



# Investigation of Mobile Library user Needs of International students based on the Expectancy Theory of Motivation

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## Abstract

*The purpose of this paper is to investigate International students' mobile library user needs based on the expectancy theory. To attain this objective; the investigation attempts to mold and test international students' mobile library user needs motivational model grounded on the expectancy theory of motivation. A survey was designed to gather feedback from international student users of mobile services at Central China Normal University library through use of a questionnaire. The data was then examined using correlation research analysis and a finalized international students' mobile library user needs motivational model presented. The findings indicate that international students' mobile information needs satisfaction is influenced by the student users themselves and the library service personnel. How well users execute mobile services influences their information needs satisfaction and is dependent on their past experiences with the services. Users with great experiences are more likely to execute the services comfortably, ensuing in their information needs contentment. Library service personnel's role is also crucial as offering proficient services with excellent human factors and marketing the services are more likely to motivate international students to use mobile services. Academic libraries are also encouraged to involve international students in the implementation of mobile services.*

**Keywords:** International students, Mobile services, User needs, Motivation, University libraries.

## Introduction

Studies are in harmony that International student user needs are different from those of the general student user community<sup>1-3</sup>. This is also exemplified by the many unique challenges the students encounter when accessing library resources. Such challenges include variations in culture, viewpoint, technological barriers, interests, communication barriers and unfamiliarity with information resources and processes<sup>3</sup>. The need therefore arises to investigate international students' mobile library user needs independently from the general student user community.

To investigate the mobile library user needs of international student's, fundamental key concerns arise; i Specifically why international students make use of mobile services and ii The kinds of resources they want to appear on their mobile devices.

Information user needs are however determined through identification of how users are motivated to utilize library resources<sup>4</sup>. Connecting library use to user motivation may also be a stride frontward as purchase of information resources alone does not quantity users' use of the library<sup>4</sup>. Library users akin to customers purchase goods and services from the market which is motive driven. Consequently, it is vital that library service personnel motivate international students towards mobile services as they work in competitive settings with the jeopardy of losing them to other information service providers. This study

employs a similar view in elucidation of international students' mobile library user needs.

**International students' mobile library user needs:** Multicultural student user needs are dissimilar from those of the general student user community<sup>3,5</sup>. This is because of their variations in culture, language, viewpoint and interest with the general student user community<sup>3</sup>. Lee as well adds that there are generally low numbers of international students using library resources even as Academic libraries remain a contributing factor to their learnability. Other authors are however of the view that the low use of library resources among multicultural students is as a result of poor retrieval skills<sup>6</sup>. Academic libraries should make it a priority to gratify international students' mobile information needs through provision of meaningful content and ensure service personnel are on standby to attend to their needs.

There is also the need to investigate how academic library users from varied ethnic groups discover, select and utilize information resources<sup>5</sup>. The authors aver that multi-cultural student users who speak the English language as their main means of communication are much more triumphant in utilization of library resources when compared to those who don't speak English as their native language. Students who also happened to utilize library resources more regularly are more successful in using the resources compared to those who infrequently use them. Unsuccessful international student users

do not however seek assistance from relevant library service personnel limiting their information needs satisfaction<sup>4</sup>.

Multicultural student users also want mobile libraries to provide them with speedy access to precise, sharp bite-size chunks of highly meaningful content at their own convenience<sup>7</sup>. The students would like to access these kinds of resources anywhere and at anytime with little or no hustle. These services should be offered on responsive tools such as mobile sites and mobile applications which would alert them in case of handheld books, fines, overdue etc. The author further continues that there is growing interest among varied student users for live and up to date mobile services such as updates on new information resources, available rooms, computers, etc. Such needs reflect the increasingly growing interest of international students towards instant live updates regardless of whether they are in the library or not.

In addition to provision of speedy access to precise, sharp bite-size chunks of highly meaningful content, the need also arises to examine how international student users' use library resources outside the library<sup>8</sup>. The authors aver that International students rarely use digital resources when outside the library. The students make the most of print resources. On the contrary other findings show that multicultural students generally prefer digital resources over print resources whether in or outside the library<sup>9</sup>. The author states that the number of international students using print resources has been reducing drastically. The students prefer online information resources because of easier and faster retrieval. Multicultural students would also like to access electronic resources at their own convenience, and have stand by service personnel ready to meet their information needs.

Multicultural students are also known to encounter challenges when accessing information resources<sup>3</sup>. The author points out the general inadequate user skills, lack of knowledge on retrieval expertise, poor research skills, language barrier and inability to ask for help from service personnel. The author concludes by adding that there are no major gender disparities in utilization of information resources among international students. The need therefore arises for academic libraries to prioritize serving multicultural students and address the challenges they encounter when accessing information resources<sup>10</sup>. Many Universities offering courses to international students also have a language requirement before the students can commence their studies<sup>1</sup>. According to the authors language does not pose a great challenge in international students mobile information needs satisfaction.

There is also the need for academic libraries to habitually evaluate their mobile resources to make certain they are satisfying the information needs of varied student users<sup>11</sup>. The evaluation can include tracking online usage, conducting online surveys etc. The author further adds that the assessment can not only offer valuable information on whether the mobile resources are satisfying user needs but also aid ascertain the kind of

mobile resources users deem meaningful. Consequently, library service personnel are able to make the right decisions on the content to add or weed as per the different end user needs. In the event of new mobile resources, the author recommends user testing through a survey.

**The expectancy theory of Motivation:** The theory of motivation may perhaps be novel in the library world but has earlier been applied in a range of studies to examine and explain user behavior. Motivational concepts are subdivided into two; mainly content and process. Content theories define aspects in a personality that guide, maintain and impede behavior whereas process theories elucidate and examine how personality behavior is guided maintained and clogged<sup>4</sup>. Process theories center on personality cognitive practices and try to discern the mechanisms that elucidate their motivation; consequently explicating their user needs. The study adopts one of the process theories; the expectancy theory to explore the associations among constructs identified in the model of the study; to explicate the motivation process of international students towards mobile services; thereupon elucidating their mobile library user needs.

## Methodology

**Procedure:** The investigation examines the associations among constructs identified in the model of the study to elucidate international students' motivational process to use mobile services consequently explicating their mobile information needs. The survey will therefore employ correlation research.

Data in correlation research design can be collected through a number of methods such as questionnaires, standardized means, interviews, observations etc<sup>12</sup>. Data in this survey will be collected using a questionnaire as they are relatively easy to analyze and familiar to both the researcher and participants<sup>13</sup>.

Pilot interviews with international students at Central China Normal University will be conducted prior to data collection to pretest the questionnaire.

