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A Shorter Version of Student Accommodation Preferences Index (SAPI)

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ABSTRACT

This study aims to develop a short but valid and reliable instrument for the examination of student accommodation preferences. This study draws upon the instrument developed by Khozaei et al. (2011), the student accommodation preferences index (SAPI). The construct validity of the instrument was assessed through an exploratory factor analysis using a principal components analysis with varimax rotation, by which 6 factors were extracted with 64 items. Because the questionnaire is lengthy, the current study aimed to develop a valid and reliable shorter version of the instrument to examine student accommodation preferences, thereby extending the previous work by collecting data from a subsequent sample. The confirmatory factor analysis and subsequent iterative process yielded a valid and reliable student accommodation preferences instrument (SAPI) with only 29 items. This is much shorter than the original 60-item instrument. The iterative process was performed by considering good measurement theory and retaining at least 4 items per construct. This shorter revised instrument has been shown to be both valid and reliable.

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1. Introduction

The availability of student housing has been acknowledged as one of the major issues that students must consider when choosing a university. If universities are unable to provide housing for students, students face additional pressure, and the lack of affordable off-campus housing may become a significant problem. The result is that, in choosing between two similar universities, students may prioritize the university with available on-campus housing.

When students move far from home to attend university, they often need to minimize spending, and residence halls have been a proven means of achieving this goal. Consequently, many students prefer to reside in university residence halls. The issue of the affordability of residence halls aside, the profound impacts and benefits of residence halls on students must be considered. Because of the significance of these impacts, scholars have examined the influence of residence halls on students from various perspectives (Blimling, 1999; Cross et al., 2009). Some even studies have suggested that residence halls may influence students' growth, behavior and academic performance (Araujo & Murray, 2010; Lanasa et al, 2007). Indeed, the crucial influence of residence halls might explain the numerous studies on college and university students' lives, both on-campus and off-campus, over the last decades (Foubert *et al*., 1998; Rinn, 2004; Amole, 2005; Bekurs, 2007; Paine, 2007; Thomsen, 2007, 2008; Black, 2008; Cross *et al.* , 2009; Najib *et al.*, 2011).

While the affordability of student housing is crucial for some students, for other students, comfort and home-like attributes are their main concerns. A recent study suggested that current students have significantly higher expectations for housing than their parents did when they were students, and students are willing to pay for certain amenities (Roche *et al*., 2010). Therefore, a distinctive feature of contemporary universities is the diversity of students and their needs and requirements. Thus, universities must provide students with housing that not only is affordable but also fulfills their requirements. Then the question arises, "What are the attributes of such a residence hall?" There is no single answer to this question; however, our basic knowledge of student housing preferences is also very limited. Although a number of studies have examined student housing (Holahan and Wilcox, 1978; Han, 2004; Charbonneau *et al*. ,2006; Stern *et al*,

2007; Brandon *et al*, 2008; Hassanain, 2008; Cross *et al*. ,2009; Araujo & Murray, 2010) there is a lack of research on students' housing preferences, and methods and research instruments in this area remain underdeveloped. The current study is an attempt to partially fill this gap by developing and validating an instrument called the SAPI (Student Accommodation Preference Instrument), which can be used by university organizers and researchers. The SAPI was primarily developed by Khozaei *et al*. (2011), and its reliability and validity have been assessed. This instrument was conceptualized on the basis of similarities between residence halls and homes and was developed using exploratory factor analysis (EFA). Although the instrument had good reliability and validity and covered a large number of factors that influence student housing preferences, its questionnaire was extremely long. The purpose of this paper is to develop a valid and reliable shorter version of the instrument.

2. Review of studies on housing preferences

A vast body of previous research was studied critically during the development of the student accommodation preferences index (SAPI). In very early stages of this study, it was found that there are very few direct references to reports on student housing preferences. Therefore, it is not enough to review the studies that have analyzed the aforementioned issues. Accordingly, other scholarly works addressing housing preferences and related subjects (e.g., satisfaction and expectations), as well as studies of student housing in general, were also examined as a source of inspiration. In the limited pages of this paper, the most direct studies on housing preferences are discussed, and a large numbers of other studies are omitted.

