Development and validation of the Information Seeking Anxiety scale

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ABSTRACT
The purpose of the study was to develop and validate the Information Seeking Anxiety Scale. The research took place in several empirical phases. First, a list of ninety-four (94) potential key components was developed by the researchers and was sent to a panel of experts for validation. Then a pilot instrument comprising ninety-three (93) statements was generated according to the list of key components and was validated again for content by the experts. The face validity of the instrument was then evaluated by a group of fifteen (15) postgraduate students. Finally, the psychometric properties of the instrument were tested with a group of four hundred (400) postgraduate students using exploratory factor analysis and Cronbach's alpha internal reliability coefficient. Consequently a valid and reliable 47-item Information Seeking Anxiety Scale was produced which could be employed in efforts to measure information seeking anxiety among library users.

Keywords: Information seeking anxiety; Information Seeking Anxiety Scale; Face validity; Content validity; Construct validity; Internal consistency.

INTRODUCTION

Anxiety has always been known as a psychological barrier in educational setting which has caused different cognitive, emotional, and behavioral effects in students. Several forms of academic-related anxiety have been studied, including library anxiety (Mellon 1986; Bostick 1992; Jiao and Onwuegbuzie 1997, 1998, 1999, 2001, 2002, 2004; Jiao, Onwuegbuzie and Bostick 2006; Jiao, Onwuegbuzie and Waytowich 2008), research anxiety (Onwuegbuzie 1997; Higgins 2001; Kracker 2002), computer anxiety (Turkzadeh and Angulo 1992; Maurer 1994; Jerabek, Meyer and Cordinak 2001; Kohrman 2003; Jiao and Onwuegbuzie 2004, Abusin and Zainab 2010), Internet anxiety (Ben Omran 2001), mathematics and statistics anxiety (Bander and Betz 1981; Onwuegbuzie and Wilson 2000), writing anxiety (Hadfield, Martin and Wooden 1992; Onwuegbuzie 1997), and test anxiety (Hill and Wigfield, 1984). However, of all the forms of academic-related anxiety, frustration associated with the search for information in library or electronic resources appear to be among the most prevalent, presumably because virtually most, if not all, students are compelled to find information at some point in their programs of study (Jiao and Onwuegbuzie 2002; Onwuegbuzie and Jiao 2004).

Fear and apprehension concerning the information search process has been documented by many researchers (Mellon 1986; Kuhlthau 1988). According to Mellon (1986), "when confronted with the need to gather information in the library … many students become so anxious that they are unable to approach the problem logically or effectively" (p. 163).

Kuhlthau (1988, 1993) stated that anxiety is a natural occurrence during the information seeking process which may begin during any one of the six (6) stages of the research process. She found that feelings of anxiety were the highest at the beginning of the search process when students suffer from confusion and lack of certainty. Jiao and Onwuegbuzie have collaborated on a series of studies on library anxiety among academic library users (Jiao and Onwuegbuzie 1997, 1998, 1999; Onwuegbuzie and Jiao 1998, 2000). Van Kampen (2003) conducted a research to determine which aspects of the information search process contributed to the library anxiety phenomenon. According to Young and Von Seggern (2001) frustration and anxiety have been reported to be the most prevalent negative feelings during the information seeking process among undergraduate and postgraduate students.

Branch (2001) found that uncertainty, frustration, and anxiety to be the common emotions while seeking information using the CD-ROM encyclopedias among students. Chowdhury and Gibb (2009) identified some sources of uncertainty and anxiety during information seeking process. They found that information seeking anxiety may be triggered and heightened because of some problems associated with information seeking. Hyldegard (2006, 2009) explored Kuhlthau's Information Search Process (ISP) model in a group-based educational setting and reported existence of anxiety and frustration in the beginning, middle, and the end of the process. Cheng (2004) indicated that negative feelings such as anxiety were indeed important factors involved in students' information seeking. Loerke (1992) found that high school students engaged in the research process experienced different levels of information seeking anxiety. Kohrman (2003) reported that the phenomenon of information seeking anxiety is more common among postgraduate students, because the intricacy of graduate-level research necessitates extensive use of information resources.

However, to date no valid and reliable instrument has been developed to measure levels of information seeking anxiety among students. Those studies which have investigated the information seeking anxiety did not develop a scale to measure this construct. Rather, many of them have included information seeking as a part of general library research and used library anxiety scales. As such, the present study was conducted in order to measure and validate a scale that could be employed to assess anxiety during the information seeking process.

LITERATURE REVIEW

An extensive review of the literature on feelings and emotions during the information seeking process was conducted for this study. However, hitherto no scale was ever developed, let alone validated, to assess the anxiety that was experienced by individuals during the information seeking process. Subsequently, this study was conducted to address a gap in the literature by developing and validating the Information Seeking Anxiety Scale. A review of the related research was carried out in an effort to conceptualize and operationalize the information seeking anxiety constructs.

Bostick (1992) developed and validated the Library Anxiety Scale. This 43-item 5-point Likert-format instrument has five dimensions, namely, barriers with staff ($\alpha=0.90$), affective barriers ($\alpha=0.80$), comfort with the library ($\alpha=0.66$), knowledge of the library ($\alpha=0.62$), and mechanical barriers ($\alpha=0.60$). These factors collectively explained 51.8% of the variation in library anxiety. Further, the internal reliability assessment using Cronbach's

alpha was reported to be at 0.80 for the overall scale. A test-retest further confirmed the overall scale to be internally reliable (α=0.74). This instrument has been utilized extensively in library anxiety studies.

