collection and interpretation, writing of the manuscript. YM carried out the statistical analysis, preparation of Chinese questionnaire, recruitment of participants, data collection and interpretation of the results and assisted in writing of the manuscript. XMW assisted in design concept, revision of paper and was in-charge for statistical analysis. BSZ was responsible for the facilitation of the performance of the study. All authors read and approved the manuscript.

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Figures

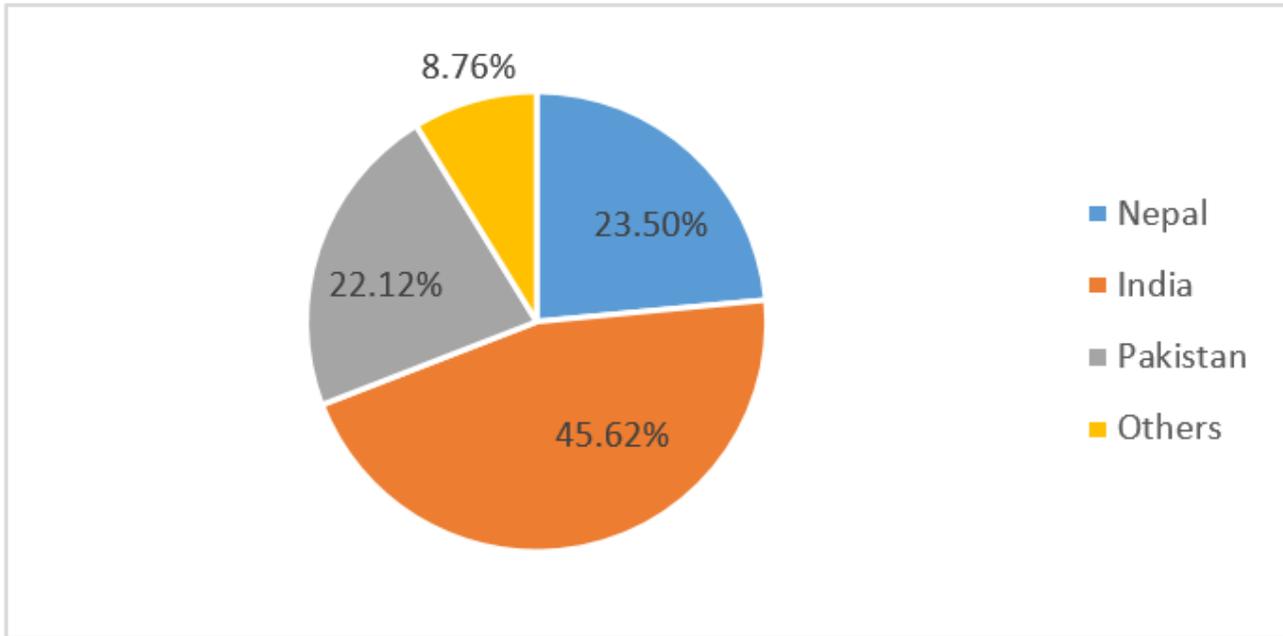


Figure 1

Distribution of students in Asia-South countries

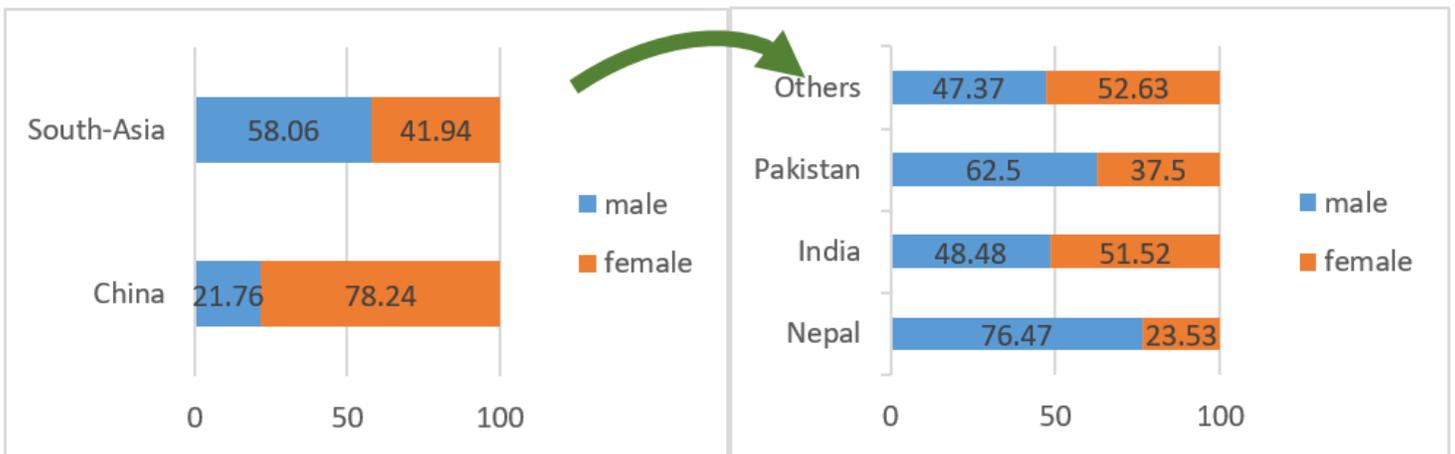


Figure 2

Gender distribution of participants



Figure 3

Proportion of each dimensions in different countries

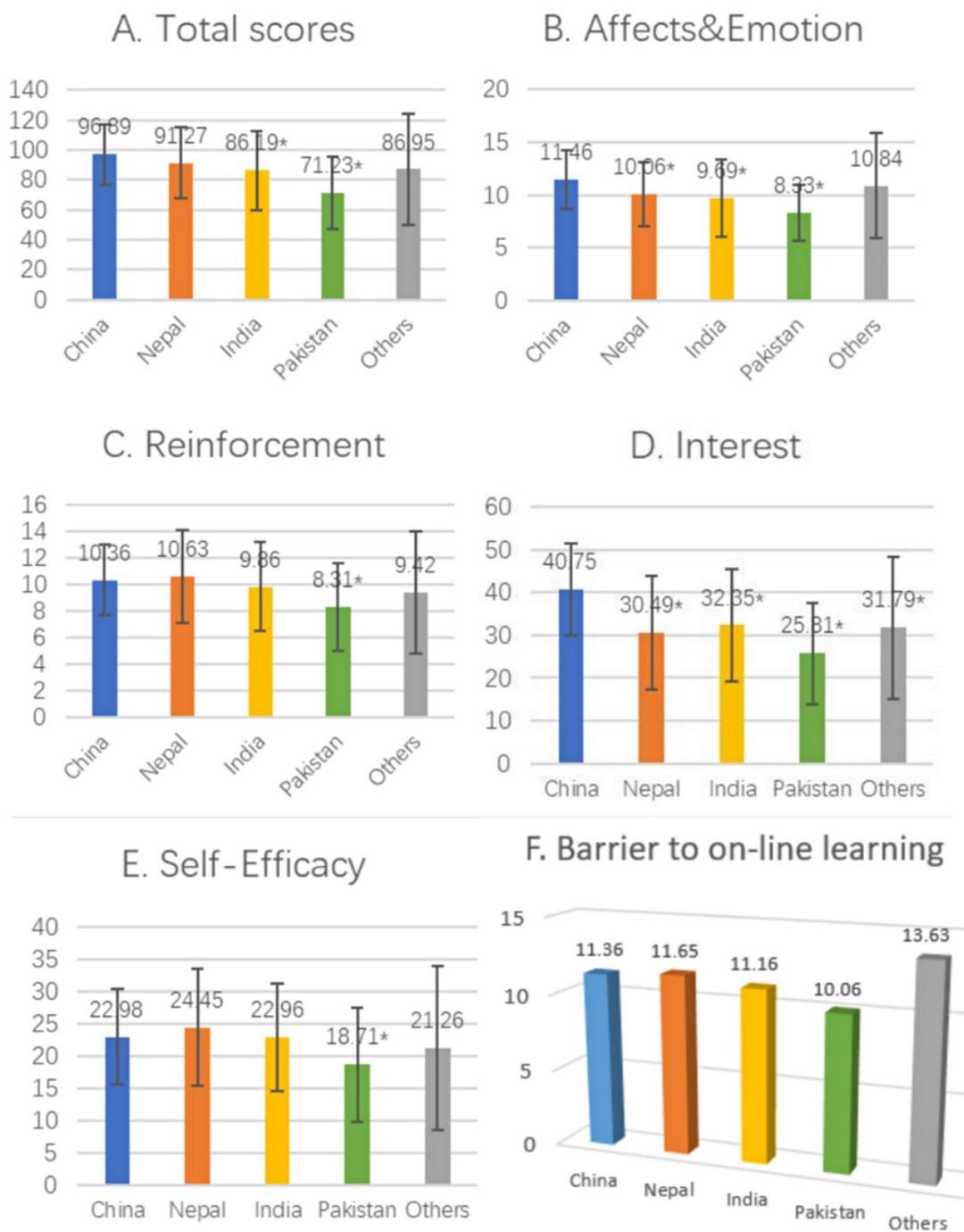


Figure 4

scores of total and five dimensions in China and different South Asian countries (*Compared with Chinese students $P < 0.05$)