Borrowing from studies on housing preferences and choice, several influencing factors are examined in the study of residence preferences. These factors are examined at both the macro and micro level. Some other studies have canonized the influence of the demographic background of respondents on their preferences. At the macro level, factors include time, space, money and social relationships (Ge and Hokao, 2006), size of place of residence (Jong, 1977; Heaton *et al*., 1979; Hwang and Albrecht, 1987; Hempel and Tucker, 1979; Tremblay *et al*., 1980), functional congruity (Sirgy *et al*., 2005) and neighborhood attributes (Wang and Li , 2006; Lindberg *et al*.

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,1989). Other factors in residence housing preferences include outdoor environmental quality (Jim and Chen, 2007), location (Devlin, 1994, Thamaraiselvi & Rajalakshmi, 2008; Karsten, 2007; Lindberg *et al*., 1989), neighborhood attributes (Hempel &Tucker, 1979), local landscape (Nasar, 1983), safety, and proximity to the city, public transportation, proximity to workplace, sense of safety, medical and health facilities, and educational facilities (Wu, 2010).

At the micro level, the exterior facade of the residence (Nasar and Kang, 1999; Akalin et al., 2009; Stamps & Miller, 1993; Stamps, 1999), dwelling type (Opoku & Abdul-Muhmin 2010; O'Connell et al., 2006; Elliott *et al*. , 1990), convenience, security, price, orientation and layout (Wang and Li, 2006), as well as the dwelling's architectural style (Devlin, 1994 a,b; Hempel & Tucker, 1979), are also examined in the study of housing preferences. Studies have also examined the role of safety, resale value, maintenance, amenities (Thamaraiselvi & Rajalakshmi, 2008), lot size, housing price, location, distance attributes (e.g., distance to shops, schools, facilities), range of housing styles available, and the size of the home (Reed & Mills, 2007).

Regarding the demographic background of respondents, studies have shown that housing preferences are linked to residents' gender (Devlin, 1994b), family income, age, education, type of employment (Wang and Li, 2006), kinship, religion and attitude toward women (Jabareen, 2005).

In the vast body of literature on housing, few studies have focused on student housing preferences. For example, Roche *et al.* (2010) examined the housing preferences of 325 undergraduate students. They found that the students desired housing options that fulfilled their high expectations for privacy and amenities. These authors found that the majority of students preferred to live in apartment-style housing, and only 3.2% of students preferred to live in traditional residence halls. Roche et al. listed the top ten amenities for students: "private bedroom, onsite parking, double beds, onsite laundry facilities, internet access, proximity to campus, fitness center, private bathroom, cable TV and satellite dining" (50).

Students' desire to personalize college residence hall rooms was examined in a study by Hansen and Altman (1976). They found that the majority of students decorated their living spaces soon after arriving on campus. Based on how the students had decorated the walls of their rooms,

the researchers teased out evidence pertaining to students' values, personal interests and personal relationships. This study suggests the importance of providing students with the flexibility to personalize their living space. Oppewal *et al* (2005) found that factors such as a mixed- or single-gender floor, mixed- or single-course floor, shared toilet and shower, view from the room, distance from campus, age of the building, and weekly rent were influential factors in students' housing preferences (Oppewal *et al*., 2005).

These studies provide relevant resources and concepts for the current study. However, the main concept in the development of the SAPI was that, in general, students prefer to live in home-like residence halls rather than institutional residence halls. Thus, the SAPI "is conceptualized on the basis of similarities between residence halls and homes" (Khozaei *et al*. 2011, 301). This concept has previously been discussed in the literature (e.g. Robinson, 2004; Thomsen, 2007; Khozaei *et al*., 2010). Accordingly, in developing the SAPI, contributing factors drawn from the literature review on housing preferences were combined and categorized into those factors that make residence halls similar to houses. This subject will be discussed further in the methodology section.

3. Methodology

The main aim of this study is to achieve a shorter and more user-friendly version of the student accommodation preference index (SAPI) developed by Khozaei *et al*. (2011). Before discussing the procedure for shortening and validating the instrument questionnaire, we explain the steps in the development of the original index.

The key concept in the development of the instrument was the assumption that the current students prefer to live in home-like residence halls rather than in residence halls with more institutional characteristics. Residence halls and private homes were conceptualized as being similar in terms of 8 main factors: visual, facilities, amenities, location, personalization and flexibility of room, social contact, security and privacy (Khozaei *et al*. 2011, 305). With these 8 dimensions in mind, the related literature was studied critically to identify a pool of items (Pett et al., 2003).