**Preliminary interviews:** The author executed pilot interviews with 4 international Student users of mobile services at Central China Normal University. The interview's intent was to validate that the study population would comprehend the questionnaires.

Foremost, the students were asked whether they use mobile services at the University library. After confirmation of use, the students were then requested to analyze the questionnaire critically and point out any questions they did not comprehend and recommend for revisions. The interviewees concluded that they could comprehend the questions with no difficulty.

**Overview of correlation research method:** Correlation research explains associations between two or more variables<sup>14</sup>. It was first specified as a quantitative design in 1963 by

Campbell & Stanley and has since been applied in different studies to identify intricate relationships among variables<sup>15</sup>.

Correlation research is divided into two main categories; relationship and prediction surveys. Relationship surveys are concerned with analysis of relationships among two or more variables from an even population and at roughly similar times<sup>12</sup>. The researcher also obtains at least two scores for each variable<sup>15</sup>. Prediction studies on the other hand determine variables that positively augur a result. The investigator quantifies a prediction factor at a similar point in time then the criterion sooner after. The word prediction is also included in the title<sup>15</sup>.

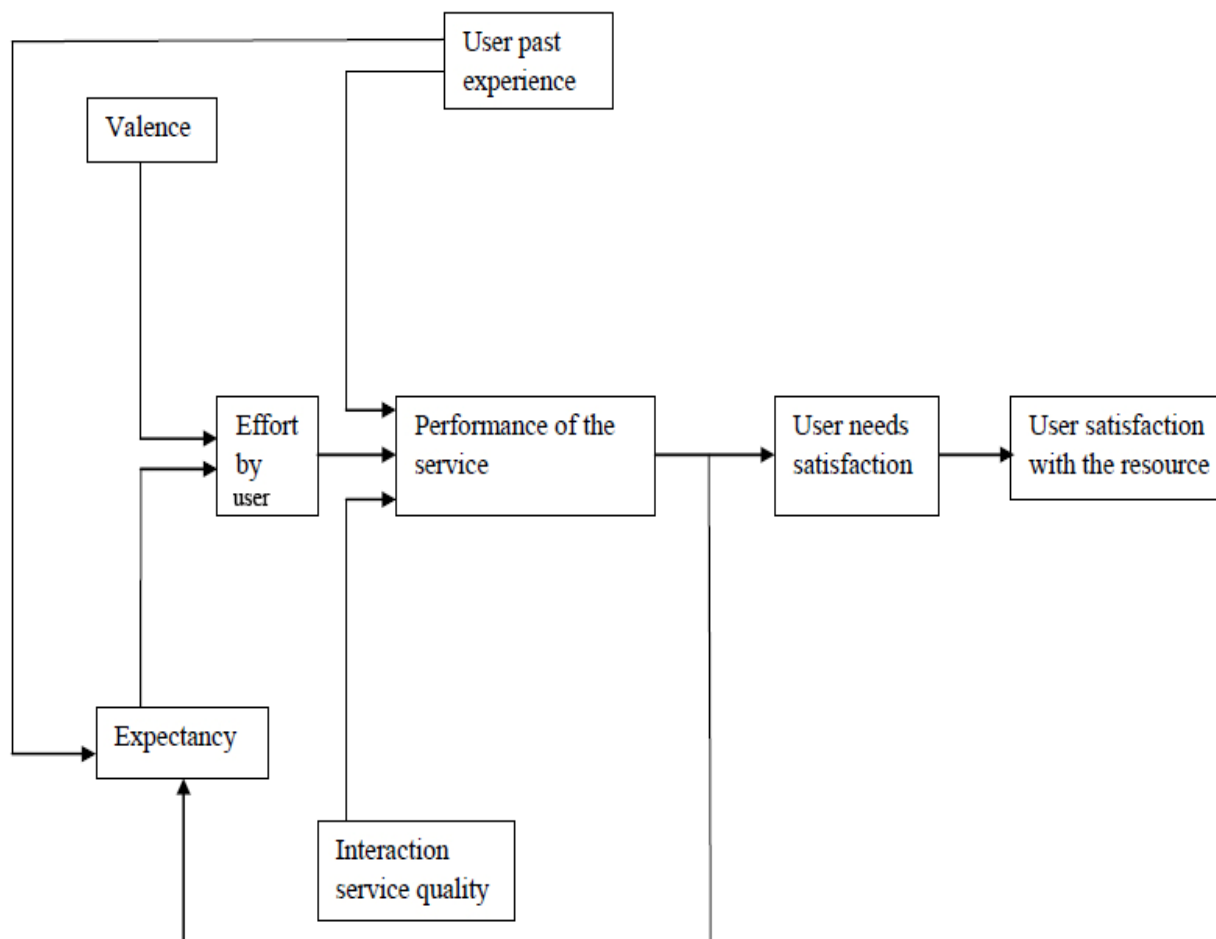
The author developed International students' mobile library user needs motivational model grounded on the expectancy theory. The model is made up of 8 variables. To explore the relationships among the 8 variables; correlation research was applied.

**The Study model:** The study model is grounded on the expectancy of motivation which was first brought up by victor vroom and later remodeled by Porter & Lawler and Campbell, Dunnette, Lawler & Weick.

Information users are motivated only when they see value in behavioral outcome (valence); anticipate that behaving in certain ways will make them attain certain things (instrumentality) and when they foresee that they are proficient of executing the behavior that would lead to attaining certain outcomes (Expectancy)<sup>16</sup>.

These key observations can be summed up as valance, instrumentality and expectancy. The model employs 8 constructs. These are User needs satisfaction/Outcomes, Valence, user past experience, Effort by user, performance of the service, Expectancy and Interaction service quality and user satisfaction with the resource.

The model for the study is shown below:



**Figure-1**  
**International students' mobile library user needs motivational model**

The variables are discussed below

**Table-1**  
**Variable definition and adoption**

Variable	Definition	Variable adoption
Valence	The expected value by a user when their information needs are met.	(Porter & Lawler, 1968)
Expectancy	A user's own probability estimate that he or she can execute a task at hand given effort.	(Snead & Harrell, 1994)
Effort by user	The amount of energy exerted by a user in order to comfortably accomplish the task at hand.	(Burton et. al, 1993)
Performance of the service	User's execution of a service without any intricacy.	(Lee, 2007)
Interaction service quality	<ol style="list-style-type: none"> <li>1. Readiness of service personnel to assist users</li> <li>2. Professional etiquette of service personnel</li> <li>3. Right qualifications of service personnel to enable delivery of high quality services.</li> </ol>	(Lee, 2007)
User past experience	<ol style="list-style-type: none"> <li>1. Frequency of service use</li> <li>2. Past experiences with the mobile services.</li> <li>3. Available services</li> </ol>	(Lee, 2007)
User needs satisfaction/ Outcomes	User's Information needs satisfaction	(Schwab et. Al, 1979)
User satisfaction with the resource	Overall evaluation of the resources by the user	(Snead & Harrell, 1994)

**Participants of the study:** The study population is international student users' of mobile services at Central China Normal University (CCNU) library. The participants of the study were selected through judgmental sampling of non probability sampling. Judgmental sampling involves use of the researchers own judgment to select the sample of the study. In this study Judgmental sampling ensures that; i Only students who are international students at Central China Normal University (CCNU) are selected as the participants; ii Only international students who can communicate in English are selected as participants. iii Only international students who have used mobile services at Central China Normal University library before are selected as participants.