Shoham and Mizrachi (2001) developed and validated a modified version of the Library Anxiety Scale (LAS) which was culturally appropriate for Israeli population. The researchers dropped eight (8) out of forty-three (43) statements from Bostick's LAS to adapt it to the cultural situation of this country. Six hundred and sixty-four (664) undergraduate students from different universities were asked to respond to the 35-item Likert-type questionnaire. Using exploratory factor analysis, Shoham and Mizrachi identified the following seven (7) factors: barriers with staff (α=0.75), Knowledge barriers (α=0.76), language barriers (α=0.76), library physical comfort barriers (α=0.60), library computer comfort barriers (α=0.51), library policies/hours barriers (α=0.45), and library resources barriers (α=0.52).

The Kuwaiti-Library Anxiety Scale (K-LAS) was developed and validated by Anwar, Al-Kandari and Al-Qallaf (2004). The study participants included one hundred and forty-five (145) students of Biological Sciences at the Kuwait University who completed a modified version of the Library Anxiety Scale consisted of thirty-four (34) statements. Exploratory factor analysis was carried out to establish the scale's construct validity. The factor analysis yielded four (4) factors, which explained 47% of the total variance. The internal reliability coefficients using Cronbach's alpha for the sub-scales were as follows: staff approachability, 0.90; feelings of approachability, 0.90 and library confidence, 0.78; library constrains, 0.70. The researchers concluded that the Kuwaiti-Library Anxiety Scale (K-LAS) has adequate internal consistency as well as construct validity for assessing Kuwaiti undergraduate student's levels of library anxiety.

Van Kampen (2003) developed and validated a 54-item instrument using the Bostick's Library Anxiety Scale, called the Multidimensional Library Anxiety Scale (MLAS). Two hundred and ninety-nine (299) doctoral students at an urban south-eastern university completed pilot questionnaires in two (2) phases. An exploratory factor analysis using a varimax procedure was performed to analyze possible patterns between variables. Also, to establish reliability of the scale, a test-retest study was carried out. The factor analysis yielded six (6) components which accounted for 43.39% of the total variance. Six (6) sub-dimensions were identified as follow: comfort and confidence using the library (α=0.86), information seeking process and general library anxiety (α=0.87), barriers with staff (α=0.73), perceived importance of the library (α=0.79), comfort level with library technologies (α=0.73), and comfort level with library building (α=0.74). The Multidimensional Library Anxiety Scale was reported to have satisfactory internal consistency (α=0.88) for the overall scale.

Noor and Ansari (2010) investigated the Bostick's Library Anxiety Scale (LAS) psychometric properties in a Malaysian university library environment. For this purpose, three hundred and sixty-seven (367) students were given a 49-item modified version of the Library Anxiety Scale. A principal component exploratory factor analysis and an item to total score correlation analysis were performed to demonstrate the validity of the scale. Using these methods, fourteen (14) statements with factor loading less than 0.40 were extracted. Additionally, five (5) factors were identified which explained 39.56% of the total variance. The researchers stated that "with the exception of comfort with library technology sub-dimension (α=0.67), other four sub-dimensions (barriers with staff, 0.91; comfort with library services, 0.73; affective barriers, 0.70; cognitive barriers, 0.80) as well as the overall scale (α=0.78) were found to have adequate internal consistency" (p.115). Also, in order to

increase coefficient alpha value of different sub-scales, five (5) other statements were dropped.

Swigon (2011) developed and validated the Polish-Library Anxiety Scale (P-LAS). For this purpose, one hundred (100) participants who included bachelor's level students, master's level students, doctoral level students, and faculty members at three (3) Polish universities were studied. Using factor analysis, forty-six (46) statements were grouped into six (6) factors: barriers with staff (5 statements), affective barriers (9 statements), technological barriers (8 statements), library knowledge barriers (10 statements), library comfort barriers (8 statements), and resource barriers (6 statements). The reliability of the sub-scales as reported using Cronbach's internal reliability coefficient alpha was 0.75, 0.80, 0.73, 0.78, 0.47, and 0.75 respectively. In addition, overall scale was reported to have sufficient internal reliability coefficient with a Cronbach's alpha value at 0.91.

Erfanmanesh (2011) validated the Multidimensional Library Anxiety Scale (MLAS) which was developed by Van Kampen (2003) in an Iranian university. One hundred and twenty-three (123) postgraduate students at the Shiraz University completed a translated copy of the questionnaire. The exploratory factor analysis was conducted in order to assess the construct validity of the scale. Also, a test-retest method was used to enhance internal validity of the overall scale. The results of the factor analysis yielded eight (8) sub-scales, namely, barriers with library resources ($\alpha=0.81$), barriers with library services ($\alpha=0.75$), barriers with information seeking process ($\alpha=0.68$), mechanical barriers ($\alpha=0.78$), barriers with knowledge of the library ($\alpha=0.72$), barriers with use of library ($\alpha=0.75$), barriers with library staff ($\alpha=0.83$), and barriers with library building ($\alpha=0.62$). Additionally, the resultant alpha coefficient of 0.84 for overall scale supported internal reliability of the scale. In view of these findings, the modified version of Multidimensional Library Anxiety Scale was valid as well as internally reliable for assessing library anxiety among Iranian academic library users.