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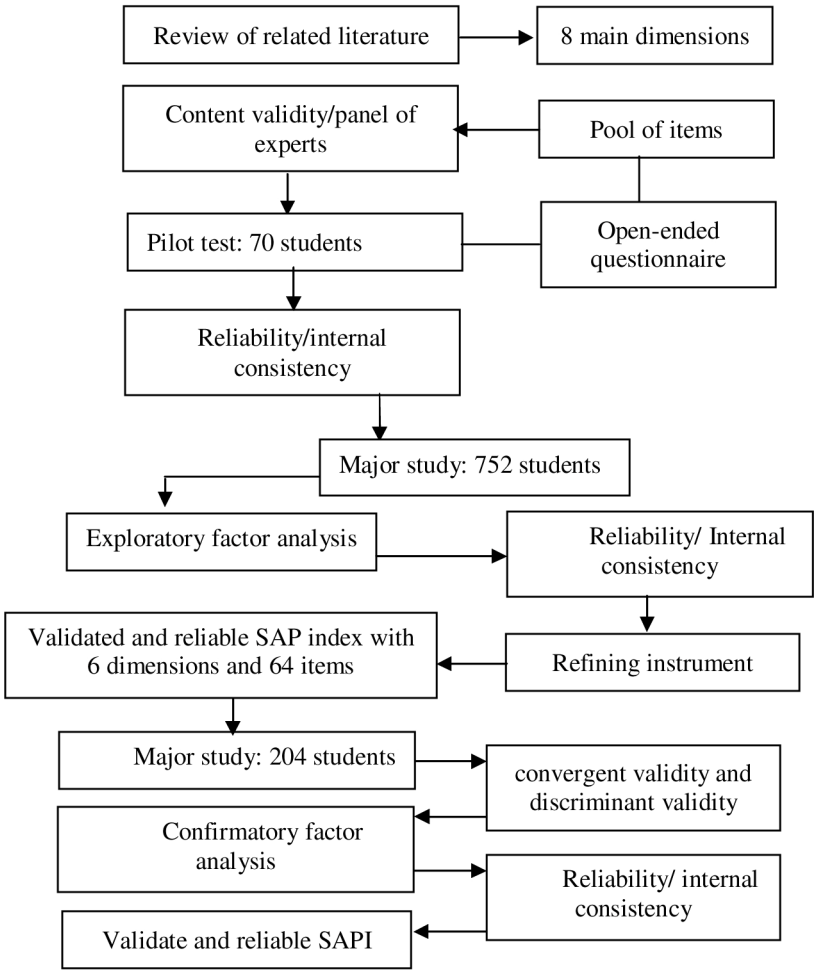

Figure 1: The development process of the SAPI (Student Accommodation Preferences Instrument (adapted from Khozaei *et al*. 2011.)

As can be seen in Figure 1, the development of the SAPI involved several steps. The development began with a critical review of previous studies on housing, and the similarities of residence halls and student housing preferences were critically examined. The factors derived from the literature were listed in the pool of items. The items were then categorized into 8 constructs, visual, facilities, amenities, location, personalization and flexibility of the room, social contact, security and privacy (khozaei *et al*. 2011, 299), which were assumed to represent the similarities between residence halls and private homes. Once the primary draft was complete, it was sent to several experts at Universiti Sains Malaysia (USM) and other universities, six undergraduate and

graduate residence hall students and two statisticians from USM. Based on the experts' suggestions, 5 questions were deleted, and the first version of the instrument, with 69 items, was produced.

In the next step, to examine whether the questions can be understood by students and whether there are questions that lower the reliability of the instrument, a pilot test was conducted. This pilot test was conducted with approximately 10 percent (70 students) of the sample population (Pett *et al* 2003) who were living in any of the residence halls of USM.

The questionnaire was designed on a four-point Likert scale that was constructed as follows: (1) not at all; (2) very little; (3) mostly; and (4) very much. Data were analyzed using PASW Statistics 17, and the internal consistency of the index was determined through the application of Cronbach's alpha, yielding a reliability coefficient from 0.70 to 0.91. Based on the internal consistency of the items, none of the items was deleted in this stage. After conducting the pilot test, the major study was conducted with 752 residence hall students (for more information about the demographics of respondents, please see Khozaei et al. 2011).