Associational research demands that participants be alike to contain other factors/ constructs excluded in the survey<sup>17</sup>. Through judgmental sampling, the participants can generally be regarded as homogeneous.

**Collection of data:** The investigator constructed a questionnaire with 30 questions and 3 demographic questions for data collection purposes. The questions are to measure each one of the 8 variables identified in the study model.

**Questionnaire design:** The questionnaire had 30 questions and 3 other questions that measured the demographic characteristics

of participants. The 30 questions were mainly divided into 3 sections: i Questions that asked personality views before using mobile services (Valence, Expectancy and user past experiences). ii Questions linked to accomplishment of mobile services (effort by user, performance of the service). (iii) Questions to ask personality experiences after use of mobile services (Outcomes/ User needs contentment/satisfaction, user satisfaction/contentment with the resource and interaction service quality).

## Data Analysis

**Data analysis techniques:** Data in correlation research design can be analyzed and interpreted using, factor analysis, simple correlation research analysis, canonical correlation, multiple regression, path analysis, etc<sup>13</sup>. In this investigation, data is analyzed using correlation coefficient.

Correlation coefficient alludes to Pearson's product moment correlation coefficient. Pearson's posits that either both or one of the scales ought to be interval or ratio. Given that the data does not match this supposition, a non parametric statistical test should be applied i.e. Spearman's  $r_s$  if not Kendall's tau-b<sup>18</sup>. The investigation employs ordinal scale. Therefore, the researcher applies Kendall's tau-b to gauge the associational coefficients. Using correlation coefficient, the investigator can be able to

gauge the potency of linear associations between two constructs and interpret the results.

The researcher will therefore review the demographic characteristics of the participants. Then assess the reliability of measures using cronbach's alpha coefficients and finally present the associations among the constructs using Kendall's tau-b. The statistical tool used is Statistical Package for the Social Sciences (SPSS) version 20.

**Overview of participants:** The participants of the investigation were international students at Central China Normal University. Data was collected from December 26<sup>th</sup> 2015 to January 21<sup>th</sup> 2016. 64 students participated in the survey. 9 respondents did not provide complete answers hence were removed. In total, 55 responses were analyzed. Of the participants, 29 (52.73%) were male and 26 (47.27%) were female. On their educational levels, 14 (25.45%) of the participants were doctor degree students while 28 (50.91%) were masters degree students. 13 (23.64%) of the participants were undergraduate students. On the ages, 42 (76.36%) were aged between 18-35 years and 10 (18.18%) were aged between 36-45 years. Only 3 (5.45%) participants were above 45 years. The data is illustrated in Table 4-1 below.

**Table-2**  
**Participant characteristics**

Participants' Characteristics		Frequency	Percentage
<b>Gender</b>	Female	26	47.27
	Male	29	52.73
<b>Educational Level</b>	Doctor	14	25.45
	Master	28	50.91
	Undergraduate	13	23.64
<b>Age</b>	18-35	42	76.36
	36-45	10	18.18
	Over 45	3	5.45

**Reliability analysis of measures:** The researcher constructed a questionnaire with 30 questions for data collection purposes. The questions measured each of the 8 variables of the study model. The researcher asked three questions on each variable except for the variables of effort by user and user past experience which had 2 and 10 questions respectively. To determine the internal consistency of constructs, cronbach's alpha coefficient was presented. Cronbach's alpha coefficient is commonly used to show the reliability of measures/constructs. Cronbach's alpha coefficient must also be greater than 0.7 to indicate the internal consistency of measures<sup>19</sup>. Cronbach's

alpha coefficients of all variables are more than 0.7 as shown in the Table-3.

**Table-3**  
**Reliability of measures**

Variable	Cronbach's alpha coefficients
Valence	0.723
Variable of Expectancy	0.702
Effort by User	0.720
User past experience	0.767
Performance of the service	0.701
The Interaction service quality	0.848
User needs contentment /satisfaction	0.813
User satisfaction/contentment with the resource	0.719

**Correlation analysis:** It is used to measure the strength/force and direction of associations between constructs. Correlation analysis has no dependent and independent variable; investigators basically measure two constructs<sup>3</sup>. The Statistical Package for the Social Sciences commonly referred to as SPSS presents two classes of correlation namely simple bi-variate and partial correlation. In this investigation, the researcher adopted bivariate Kendall tau-b correlation coefficient. Kendall tau-b correlations vary from (-1 to +1). The - and + signs signify the state of correlations; whether positive or negative. The value of r shows the strength of associations. An association of 1 signifies an ideal positive association while an association of -1 shows an ideal negative association. An association of 0 shows that there is no relationship between the two constructs<sup>19</sup>. The Table-4 shows the interpretations.

**Table-4**  
**Interpretation of r values as adopted from<sup>19</sup>**

Small	.10 to .29 or -1.0 to -2.9
Medium	.30 to .49 or -3.0 to -.49
Large	.50 to 1.0 or -.50 to -1.0

Correlation research analysis results can be analyzed in 3 ways<sup>20</sup>. These are; i Analyzing the strength/force of the relationships, ii Analyzing statistical implications/significance of associations iii Analyzing the square of associations.

The next section therefore examines the Kendall tau-b correlations (r) among constructs. The findings are also presented based on Cohen and Manion's assertions above.