INSTRUMENTATION AND DATA COLLECTION

a) Development of the Information Seeking Anxiety Scale

The research to develop the Information Seeking Anxiety Scale took place in several empirical phases (Figure 1). The first step involved the development of a list of key components concerning the construct of information seeking anxiety. For this purpose, potential components were gleaned from several sources: a) extensive review of the literature in the areas of library anxiety, computer anxiety, internet anxiety, information anxiety, information seeking process, and other related areas; b) existing instruments in aforementioned constructs; c) interviews with ten (10) postgraduate students to identify what made them anxious when they were seeking information related to their research. Students from a research-intensive university in Kuala Lumpur Malaysia were sampled at this stage. The interviews were recorded using a voice recorder and transcribed to identify possible key components. Comments from the Library and Information Science (LIS) faculty at the university were also solicited in the development of the key components. As a result, a pool of ninety-four (94) key components was formulated by the researchers.
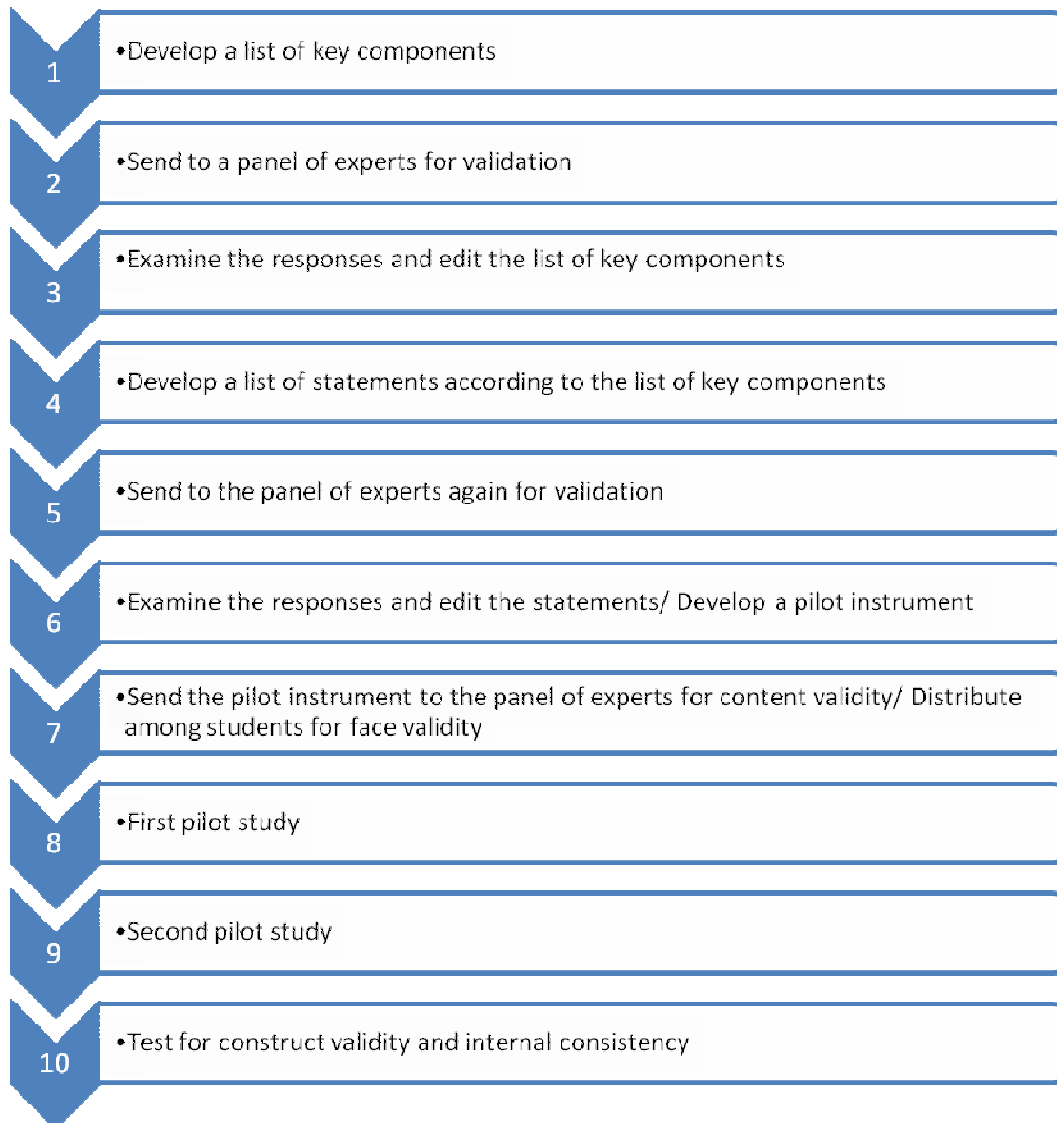
1	•Develop a list of key components
2	•Send to a panel of experts for validation
3	•Examine the responses and edit the list of key components
4	•Develop a list of statements according to the list of key components
5	•Send to the panel of experts again for validation
6	•Examine the responses and edit the statements/ Develop a pilot instrument
7	•Send the pilot instrument to the panel of experts for content validity/ Distribute among students for face validity
8	•First pilot study
9	•Second pilot study
10	•Test for construct validity and internal consistency

Fiqure 1: Procedures of the Development and Validation of the Information Seeking Anxiety Scale

The initial list of key components was sent to a panel of experts for validation. Seventeen (17) panelists in the area of LIS were selected to participate in different stages of the study. The criterion for selection of the expert judges included their publications and dissertation supervision in the area of research. Of the seventeen (17) experts, fourteen (14) are doctoral degree holders who are either faculty members or librarians and three are Masters degree holders. All experts were contacted personally by e-mail and were asked to participate in the study, of which fourteen (14) of them accepted. The list of key components was then sent to them to elicit their expert opinions and comments on those key components. The experts were given two (2) weeks to respond. Responses were received from ten (10) experts out of fourteen (14). Any component that was eliminated by more than one (1) expert was removed from the list. Also, any new component that was suggested by at least one (1) expert was added to the list. Based upon the expert's comments, sixty-five (65) out of ninety-four (94) components were approved, while

twenty-nine (29) components were omitted, five (5) new components were added, and eight (8) components were reworded. As a result, the revised list of key components was developed, which came to a total of seventy (70) items.