4. Exploratory factor analysis

To assess the construct validity of the instrument, an exploratory factor analysis was conducted using the principal component analysis with varimax rotation. The analysis extracted 6 factors that had eigenvalues greater than 1. The total variance explained was 46.55% of the total variance. Therefore, at this stage, the instrument was reduced from 8 dimensions to 6 dimensions: facilities and amenities, visual, convenience of student's room, location, social contact and security (khozaei et al. 2011, 300). In addition, the reliability of each factor was assessed and yielded a high reliability coefficient, from 0.73 to 0.92. Through this process, the validity and reliability of the instrument were tested. The developed instrument was 64 items long with 6 preference factors: facilities and amenities (22 items), visual (14 items), convenience of room (10 items), location (7 items), social contact (6 items) and security (5 items). Because the questionnaire was very lengthy, we attempted to develop a valid and reliable shorter version of the instrument.

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Table 1: Students' demographic backgrounds.

Variable		Valid percentage
Gender	Male	30.4
	Female	69.6
Age	18-20	41.7
	21-23	46.1
	24-26	5.9
	27-29	2.5
	Above 30	3.9
Nationality	Malaysian	88.7
	Indonesian	1.5
	Iranian	2.5
	Iraqi	1.0
	Other	6.4
Race	Malay	50.5
	Indian	4.4
	Chinese	36.3
	Other	8.8
Study level	Undergraduate	84.3
	Master's - research	4.9
	Master's - course work	5.9
	PhD	4.9

5. Confirmatory factor analysis

To conduct the confirmatory factor analysis, another set of data was collected from students living in university residence halls. In total, 204 respondents replied and returned the questionnaires. The demographic makeup of the respondents is presented in Table 1. Two main criteria, validity and reliability, were used to test the measures. Reliability is a test of how consistently an instrument measures a specific concept, and validity is a test of how well an instrument measures the particular concept it is intended to measure (Sekaran & Bougie, 2010). SmartPLS software (http://smartpls.com) (Ringle et al., 2005) was used to assess the validity and reliability of the instrument. Two important construct validities, convergent validity and discriminant validity, were assessed based on the recommendation of Chin (1998). Convergent and discriminant validities can be inferred if the PLS indicators fulfill the following criteria (Lee & Chen, 2010):

(1) the indicators load much higher on their measured construct than on other constructs; that is, the own-loadings are higher than the cross-loadings, and

(2) the square root of each construct's average variance extracted (AVE) is larger than its correlations with other constructs.

Table 2: Results of Validity – Cross Loadings.

	Convenience	Facilities	Location	Security	Social	Visual
CR1	**0.751**	0.519	0.290	0.207	0.244	0.377
CR2	**0.704**	0.486	0.296	0.192	0.188	0.413
CR3	**0.728**	0.446	0.361	0.341	0.203	0.276
CR6	**0.829**	0.410	0.477	0.366	0.201	0.210
CR8	**0.685**	0.346	0.189	0.374	0.357	0.184
FA1	0.449	**0.656**	0.302	0.267	0.198	0.261
FA2	0.431	**0.847**	0.267	0.294	0.318	0.258
FA2	0.460	**0.770**	0.395	0.280	0.207	0.344
FA7	0.465	**0.662**	0.254	0.243	0.163	0.371
FA8	0.385	**0.625**	0.318	0.267	0.237	0.298
L2	0.398	0.224	**0.598**	0.158	0.264	0.256
L3	0.326	0.270	**0.846**	0.290	0.290	0.093
L4	0.415	0.416	**0.871**	0.221	0.353	0.209
L6	0.303	0.295	**0.697**	0.261	0.212	0.261
SC1	0.335	0.346	0.288	**0.777**	0.281	0.177
SC2	0.290	0.270	0.201	**0.709**	0.240	0.141
SC3	0.374	0.316	0.263	**0.927**	0.249	0.195
SC4	0.374	0.316	0.263	**0.927**	0.249	0.195
SO1	0.176	0.252	0.228	0.229	**0.912**	0.164
SO2	0.389	0.309	0.408	0.265	**0.666**	0.124
SO3	0.399	0.312	0.437	0.278	**0.697**	0.172
V1	0.200	0.264	0.095	0.190	0.321	**0.612**
V10	0.191	0.137	0.131	0.192	0.085	**0.740**
V11	0.207	0.231	0.151	0.026	0.110	**0.676**
V12	0.292	0.389	0.201	0.168	0.165	**0.760**
V13	0.155	0.279	0.173	0.054	0.048	**0.640**
V14	0.397	0.343	0.285	0.223	0.221	**0.790**
V5	0.337	0.343	0.117	0.162	0.101	**0.725**