**Table-5**  
**Associations**

<b>Relationships</b>	
Valence	Effort by user
Expectancy	Effort by user
Effort by user	Performance of the Service
User past experience with mobile library website	Performance of the Service
User past experience with mobile library application	performance of the Service
User past experience with quick response codes	performance of the Service
User past experience with augmented reality	performance of the Service
User past experience with text messaging service	performance of the Service
User past experience with mobile library databases	performance of the Service
User past experience with mobile library instruction service	performance of the Service
User past experience with mobile library electronic books	performance of the Service
User past experience with mobile library catalog	performance of the Service
User past experience with the mobile library service in general	performance of the Service
Interaction service quality	performance of the Service
Performance of the Service	User needs satisfaction/ Outcomes
User needs satisfaction	Expectancy
User needs satisfaction	User satisfaction with the resource
User past experience with mobile library website	Expectancy
User past experience with mobile library application	Expectancy
User past experience with quick response codes	Expectancy
User past experience with augmented reality	Expectancy
User past experience with text messaging service	Expectancy
User past experience with mobile library databases	Expectancy
User past experience with mobile library instruction service	Expectancy
User past experience with mobile library electronic books	Expectancy
User past experience with mobile library catalog	Expectancy
User past experience with the mobile library service in general	Expectancy

In correlation analysis, The sub variables of the variable user past experience namely user past experience with mobile library website; mobile library application; quick response codes; augmented reality; text messaging service and user past experience with mobile library databases; mobile library instruction service; mobile library electronic books; mobile library catalog service and mobile library service in general will be represented as follows:

**Table-6**  
**Representation of sub variables of user past experience in correlation analysis**

<b>Sub variable User past experience</b>	<b>Representation in correlation analysis</b>
User past experience with mobile library website	Past 1
User past experience with mobile library application	Past 2
User past experience with quick response codes	Past 3
User past experience with augmented reality	Past 4
User past experience with text messaging service	Past 5
User past experience with mobile library databases	Past 6
User past experience with mobile library instruction service	Past 7
User past experience with mobile library electronic books	Past 8
User past experience with mobile library catalog service	Past 9
User past experience with the mobile library service in general	Past 10

The constructs are then examined using correlation research analysis to identify associations ascertained in the model of the study.

**Association between Valence and the effort by User:** The relationship between valence and effort by user was not statistically significant (Valence and effort by user  $r = -.001$ ,  $N=55$ ). An association of  $-.001$  signifies that the variable of valence can't help elucidate the variance in the respondent's score on the construct of effort by user ( $.001 \times .001$ ).

**Table-7**  
**Association between Valence and effort by User**

			Valance	Effort
Kendall's tau_b	Valence	Correlation Coefficient	1.000	-.001
		Sig. (2-tailed)	.	.993
		N	55	55
	Effort	Correlation Coefficient	-.001	1.000
		Sig. (2-tailed)	.993	.
		N	55	55

**Associations between Expectancy and effort by user:** The association between expectancy and the effort by user had no statistical significance as shown in the table below ( $r = 0.014$ ,  $N=55$ ). An association of 0.014 means the variable of expectancy can't help elucidate the variance in the respondents' score on the construct of effort by user.

**Table-8**  
**Association between Expectancy and effort by User**

			Expectancy	Effort
Kendall's tau_b	Expectancy	Correlation Coefficient	1.000	.014
		Sig. (2-tailed)	.	.904
		N	55	55
	Effort	Correlation Coefficient	.014	1.000
		Sig. (2-tailed)	.904	.
		N	55	55

**Association between the effort by user and performance of the service:** The relationship between the effort by user and performance of the service had no statistical significance ( $r = -.149$ ,  $N=55$ ). A correlation of  $-.149$  means the variable of effort by user can only explain 2% of the variance in respondent's score on the construct of performance of the service.

**Table-9**  
**Association between the effort by User and performance of the service**

			Effort	Performance of the service
Kendall's tau_b	Effort	Correlation Coefficient	1.000	-.149
		Sig. (2-tailed)	.	.187
		N	55	55
	Performance of the service	Correlation Coefficient	-.149	1.000
		Sig. (2-tailed)	.187	.
		N	55	55

**Association between user past experience with mobile library website and performance of the service:** The correlation between user past experience with mobile library website and performance of the service was moderately positively ( $r = 0.331$ ,  $N = 55$ ). An association of 0.331 means user's past experience with mobile library website helps explain 11% of the variance in respondent's score on the construct of performance of the service. The association between user past experience with mobile library website and performance of the service was also statistically significant at 0.01 significance level.

**Table-10**  
**Association between User past experience with mobile library website and performance of the service**

			Past-1	Performance of the service
Kendall's tau_b	Past-1	Correlation Coefficient	1.000	.331**
		Sig. (2-tailed)	.	.007
		N	55	55
	Performance of the service	Correlation Coefficient	.331**	1.000
		Sig. (2-tailed)	.007	.
		N	55	55

\*\*. Correlation is significant at the 0.01 level (2-tailed).

**Association between User past experience with mobile library application and performance of the service:** The correlation between user past experience with mobile library application and performance of the service had no statistical significance ( $r = 0.042$ ,  $N=55$ ). An association of 0.042 means less than 1% shared variance.

**Table-11**

**Association between User past experience with mobile library application and performance of the service**

			Past-2	Performance of the service
Kendall's tau_b	Past-2	Correlation Coefficient	1.000	.042
		Sig. (2-tailed)	.	.741
		N	55	55
	Performance of the service	Correlation Coefficient	.042	1.000
		Sig. (2-tailed)	.741	.
		N	55	55

**Association between user past experience with quick response codes and performance of the service:** The correlation between user past experience with quick response codes and performance of the service too had no statistical significance ( $r = 0.098$ ,  $N= 55$ ).

**Table-12**

**Association between User past experience with mobile library application and performance of the service**

			Past-3	Performance of the service
Kendall's tau_b	Past-3	Correlation Coefficient	1.000	.098
		Sig. (2-tailed)	.	.440
		N	55	55
	Performance of the service	Correlation Coefficient	.098	1.000
		Sig. (2-tailed)	.440	.
		N	55	55

**Association between user past experience with augmented reality and performance of the service:** The correlation between user past experience with augmented reality and performance of the service as well had no statistical significance ( $r = -0.016$ ,  $N= 55$ )

**Table-13**

**Association between User past experience with augmented reality and performance of the service**

			Past-4	Performance of the service
Kendall's tau_b	Past-4	Correlation Coefficient	1.000	-.016
		Sig. (2-tailed)	.	.901
		N	55	55
	Performance of the service	Correlation Coefficient	-.016	1.000
		Sig. (2-tailed)	.901	.
		N	55	55

**Association between user past experience with text messaging service and performance of the service:** The correlation between user past experience with text messaging services and performance of the service too had no statistical significance ( $r = 0.059$ ,  $N= 55$ ).

**Table-14**

**Association between User past experience with text messaging service and performance of the service**

			Past-5	Performance of the service
Kendall's tau_b	Past-5	Correlation Coefficient	1.000	.059
		Sig. (2-tailed)	.	.644
		N	55	55
	Performance of the service	Correlation Coefficient	.059	1.000
		Sig. (2-tailed)	.644	.
		N	55	55



**Association between user past experience with mobile library databases and performance of the service:** The association between user past experience with mobile library databases and performance of the service was moderately positive ( $r = 0.437$ ,  $N = 55$ ). An association of 0.437 means user's past experience with mobile library databases helps explain 19% of the variance in respondent's scores on the construct of performance of the service. The association was also statistically significant at the 0.01 significance level.