In the next stage of the study, a list of one hundred and fifty-four (154) statements was created based on the list of seventy (70) key components. All key components were addressed in a minimum of one (1) statement. Care was taken to ensure that each statement was short, simple, clear, and addressed a single issue. The list of statements was submitted again to the same panel of experts for validation. They were given three (3) weeks to respond to the new list of items and return their comments, modifications and suggestions. Responses were received from eight (8) experts out of fourteen (14) which incorporated several changes and modifications. Statements were then edited based on feedback from expert judges. Accordingly, ninety-one (91) statements were retained in the list, sixty-three (63) were removed, and two (2) new statements were added, resulting in a total of ninety-three (93) items. Additionally, twenty-five (25) items were slightly reworded for clarity.

Following revisions to the list of statements, a pilot instrument was developed in order to determine its potential validity. The pilot instrument consisted of ninety-three (93) statements, scored on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The statements were both in positive and negative forms and had at least one (1) statement addressing each key component that identified before. Also, a demographic information form was developed to collect the essential information for this study. The following items of demographic information were collected using this form: age, gender, major, level of study (master or doctorate), year of study, nationality (Malaysian or international), frequency of library use, frequency of internet use, and number of information literacy skill sessions attended.

Two (2) steps were performed before the instrument was pilot tested (Procedure 7 in Figure 1). These steps included determination of instrument's content and face validity. Content validity may be defined as the degree to which elements of an assessment instrument are relevant to and representative of the targeted construct for a particular assessment purpose which is an essential part of generating new instruments (Haynes, Richard and Kabany 1995). The panel of experts was asked again for review of the pilot instrument to determine whether or not the instrument will actually measure what the researchers think it will measure. Seven (7) out of fourteen (14) experts evaluated the content validity of the instrument and confirmed that the statements of the instrument appeared to measure the concept of information seeking anxiety. Additionally, fifteen (15) postgraduate students from different departments at the university were selected to evaluate the face validity of the pilot instrument. Face validity pertains to whether the instrument appears valid to the examinees who take it (Anastasi 1988). The refinement of items based on the perspective of study participants may improve response rates and enhance the validity of the data. Accordingly, after receiving advice concerning the clarity, phrasing, terminology, and readability of the statements from the students, the statements were revised and the pilot instrument was finalized. Overall, student respondents reported that the instrument was easy to understand and that the format was pleasant.

Subsequently, the first pilot study was conducted in February 2011 at the university. Participants were one hundred (100) postgraduate students who were selected for the study using convenience sampling method. The instrument was distributed personally by

the researchers. The students were informed that their participation was voluntary and that their responses would be used only for the research. They were asked to respond to the pilot instrument which consisted of ninety-three (93) statements and return it to the researcher. This instrument was seven (7) pages long and took about twenty (20) minutes to complete. A cover letter was attached to the questionnaire, which explained the purpose of the study, asked for cooperation, and provided some instruction for completing the questionnaire. Of the one hundred (100) participants, fifty-seven percent (57%) were master students and forty-three percent (43%) were PhD students. Fifty-eight percent (58%) were female and forty-two percent (42%) were male. International students formed the majority of the sample (78%), while Malaysian students comprised twenty-two percent (22%) of the participants. Finally, the participants were from different areas of study included arts, humanities and social sciences (28%), pure sciences (22%), engineering (39%), and medical sciences (11%).

 Upon completion of the pilot study, the returned questionnaires were reviewed for completeness and usability and were coded for data analyses. Responses from three (3) participants were excluded because they did not complete the entire questionnaire. After that, data were input into Predictive Analysis Software (PASW) for statistical analysis. In an attempt to assess construct validity of the pilot instrument, an exploratory factor analysis was performed. Construct validity is "the extent to which a set of measured variables actually represent the theoretical latent construct they are designed to measure" (Hair et al. 2006). Exploratory factor analysis is most frequently used as a part of the instrument development process. The purpose of the first factor analysis was to identify statements that were not contributing to the explanation of variance in information seeking anxiety construct. Results of running an exploratory factor analysis using principal component and varimax rotation method yielded seven (7) factors which collectively explained 50.82% of the total variance. The first factor accounted for 20.21% of the variance (eigenvalue=18.79), the second factor explained 8.20% of the variance (eigenvalue=7.63), the third factor represented 5.72% of the variance (eigenvalue=5.32), and the fourth factor accounted for 4.98% of the variance (eigenvalue=4.63). Factors five, six, and seven accounted for 4.44%, 4.03%, and 3.22% of the total variance respectively (eigenvalues=4.13, 3.74, and 3.00 respectively). Items with factor loading less than 0.4 were reviewed and re-paraphrased again. The researchers decided to keep all ninety-three (93) statements for the second pilot study.