**Table-15**  
**Association between User past experience with mobile library databases and performance of the service**

			Past-6	Performance of the service
Kendall's tau_b	Past-6	Correlation Coefficient	1.000	.437**
		Sig. (2-tailed)	.	.000
		N	55	55
	Performance of the service	Correlation Coefficient	.437**	1.000
		Sig. (2-tailed)	.000	.
		N	55	55

\*\*, Correlation is significant at the 0.01 level (2-tailed).

**Association between user past experience with mobile library instruction and performance of the service:** The correlation between user past experience with mobile library instruction and performance of the service had no statistical significance ( $r = 0.122$ ,  $N=55$ ).

**Table-16**  
**Association between User past experience with mobile library instruction and performance of the service**

			Past-7	Performance of the service
Kendall's tau_b	Past-7	Correlation Coefficient	1.000	.122
		Sig. (2-tailed)	.	.336
		N	55	55
	Performance of the service	Correlation Coefficient	.122	1.000
		Sig. (2-tailed)	.336	.
		N	55	55

**Association between user past experience with mobile library electronic books and performance of the service:** The association between user past experience with mobile library electronic books and performance of the service was moderately positive ( $r = 0.353$ ,  $N = 55$ ). An association of 0.353 means user's past experience with mobile library electronic books helps explain 12.5% of the variance in respondent's scores on the construct of performance of the service. The association was also statistically significant at the 0.01 significance level.

**Table-17**  
**Association between User past experience with mobile library electronic books and performance of the service**

			Past-8	Performance of the service
Kendall's tau_b	Past-8	Correlation Coefficient	1.000	.353**
		Sig. (2-tailed)	.	.003
		N	55	55
	Performance of the service	Correlation Coefficient	.353**	1.000
		Sig. (2-tailed)	.003	.
		N	55	55

\*\*, Correlation is significant at the 0.01 level (2-tailed).

**Association between user past experience with mobile library catalog and performance of the service:** The association between user past experience with mobile library catalog and performance of the service was strongly positive ( $r = 0.614$ ,  $N= 55$ ). An association of 0.614 means user's past experience with mobile library catalog helps explain 38% of the variance in respondents scores on the construct of performance of the service. The association was also statistically significant at the 0.01 significance level.

**Table-18**  
**Association between User past experience with mobile library catalog and performance of the service**

			Past-9	Performance of the service
Kendall's tau_b	Past-9	Correlation Coefficient	1.000	.614**
		Sig. (2-tailed)	.	.000
		N	55	55
	Performance of the service	Correlation Coefficient	.614**	1.000
		Sig. (2-tailed)	.000	.
		N	55	55

\*\*, Correlation is significant at the 0.01 level (2-tailed).

**Association between user past experience with the mobile library service in general and performance of the service:** The association between user past experience with the mobile library service in general and performance of the service was strongly positive ( $r = 0.609$ ,  $N = 55$ ). An association of 0.609 means user's past experience with the mobile library service in general helps explain 37% of the variance in respondents' scores on the construct of performance of the service. The association was also statistically significant at the 0.01 significance level.

**Table-19**

**Association between User past experience with mobile library service in general and performance of the service**

			Past-10	Performance of the service
Kendall's tau_b	Past-10	Correlation Coefficient	1.000	.609**
		Sig. (2-tailed)	.	.000
		N	55	55
	Performance of the service	Correlation Coefficient	.609**	1.000
		Sig. (2-tailed)	.000	.
		N	55	55

\*\*. Correlation is significant at the 0.01 level (2-tailed).

**Association between Interaction service quality and performance of the service:** The association between interaction service quality and performance of the service was moderately positive ( $r = 0.439$ ,  $N = 55$ ). An association of 0.439 means the construct of interaction service quality helps explains 19% of the variance in respondents' scores on the construct of performance of the service. The association was also statistically significant at the 0.01 significance level.

**Table-20**

**Association between interaction service quality and performance of the service**

			Interaction service quality	Performance of the service
Kendall's tau_b	Interaction service quality	Correlation Coefficient	1.000	.439**
		Sig. (2-tailed)	.	.000
		N	55	55
	Performance of the service	Correlation Coefficient	.439**	1.000
		Sig. (2-tailed)	.000	.
		N	55	55

\*\*. Correlation is significant at the 0.01 level (2-tailed).

**Association between performance of the service and User needs satisfaction:** The association between performance of the service and user needs satisfaction was moderately positive ( $r = 0.342$ ,  $N = 55$ ). An association of 0.342 means the construct of performance of the service helps explains 12% of the variance in respondents' scores on construct of user needs satisfaction. The association was also statistically significant at the 0.01 significance level.

**Table-21**

**Association between performance of the service and user needs satisfaction**

			Performance of the service	Outcomes
Kendall's tau_b	Performance of the service	Correlation Coefficient	1.000	.342**
		Sig. (2-tailed)	.	.005
		N	55	55
	Outcomes	Correlation Coefficient	.342**	1.000
		Sig. (2-tailed)	.005	.
		N	55	55

\*\*. Correlation is significant at the 0.01 level (2-tailed).

**Association between user needs satisfaction/outcomes and expectancy:** The correlation between user needs satisfaction and expectancy was not statistically significant ( $r = -.034$ ,  $N = 55$ ).

**Table-22**

**Association between user needs satisfaction and expectancy**

			Outcomes	Expectancy
Kendall's tau_b	Outcomes	Correlation Coefficient	1.000	-.034
		Sig. (2-tailed)	.	.778
		N	55	55
	Expectancy	Correlation Coefficient	-.034	1.000
		Sig. (2-tailed)	.778	.
		N	55	55

**Association between User needs satisfaction and user satisfaction with the resource:** The association between user needs satisfaction and user satisfaction with the resource was strongly positive ( $r = 0.74$ ,  $N = 55$ ). An association of 0.74 means the construct of user needs satisfaction helps explains 55% of the variance in respondents' scores on the construct of user satisfaction with the resource. The association was also statistically significant at the 0.01 significance level.

**Table-23**  
**Association between User needs satisfaction and user satisfaction with the resource**

			Outcomes	User satisfaction
Kendall's tau_b	Outcomes	Correlation Coefficient	1.000	.740**
		Sig. (2-tailed)	.	.000
		N	55	55
	User satisfaction	Correlation Coefficient	.740**	1.000
		Sig. (2-tailed)	.000	.
		N	55	55

\*\*, Correlation is significant at the 0.01 level (2-tailed).

**Association between user past experience with mobile library website and Expectancy:** The correlation between user past experience with mobile library website and expectancy was not statistically significant ( $r = 0.001$ ,  $N = 55$ ).

**Table-24**  
**Association between User needs satisfaction and expectancy**

			Past-1	Expectancy
Kendall's tau_b	Past-1	Correlation Coefficient	1.000	.001
		Sig. (2-tailed)	.	.993
		N	55	55
	Expectancy	Correlation Coefficient	.001	1.000
		Sig. (2-tailed)	.993	.
		N	55	55

**Association between User past experience with mobile library application and Expectancy:** The correlation between User past experience with mobile library application and Expectancy was not statistically significant ( $r = -0.071$ ,  $N = 55$ ).

**Table-25**  
**Association between user past experience with mobile library application and expectancy**

			Past-2	Expectancy
Kendall's tau_b	Past-2	Correlation Coefficient	1.000	-.071
		Sig. (2-tailed)	.	.576
		N	55	55
	Expectancy	Correlation Coefficient	-.071	1.000
		Sig. (2-tailed)	.576	.
		N	55	55

**Association between User past experience with quick response codes and Expectancy:** The correlation between User past experience with quick response codes and Expectancy was not statistically significant ( $r = 0.102$ ,  $N = 55$ ).

**Table-26**  
**Association between User past experience with quick response codes and expectancy**

			Past-3	Expectancy
Kendall's tau_b	Past-3	Correlation Coefficient	1.000	.102
		Sig. (2-tailed)	.	.423
		N	55	55
	Expectancy	Correlation Coefficient	.102	1.000
		Sig. (2-tailed)	.423	.
		N	55	55

**Association between User past experience with augmented reality and Expectancy:** The correlation between User past experience with augmented reality and Expectancy was not statistically significant ( $r = 0.068$   $N=55$ ).

**Table-27**

**Association between user past experience with augmented reality and expectancy**

			Past-4	Expectancy
Kendall's tau_b	Past-4	Correlation Coefficient	1.000	.068
		Sig. (2-tailed)	.	.594
		N	55	55
	Expectancy	Correlation Coefficient	.068	1.000
		Sig. (2-tailed)	.594	.
		N	55	55

**Association between User past experience with text messaging service and Expectancy:** The correlation between User past experience with text messaging service and Expectancy was not statistically significant ( $r = -0.03$ ,  $N=55$ ).

**Table-28**

**Association between user past experience with text messaging service and expectancy**

			Past-5	Expectancy
Kendall's tau_b	Past-5	Correlation Coefficient	1.000	-.030
		Sig. (2-tailed)	.	.812
		N	55	55
	Expectancy	Correlation Coefficient	-.030	1.000
		Sig. (2-tailed)	.812	.
		N	55	55

**Association between user past experience with mobile library databases and Expectancy:** The correlation between User past experience with mobile library databases and Expectancy was not statistically significant ( $r = -0.009$ ,  $N=55$ ).

**Table-29**

**Association between user past experience with mobile library databases and expectancy**

			Past-6	Expectancy
Kendall's tau_b	Past-6	Correlation Coefficient	1.000	-.009
		Sig. (2-tailed)	.	.940
		N	55	55
	Expectancy	Correlation Coefficient	-.009	1.000
		Sig. (2-tailed)	.940	.
		N	55	55

**Association between User past experience with mobile library instruction service and Expectancy:** The correlation between User past experience with mobile library instruction service and Expectancy was not statistically significant ( $r = -0.136$ ,  $N=55$ ).

**Table-30**

**Association between user past experience with mobile library instruction service and expectancy**

			Past-7	Expectancy
Kendall's tau_b	Past-7	Correlation Coefficient	1.000	-.136
		Sig. (2-tailed)	.	.286
		N	55	55
	Expectancy	Correlation Coefficient	-.136	1.000
		Sig. (2-tailed)	.286	.
		N	55	55

**Association between User past experience with mobile library electronic books and Expectancy:** The correlation between User past experience with mobile library electronic books and Expectancy was not statistically significant ( $r = -0.037$ ,  $N = 55$ ).

**Table-31**

**Association between user past experience with mobile library electronic books and expectancy**

			Past-8	Expectancy
Kendall's tau_b	Past-8	Correlation Coefficient	1.000	-.037
		Sig. (2-tailed)	.	.755
		N	55	55
	Expectancy	Correlation Coefficient	-.037	1.000
		Sig. (2-tailed)	.755	.
		N	55	55

**Association between user past experience with the mobile library service in general and Expectancy:** The correlation between User past experience with the mobile library service in general and Expectancy was not statistically significant ( $r = 0.032$ ,  $N = 55$ ).

**Table-33**

**Association between user past experience with mobile library service in general and expectancy**

			Past-10	Expectancy
Kendall's tau_b	Past-10	Correlation Coefficient	1.000	.032
		Sig. (2-tailed)	.	.792
		N	55	55
	Expectancy	Correlation Coefficient	.032	1.000
		Sig. (2-tailed)	.792	.
		N	55	55

**Association between User past experience with mobile library catalog and Expectancy:** The correlation between User past experience with mobile library catalog and Expectancy was not statistically significant ( $r = 0.068$ ,  $N = 55$ ).

**Table-32**

**Association between user past experience with mobile library catalog and expectancy**

			Past-9	Expectancy
Kendall's tau_b	Past-9	Correlation Coefficient	1.000	.068
		Sig. (2-tailed)	.	.572
		N	55	55
	Expectancy	Correlation Coefficient	.068	1.000
		Sig. (2-tailed)	.572	.
		N	55	55

**Discussion:** As mentioned, the aim of this study is to investigate the mobile library user needs of international students based on the expectancy theory of motivation. To attain this objective, a mobile library user needs motivational model was developed based on the expectancy theory. The purpose of the model is to help explain how academic library users in this case; international students are motivated to use mobile services consequently gratifying their information needs.

Foremost; relationships were established between the 8 variables; namely expectancy, user past experience, valence, effort by user, interaction service quality, performance of the service, user needs satisfaction and user satisfaction with the resource. User past experience was further subdivided into the sub variables of user past experience with mobile library website, user past experience with mobile library application, user past experience with quick response codes and user past experience with augmented reality, user past experience with mobile library instruction service, user past experience with mobile library databases, user past experience with electronic books and user past experience with mobile library catalog and user past experience with the mobile library service in general. The sub variables were aimed at investigating the most frequently used mobile services; the available mobile service and whether past experiences had an impact on a user's performance of the service.

Since the study model focuses on processes and the elucidation of the motivational process of international students to use mobile service is based on relationships among the variables, the following relationships were established as significant.