The second pilot study was conducted during March and April 2011 at the same university. Again, the pilot instrument consisted of ninety-three (93) statements was completed by three hundred (300) postgraduate students who were selected using the convenience sampling method. Females made up fifty-nine percent (59%) of the sample with the remaining forty-one percent (41%) respondents being male. Of the participants, sixty-eight percent (68%) were master's students and thirty-two percent (32%) were doctoral students. The majority of subjects (70%) were international students, while only thirty percent (30%) were Malaysian. Also regarding the students' area of specialization, twenty-nine percent (29%) were engineering students and forty-two percent (42%) were from arts, humanities, and social science disciplines. Twenty-four percent (24%) and five percent (5%) of respondents were from the pure sciences and medical sciences, respectively.

b) Validation of the Information Seeking Anxiety Scale
The returned questionnaires from the second pilot study were reviewed for incomplete or missing information before being entered into PASW for statistical analysis. Thirteen (13) questionnaires were eliminated due to insufficient data, leaving a final sample of two

hundred-eighty seven (287). Negatively worded statements were reversed during data input so that all statements were scored in the same direction. The Kaise-Meyer-Olkin (KMO) is a measure of sampling adequacy and varies between zero and one, with values greater than or equal to 0.60 used to indicate a good fit. In this study the value was 0.797, suggesting that there was sampling adequacy. Additionally, significance of the Bartlett's Test of Sphericity (chi-square=12020.739, df=3828, p<0.000) indicated that the items contained adequate common variance to proceed with exploratory factor analysis.

Exploratory factor analysis with varimax rotation was performed then, in order to assess the construct validity of the instrument as well as to determine the appropriate number of factors and statements grouping in each of these factors. To produce meaningfully distinct factors, the principal axis method was used. Statements with factor loading less than 0.4 were dropped, leaving fifty-four (54) items. The initial analysis indicated twenty-nine (29) factors with eigenvalues greater than 1.0. But, using examinations of eigenvalues and scree plot, it was decided to retain only six (6) factors for further investigation. Accordingly, the items were forced into six (6) factors which accounted for 35.37% of the cumulative variance (Table 1).

Table 1: Description of Factors

Factor	Eigenvalues	% of Variance	Cumulative %	No. of Items
1	13.79	15.67	15.67	14
2	6.40	7.28	22.95	10
3	3.29	3.74	26.70	11
4	3.00	3.41	30.11	7
5	2.60	2.95	33.07	7
6	2.34	2.66	35.73	5

The first factor consisted of fourteen (14) items and accounted for 15.67% of the total variance (eigenvalue=13.79). The items within this factor had rotated factor loadings ranging from 0.420 to 0.659 (Table 2). This factor was labeled as *barriers associated with information resources*.

The second factor (eigenvalue=6.40), accounted for 7.28% of the total variance and was ten (10) items with factor loadings ranging from 0.426 to 0.584 (Table 3). This factor was labeled as *barriers associated with computer and the Internet*.

The third factor, identified as *barriers associated with library*, contained eleven (11) items. These items explained 3.74% of the total variance and had an eigenvalue of 3.29. The items within the third factor had rotated factor loadings between 0.422 and 0.615 (Table 4).

The fourth factor comprised seven (7) items and explained only 3.41% of the variance. The items within this factor exhibited rotated factor loadings ranging from 0.463 to 0.574 (Table 5) with eigenvalue of 3.00. This factor was named *barriers associated with searching for information.*

The fifth factor with eigenvalue of 2.60 consisted of seven (7) items and accounted for 2.95 % of the total variance. The items within this factor exhibited rotated factor loadings ranged from 0.451 to 0.663 (Table 6). This factor was named *technical barriers.*

Table 2: Factor Loadings for "Barriers Associated with Information Resources"

Number	Item	Factor Loading
1	21 (I feel anxious when resources found during information seeking process are irrelevant)	0.659
2	23 (Unfamiliarity with information resources make me anxious during information seeking process)	0.636
3	18 (I feel anxious when the quality of retrieved information resources are unreliable)	0.635
4	19 (Finding poor quality information resources during information seeking process make me frustrated)	0.616
5	20 (Making judgment of the relevance of the retrieved information resources make me anxious)	0.597
6	17 (Making judgment of the quality of the retrieved information resources make me anxious)	0.532
7	24 (I feel anxious when I find too many unfamiliar information resources during information seeking process)	0.525
8	22 (I feel anxious when what is retrieved during information seeking process is not up-to-date)	0.502
9	16 (I feel frustrated when information resources that I found are not easy to use)	0.463
10	15 (I feel anxious when special skills are required to access information resources)	0.449
11	10 (I feel anxious when I know information resources, but I don't have access to them)	0.447
12	13 (Restricted access to required full text resources make me anxious when I seeking for information)	0.444
13	44 (I feel anxious when I can not find necessary information on the web)	0.430
14	14 (I feel anxious when special equipments are required to access information resources)	0.420

Table 3: Factor Loadings for "Barriers Associated with Computer and the Internet"

Number	Item	Factor Loading
1	29 (When I try to use computers for seeking information resources, I feel frustrated)	0.584
2	26 (I feel frustrated when I use computers for seeking information resources)	0.548
3	27 (I don't feel comfortable using online resources when seeking information resources)	0.536
4	43 (I feel overwhelmed when I use the Internet for seeking information resources)	0.507
5	85 (I am unsure about how to complete the information seeking process)	0.486
6	46 (The Internet plays an important role in my information seeking process)	0.475
7	31 (The computers don't play an important role in my information seeking process)	0.452
8	28 (I am comfortable using computers in seeking information resources)	0.447
9	51 (My Internet skills are not adequate for success in information seeking part of my research)	0.438
10	42 (I feel overwhelmed when seeking information on the web)	0.426