**Table-34**  
**Summary of significant associations between Variables**

Variables	Relationships
User past experience with mobile library website: performance of the Service	.331**
User past experience with mobile library databases: performance of the Service	.437**
User past experience with mobile library electronic books: performance of the Service	.353**
User past experience with mobile library catalog: performance of the Service	.614**
User past experience with the mobile library service in general: performance of the Service	.609**
Interaction service quality: performance of the Service	.439**
Performance of the Service: user needs satisfaction	.342**
User Needs satisfaction: user satisfaction with the resource	.740**

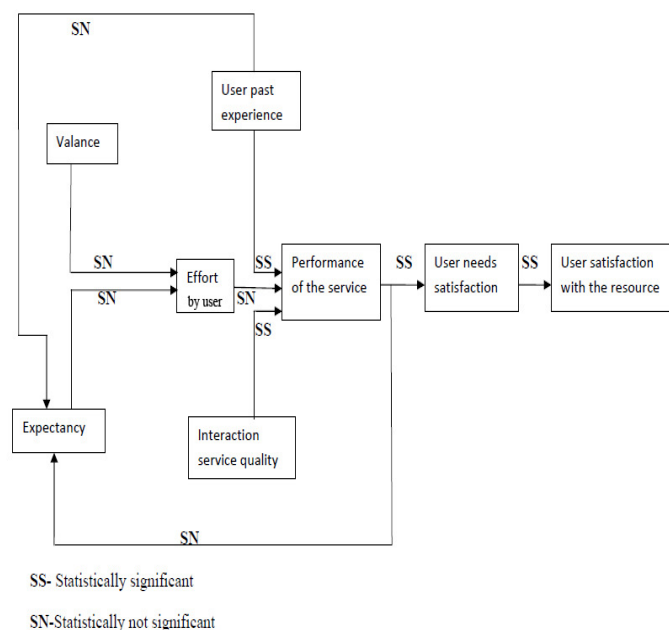
\*\* The association is significant at 0.01 level (2-tailed)

As shown in the Table above, it was established that the variables of user past experience with mobile library websites, mobile library databases, mobile library electronic books, mobile library catalog and the mobile library service in general had statistical significance to elucidate the construct of performance of the service. Other sub variables such as User past experience with quick response codes, augmented reality, mobile library instruction service, mobile library application and text messaging service did not have statistical significance to elucidate the construct of performance of the service.

Other variables that had statistical significance to explain international students' motivational process to use mobile services are interaction service quality that had statistical significance to elucidate the construct of performance of the service and Performance of the Service that had statistical meaning to explain the variable of User needs satisfaction. Additionally the construct of user needs satisfaction made statistically meaningful contributions to predict the construct of user satisfaction with the resource. The construct of valence dint however make a statistical implication on the construct of effort by user. Other variables that did not also make statistical significance include expectancy that did not predict effort by

user; User needs satisfaction that did not make statistical significance to explain the variable of expectancy and effort by user that did not elucidate the construct of performance of the service.

The sub-variables of user past experience with mobile library website, mobile library databases, mobile library electronic books, mobile library catalog and the mobile library service in general did not also make statistical significance to explain the variable of Expectancy. Other sub variables that did not also statistically contribute to the prediction of the variable of expectancy include user past experience with mobile library application, quick response codes, augmented reality, mobile library instruction service and text messaging service. The findings of the study can be summarized as shown in the Figure below.



**Figure-2**  
**Correlation analysis**

As per the findings above, the model of the study can be modified as shown in Figure-3.

Mobile library users contribute in production of services and can actively affect the process. This is as a result of inseparable service characteristic; as they are produced and consumed simultaneously. Consequently, how well users execute services depends on whether they have had prior experiences with the services. For the case of mobile services for instance, past experiences with only mobile library website, mobile library databases, mobile library electronic books and mobile library catalog had an impact on performance of the service. Past experiences with other mobile services such as mobile instruction service, augmented reality, quick response codes,

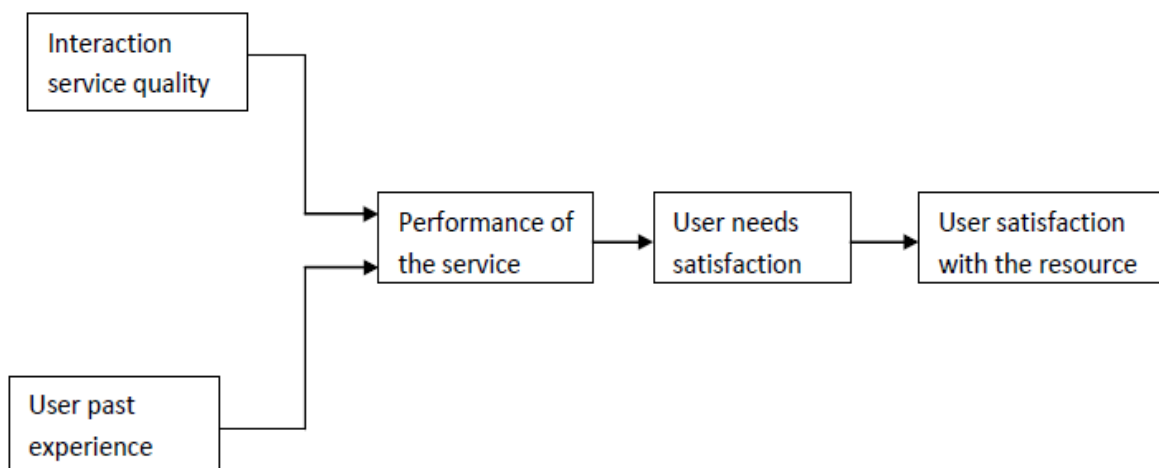
text messaging service and mobile application did not have an impact on performance of the service because the services are not offered at Central China Normal University's Library. Therefore of the most predominant mobile services in Academic libraries, the University library only offers the mobile library website service, the mobile library catalog service, the mobile library database service and the mobile library electronic book service. International students were consequently only familiar with the services that are offered at the University library.

Overall, users happened to have high experiences with the mobile library catalog service probably because they used the resource frequently. It can also be argued that the resource is the most preferred among international student users. This was exhibited by the high predictions in performance of the service as compared to other services that were significantly predicted. It can therefore be concluded that the mobile library catalog service is frequently used among international students at Central China Normal University Library. Academic library users usually want to search for library services at their own comfort and with minimal hustles. This could also explain why the mobile library catalog service is the commonest of the 4 significant services. The sub variable of the Mobile library service in general happened to be also common among the international students. This would be attributed to the fact that the sub variable measured the general experience of international student users with mobile services. Even though other services were not common among international students, it can be argued that International students had high experiences with mobile services that are offered at the University library.