Table 4: Factor Loadings for "Barriers Associated with Library"

Number	Item	Factor Loading
1	56 (When seeking information resources in the university library, I feel anxious because of the library's furniture)	0.615
2	61 (The librarian and library staff don't have time to help me when I seeking information resources)	0.574
3	60 (When seeking information resources in the university library, I feel anxious because of the library's policies and procedures)	0.527
4	63 (The university library doesn't offer enough services for postgraduate students)	0.523
5	65 (I feel anxious when seeking information from the library's website)	0.519
6	57 (Inadequate library lighting make me feel uneasy when using the library for seeking information resources)	0.517
7	62 (I feel uncomfortable asking for help from the library staff when seeking for information resources in the library)	0.477
8	72 (My previous negative experiences affect my feelings negatively when I use the university library for seeking information)	0.464
9	58 (The temperature in the university library is uncomfortable and I cant get my information seeking done)	0.459
10	64 (I am not comfortable using library services for seeking information resources)	0.448
11	66 (When I use library's Online Public Access Catalogue for seeking information, I feel frustrated)	0.422

Table 5: Factor Loadings for "Barriers Associated with Searching for Information"

Number	Item	Factor Loading
1	73 (When seeking for information, I usually experience negative feelings like anxiety and frustration)	0.574
2	75 (I am embarrassed that I don't know how to find information resources)	0.550
3	76 (I am worried about not being able to find the necessary information during information seeking process)	0.529
4	77 (I feel anxious when I need information related to my research)	0.496
5	74 (I feel anxious from the beginning to the end of the information seeking process)	0.463
6	87 (I feel satisfied with the information found during information seeking process)	0.416
7	86 (I usually know when I have enough information to complete the information seeking process)	0.408

The sixth factor (eigenvalue=2.34) explained only 2.66% of the variance and consisted of five (5) items. This factor was named *barriers associated with topic identification*, and contained items with rotated factor loadings between 0.536 and 0.838 (Table 7).

Table 6: Factor Loadings for "Technical Barriers"

Number	Item	Factor Loading
1	37 (Mechanical issues during information seeking process make me anxious)	0.663
2	36 (Unknown computer errors make me feel uneasy during the information seeking process)	0.632
3	35 (I feel fear of making mistakes that cause system malfunction during information seeking process)	0.500
4	34 (I feel fear of damaging computers or other machines during information seeking process)	0.487
5	38 (Rapid changes in familiar hardware and software make me anxious when seeking information resources)	0.482
6	49 (Slow downloading of pages and files make me anxious when I seeking information resources)	0.455
7	39 (I feel anxious when different computer technologies are required to retrieve the desire information resources)	0.451

Table 7: Factor Loadings for "Barriers Associated with Topic Identification"

Number	Item	Factor Loading
1	80 (I feel anxious when selecting a general topic for my research)	0.838
2	79 (Selecting a general topic is a difficult part of information seeking process)	0.725
3	81 (Exploring information on a general topic for finding a focus make me anxious)	0.659
4	83 (Gathering information related to my specific topic make me anxious)	0.536
5	78 (I am not sure how to start searching information resources)	0.406

The next step was to determine the internal consistency of the total scale as well as each of sub-scales. Cronbach's (1951) internal reliability coefficient alpha is the most commonly accepted measure of internal consistency. Cronbach's alpha varies from zero (0) to one (1) which higher values of alpha indicates higher reliability of the instrument. The first sub-scale presented good internal consistency for the reliability analysis that yielded an alpha coefficient value of 0.868. Table 8 contains the alpha coefficients that would be generated if each item were to be deleted from the instrument. According to this table, dropping anyone of the fourteen (14) items would not significantly raise the value of alpha coefficient higher than the present value of 0.868.

Cronbach's coefficient alpha was also calculated for the second factor. This factor scored a Cronbach's alpha of 0.300, which is an unacceptable valus. Inspection of the internal reliability analysis revealed that dropping four items (28, 43, 46, and 85) from the sub-scale had the effect of raising alpha coefficient from 0.300 to 0.726, which is an acceptable level of internal consistency (Table 9). As a result, the number of valid and reliable items in the second factor decreased to only six (6) items.

Table 8: Internal Reliability Analysis for "Barriers Associated with Information Resources"

Number	Scale Item	Alpha if item deleted
1	21	0.854
2	23	0.855
3	18	0.857
4	19	0.856
5	20	0.858
6	17	0.865
7	24	0.861
8	22	0.863
9	16	0.859
10	15	0.858
11	10	0.862
12	13	0.860
13	14	0.859
14	44	0.862

Table 9: Internal Reliability Analysis for "Barriers Associated with Computer and the Internet"

Number	Scale Item	Alpha if item deleted
1	29	0.184
2	26	0.163
3	27	0.155
4	43*	0.381
5	85*	0.372
6	46*	0.347
7	31	0.285
8	28*	0.391
9	51	0.225
10	42	0.152

* Removed from the second factor

The resultant alpha coefficient of 0.815 for the third factor provided evidence of adequate internal consistency. Inspection of Table 10 revealed that deletion any of the eleven (11) items would not increase the alpha coefficient of the sub-scale higher than the present value of 0.815.

The internal consistency coefficient of the fourth factor was 0.576, which is an unacceptable value. After examining the internal reliability analysis, it was decided to drop two (2) items from this factor (86 and 87) which increased the Cronbach's alpha to a satisfactory value of 0.802 (Table 11). As a result, the number of valid and reliable items in the fourth factor decreased to only five (5) items.