As mentioned above; Interaction service quality also had statistical implication to explain the variable of performance of the service. How best users interact with services in this case mobile services ensures that their needs are fully met. Users who can be able to fully interact with services without any

intricacy and are able to execute them comfortable are likely to have their information needs fully met<sup>21</sup>. Various research findings also allege that user needs satisfaction is dependent on how well the user interacts with services<sup>3</sup>. Compared with the other information services where there is physical interaction between library service personnel and users; mobile library service users have to possess good user characteristics that can enable them execute the services comfortably. Academic library service personnel also have to ensure user needs are met through availing meaningful content not only to the library but to the end users and good interface characteristics that can enable fast and easy access to content. Users should also perform their roles effectively to realize their desired information needs. Users who believe they have successfully accomplished their roles in interactions with the service are much more contented with the resources<sup>23</sup>. In a survey in the banking industry clients were asked to rate themselves on such questions as: i "I clearly explained what I wanted the bank employee to do." ii "I gave the bank employee proper information." iii "I tried to cooperate with the bank employee"<sup>21</sup>.

The questions were related to client contributions to service delivery. According to the survey, client views on what they did and the manner in which they did it were considerably correlated to the fulfillment of their needs. In the same context, mobile library resource gratification can also rely on what international student users did and the manner in which they did it during service delivery. To be precise, when mobile library users feel that they performed their roles perfectly during service interaction, the contentment level of their needs will be high. Other models also established that there is a correlation between performance of the service and user needs satisfaction<sup>3,22</sup>. Therefore, international student users can play a very important role as contributors in ensuring their mobile service needs are met.



**Figure-3**  
**Modified model of international students' mobile library user needs motivational process**

Mobile library service providers, behavior, acquaintance and attitude were also found to be closely related to the satisfaction of international students' mobile information needs. The study shows the importance of library service personnel's interaction with international student users in ensuring their information needs are met.

Marketing of mobile services is also essential in ensuring international students' information needs are met. Although the study targeted a higher number of participants, very few students of the over 1000 international students at Central China Normal University were aware of the services. Very many related the resources to services offered by libraries in remote areas using vans. A good number were totally unaware of the services suggesting the importance of marketing them. Services are also acts and not tangible objects, and since the acts necessitate presence of customers/ Users and are normally offered by service personnel, there is a need to market them<sup>3</sup>. In the mobile library service motivational model, User needs satisfaction is directly influenced by interaction service quality. Academic library service personnel should therefore focus on improving the factor of interaction service quality to ensure information needs of international students are fully met.

It can therefore be concluded that 5 factors influence international student users' mobile information needs satisfaction i.e.: i User past experience with mobile library service, ii Interaction service quality, iii Performance of the service, iv User needs satisfaction and v User satisfaction with the resource.

**Implications of the study:** Even as research on mobile resource use in Academic libraries increases immensely; none if any, very few have examined the motivation of users to use mobile resources as an optional and effectual approach to clientele's 24/7 information needs satisfaction. The libraries have however realized that high quality and meaningful mobile resources are not sufficient enough to attract users' attention. To be successful in contemporary society; Academic libraries ought to comprehend users' elemental motives to use mobile resources. Motivation studies principally put focus on clientele's information needs satisfaction<sup>3</sup>. It is therefore essential for academic libraries to motivate users towards mobile services to guarantee their mobile library needs gratification. This study is therefore of significance to mobile library user needs studies.

Academic libraries have in addition failed to recognize the fundamentals of marketing in user needs satisfaction<sup>3</sup>. According to the author, the libraries do not recognize marketing because of: i Lack of understanding what marketing really is. ii Equating marketing to general publicity and iii Misunderstanding user information needs.

Marketing studies in Academic libraries do not also provide marketing models. A mobile library marketing model that is well tested and supported empirically can be the basis of mobile

service marketing/promotion, planning and adoption/implementation. This investigation can play an introductory role in development of mobile service marketing models; particularly a mobile library user needs motivational model.

This study can also provide practical guides to Academic libraries looking to adopt mobile services for international students. The investigation not only presents information on mobile service implementation in University libraries but also a finalized model on how academic libraries can motivate international students to use mobile services. The finalized model shows that users and library service personnel need to work appropriately to ensure user motivation and subsequent mobile information needs satisfaction.

**Future research:** i The investigation did not put focus on gender and age differences. Future studies can however be conducted to ascertain whether there are any age or gender differences in international students' mobile service use. ii The study investigated international students' mobile library user needs based on the expectancy theory of motivation. Through correlation coefficient, the model of the study was remodeled. The model can therefore be tested with specific services such as mobile library application, mobile library website, quick response codes etc. Through this services the mobile library user needs motivational model will be detailed iii The model can also be tested using another higher learning institution. The aim of this process is to validate that the modified International students' mobile library user needs motivational model can also be applicable to other higher learning institutions. iv The investigation did not involve the views of Academic library service personnel. Future research should engross the views of Academic library service personnel so as to enable superior and wide ranging generalities.

**Limitations of the Study:** Generally, there is no suitable sample size to allow meaningful results through analysis of data. A minimum sample size of thirty (30) is however acceptable when planning to use some statistical data analysis form<sup>20</sup>. Even though the size of the sample was above 30; it's factual that the sample wasn't large enough to draw meaningful generalities. i The investigation concentrated on international student users at Central China Normal University. It is therefore problematic to regard the views of international students at Central China Normal University as a representation of the whole international student user population. ii Mobile technology has been evolving each and every day with new-fangled and sophisticated services. For example, Academic libraries are now designing library websites that are fully responsive to both mobile and desktops browsers. This is just but one of the innumerable revolutions taking place in the mobile library world. Consequently, this study can only hold waters at this particular period of time. There is need for perpetual studies to keep track of the speedily evolving mobile environment.



## Conclusion

The study established that it is indispensable for academic libraries to comprehend users' fundamental motives to use mobile services. In this way, the libraries will not only attract users but also meet their information needs.

Motivational studies primarily centre on user needs satisfaction and can answer to such queries as: i Why clientele make use of mobile resources or ii Why they do not use mobile resources and iii How academic libraries can make clientele utilize mobile resources more frequently.

Therefore, Academic libraries need to put into consideration the reasons that drive clientele into using mobile services and at what point they become uncomfortable with them. Clientele utilize mobile services because they are much more flexible and convenient as they permit instant and 24/7 access to library resources anywhere and at anytime<sup>23</sup>. However, users become uncomfortable with resources when they encounter technical challenges and fail to find meaningful content. Academic libraries must put in place the necessary mechanisms to counter the challenges and involve clientele in implementation of the services.

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