To determine the internal consistency of the fifth factor, Cronbach's coefficient alpha was calculated, yielded a reliability estimate of 0.785. Deletion of item 49 improved the reliability score slightly to 0.809 (Table 12). As a result, the totals of six (6) valid and reliable items were remained in the fifth factor.

Table 10: Internal Reliability Analysis for "Barriers Associated with Library"

Number	Scale Item	Alpha if item deleted
1	56	0.797
2	61	0.796
3	60	0.801
4	63	0.797
5	65	0.794
6	57	0.802
7	62	0.799
8	72	0.797
9	58	0.812
10	64	0.803
11	66	0.802

Table 11: Internal Reliability Analysis for "Barriers Associated with Searching for Information"

Number	Scale Item	Alpha if item deleted
1	73	0.449
2	75	0.457
3	76	0.478
4	77	0.422
5	74	0.477
6	87*	0.680
7	86*	0.668

* Removed from the fourth factor

Table 12: Internal Reliability Analysis for "Technical Barriers"

Number	Scale Item	Alpha if item deleted
1	37	0.732
2	36	0.728
3	35	0.750
4	34	0.754
5	38	0.753
6	49*	0.809
7	39	0.765

* Removed from the fifth factor

The alpha coefficient for the sixth factor was 0.825 which indicated a high degree of internal consistency. Dropping any one of the five (5) items would not significantly increase the value of alpha coefficient (Table 13).

Dropping seven (7) items from different sub-scales reduced the number of valid and reliable statements to only forty-seven (47). Finally, the high value of alpha coefficient for each of the sub-scales as well as the total instrument ($\alpha=0.902$) indicated acceptable internal consistency of the Information Seeking Anxiety Scale (Table 14).

Table 13: Internal Reliability Analysis for "Barriers Associated with Topic Identification"

Number	Scale Item	Alpha if item deleted
1	80	0.754
2	79	0.770
3	81	0.777
4	83	0.823
5	78	0.822

Table 14: Internal Reliability for Overall Scale and Sub-scales

Number	Sub-scale	Number of items	Cronbach's alpha
1	Barriers associated with information resources	14	0.868
2	Barriers associated with computer and the Internet	6	0.726
3	Barriers associated with library	11	0.815
4	Barriers associated with searching for information	5	0.802
5	Technical barriers	6	0.809
6	Barriers associated with topic identification	5	0.825
Total	Information Seeking Anxiety Scale	47	0.902

CONCLUSION

The present study was conducted in order to develop and validate the Information Seeking Anxiety Scale (ISAS). The development and validation of this scale followed a standard pattern for psychometric research. In the first step, a list of ninety-four (94) potential key components was generated using different resources. Possible components were gleaned from literature review, existing instruments, consultation with research supervisors, and interviews with postgraduate students. The list of key components was sent to a panel of experts for their comments and feedback. Based on the responses received from the experts, twenty-nine (29) components were eliminated from the list, and five (5) new components were added, leaving seventy (70) components. After that, a total of one hundred and fifty-four (154) statements were created with respect to each of the key components and were sent again to experts for validation. Based upon the experts' comments, a pilot instrument comprising ninety-three (93) statements was developed. Two (2) pilot studies were conducted during February to April 2011 at the research-intensive university sampled. A total of four hundred (400) postgraduate students took part in the pilot studies.

In order to assess the validity of the instrument, several approaches were used included face, content, and construct validation. A group of fifteen (15) postgraduate students evaluated the instrument for face validity. Overall, they reported that the instrument was complete and easy to understand. In order to assess the content validity of the instrument, it was presented to a panel of experts for suggestions and validation. Seven (7) experts established content validity of the instrument and confirmed that the statements of the instrument appeared to measure the concept of information seeking anxiety. Construct validity of the instrument was determined using an exploratory factor analysis. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (0.797) and Bartlett's Test of Sphericity (chi-square=12020.739, df=3828, p<0.000), indicated the suitability of the data for factor analysis.

Results of running an exploratory factor analysis with principal component and varimax rotation yielded six (6) factors which collectively explained 35.37% of the total variance. Using this method, thirty-nine (39) statements with factor loading less than 0.4 were excluded, leaving fifty-four (54) statements. The first factor, *barriers associated with information resources,* consisted of fourteen (14) statements which explained 15.67% of the total variance. The second factor, *barriers associated with computer and the Internet,* included ten (10) statements and accounted for 7.28% of the variance. Factor three, labeled *barriers associated with library*, contained eleven (11) statements which represented 3.74% of the variance. The fourth factor, *barriers associated with searching for information*, represented 3.41% of the variance and included seven (7) statements. Factor five, *technical barriers*, comprised seven (7) statements and accounted for 2.95% of the variance. Finally, five (5) statements were loaded on the sixth factor, *barriers associated with topic identification*, which explained 2.66% of the total variance.

To determine the internal reliability of all sub-scales as well as the overall scale, Cronbach's coefficient alpha was calculated. Reliability analysis using Cronbach's alpha revealed seven (7) problematic items which were subsequently eliminated. Dropping these items from second, fourth, and fifth factors had the effect of raising alpha coefficient values of these factors. The reliability (alpha) coefficients of the six (6) sub-scales were 0.868, 0.726, 0.815, 0.802, 0.809, and 0.825 respectively. Also, resultant alpha coefficient of 0.902 for overall scale provided evidence of adequate internal consistency of the instrument.

Results of the study indicated that the newly developed scale, Information Seeking Anxiety Scale, had satisfactory face, content, and construct validity as well as internal reliability. The Information Seeking Anxiety Scale (ISAS) contains forty-seven (47) 5-point Likert-format items that measures six (6) facets of information seeking anxiety (Appendix 1). This scale has the potential to be a useful tool for determining what aspects of the information seeking process are perceived to be barriers by postgraduate students. Accordingly, this instrument could be used in future studies to determine the information seeking anxiety of postgraduate students. This study provided the first step in understanding the factors associated with the construct of information seeking anxiety. The validity and reliability of the instrument in other cultural and educational setting should be examined. Also, the Information Seeking Anxiety Scale should be tested at universities in different countries to determine if the students share the same type of anxiety related to seeking information resources. Also, future studies should investigate the nature of the relationship between levels of information seeking anxiety and different personal, educational, and psychological variables. Furthermore, replication of this study with undergraduate students is also recommended. Finally, additional research should be conducted to determine if the instrument is amenable in other information seeking environments.

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Information Seeking Anxiety Scale (ISAS)

Please answer the following questions regarding your feelings during information seeking process of your research. Please circle the number that most closely matches your feelings about the statement using the following key:

1= Strongly Disagree   2= Disagree   3= Undecided   4= Agree   5=Strongly Agree

1. I feel anxious when selecting a general topic for my research	1 2 3 4 5
2. Selecting a general topic is a difficult part of the information seeking process	1 2 3 4 5
3. Mechanical issues during information seeking process make me anxious	1 2 3 4 5
4. I feel anxious when resources found during information seeking process are irrelevant	1 2 3 4 5
5. Exploring information on a general topic for finding a focus make me anxious	1 2 3 4 5
6. Unfamiliarity with information resources make me anxious during information seeking process	1 2 3 4 5
7. I feel anxious when the quality of retrieved information resources are unreliable	1 2 3 4 5
8. Unknown computer errors make me feel uneasy during the information seeking process	1 2 3 4 5
9. Finding poor quality information resources during information seeking process make me frustrated	1 2 3 4 5
10. When seeking information resources in the university library, I feel anxious because of the library's furniture	1 2 3 4 5
11. I am not sure how to start searching information resources	1 2 3 4 5
12. making judgment of the relevance of the retrieved information resources make me anxious	1 2 3 4 5
13. I feel frustrated when I use computers for seeking information resources	1 2 3 4 5
14. The librarian and library staff don't have time to help me when I seeking information resources	1 2 3 4 5
15. When seeking for information resources, I usually experience negative feelings like anxiety and frustration	1 2 3 4 5
16. I am embarrassed that I do not know how to find information resources	1 2 3 4 5
17. When seeking information, I feel uncomfortable using electronic resources	1 2 3 4 5
18. I do not feel comfortable using online resources when seeking information resources	1 2 3 4 5
19. Gathering information related to my specific topic make me anxious	1 2 3 4 5
20. making judgment of the quality of the retrieved information resources make me anxious	1 2 3 4 5
21. I am worried about not being able to find the necessary information during the information seeking process	1 2 3 4 5
22. When seeking information resources in the university library, I feel anxious because of the library's policies and procedures	1 2 3 4 5

23. I feel anxious when I find too many unfamiliar information resources during information seeking process   1 2 3 4 5

24. The university library does not offer enough information services for postgraduate students   1 2 3 4 5

25. I feel anxious when seeking information from the library's website   1 2 3 4 5

26. Inadequate library lighting make me feel uneasy when using the library for seeking information resources   1 2 3 4 5

27. I feel anxious when what is retrieved during information seeking process is not up-to-date   1 2 3 4 5

28. I feel fear of making mistakes that cause system malfunction during information seeking process   1 2 3 4 5

29. I feel anxious when I need information related to my research   1 2 3 4 5

30. I feel fear of damaging computers or other machines during information seeking process   1 2 3 4 5

31. Rapid changes in familiar hardware and software make me anxious when seeking information resources   1 2 3 4 5

32. I feel uncomfortable asking for help from the library staff when seeking for information resources in the library   1 2 3 4 5

33. My previous negative experiences affect my feelings negatively when I use the university library for seeking information   1 2 3 4 5

34. I feel frustrated when information resources that I found are not easy to use   1 2 3 4 5

35. I feel anxious from the initial to the final stage of the information seeking process   1 2 3 4 5

36. The temperature in the university library is uncomfortable that I cannot get my information seeking done   1 2 3 4 5

37. Computers do not play an important role in my information seeking process   1 2 3 4 5

38. I feel anxious when different computer technologies are required to retrieve the desire information resources   1 2 3 4 5

39. I feel anxious when special skills are required to access information resources   1 2 3 4 5

40. I am not comfortable using library services for seeking information resources   1 2 3 4 5

41. I feel anxious when I know information resources, but I don't have access to them   1 2 3 4 5

42. Restricted access to required full text resources make me anxious when I seeking for information   1 2 3 4 5

43. My Internet skills are not adequate for success in information seeking part of my research   1 2 3 4 5

44. I feel anxious when I cannot find necessary information resources on the Internet   1 2 3 4 5

45. I feel overwhelmed when I use the Internet for seeking information resources   1 2 3 4 5

46. When I use library's Online Public Access Catalogue for seeking information, I feel frustrated   1 2 3 4 5

47. I feel anxious when special equipments are required to access information resources   1 2 3 4 5