Convergent validity assesses whether a measure is correlated with other measures, whereas discriminant validity assesses whether the measurement for one variable is correlated or not correlated with the measurement for other variables (Lee & Chen, 2010). Table 2 shows the item loadings for their measured constructs. The item loadings on the particular variables (in bold) are

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much higher than their corresponding loadings on the other variables, which indicates adequate convergent and discriminant validity.

Table 3: Results of measurement model.

	Loadings	AVE	CR	Cronbach's α
CR1 Mini refrigerator in room	0.751	0.549	0.859	0.803
CR2 Air conditioner in room	0.704			
CR3 The ability to move furniture and redecorate the room	0.728			
CR6 Potential to divide room into studying, eating and sleeping spaces	0.830			
CR8 Under bed space can be used as storage	0.685			
FA12 24-hour study room	0.656	0.514	0.839	0.801
FA20 Indoor pool	0.847			
FA22 Fitness room	0.770			
FA7 ATM	0.662			
FA8 Storage rooms	0.625			
L2 Close to bus stop	0.598	0.580	0.844	0.778
L3 Close to academic facilities	0.846			
L4 Close to sports facilities	0.871			
L6 Close to university clinic	0.697			
SC1 Requires card access to enter the residence hall	0.777	0.706	0.905	0.861
SC2 Requires card access to enter room	0.709			
SC3 Room doors are equipped with viewing devices	0.927			
SC4 Has 24-hour security staff	0.927			
SO1 Double shared room	0.912	0.587	0.807	0.739
SO2 Has large area for students to gather	0.666			
SO3 Has a sitting room	0.697			
V1 Beautiful exterior and facade	0.612	0.502	0.875	0.840
V10 New or newly renovated	0.740			
V11 Proper natural and artificial lighting in room	0.676			
V12 Good-looking and nice interior in room	0.761			
V13 New or good-condition furniture in room	0.640			
V14 Modern and stylish furniture in room	0.790			
V5 Beautiful and stylish furniture in TV room and other social spaces	0.725			

Note: AVE = Average Variance Extracted, CR = Composite reliability

Table 3 shows the AVE, CR and Cronbach's alpha values for all constructs. As suggested by Hair et al. (2010), we used the factor loadings, composite reliability and average variance extracted to assess convergence validity. The loadings for all items exceeded the recommended value of 0.5

(Hair et al. 2010), with the lowest loading at 0.598 and the highest loading at 0.927. Composite reliability values , which represent the degree to which the construct indicators indicate the latent construct, ranged from 0.839 to 0.905, exceeding the recommended value of 0.7 (Hair *et al*., 2010). The average variance extracted (AVE) measures the variance captured by the indicators relative to measurement error. It should be greater than 0.50 to justify using a construct. The average variance extracted was in the range of 0.502 to 0.706.

Through the above process of confirmatory factor analysis, we reduced the instrument from 60 items to only 28 items, ensuring that there were at least 4 items to measure each construct so that they were over-identified. The 28 items included 6 factors: facilities and amenities (5 items), visual (7 items), convenience of room (5 items), location (4 items), social contact (3 items) and security (4 items). Next, we proceeded to test the discriminant validity. The discriminant validity of the measures (the degree to which items differentiate among constructs or measure distinct concepts) was assessed by examining the correlations between the measures of potentially overlapping constructs. Items should load more strongly on their own constructs in the model, and the average variance shared between each construct and its measures should be greater than the variance shared between the construct and other constructs (Compeau, Higgins & Huff, 1999).

As shown in Table 4, the correlations for each construct were less than the square root of the average variance extracted by the indicators measuring that construct, indicating adequate discriminant validity. In total, the measurement model demonstrated adequate convergent validity and discriminant validity.

Table 4: Discriminant validity of constructs.

Constructs	1	2	3	4	5	6
Convenience (CR)	**0.741**					
Facilities and amenities (FA)	0.575	**0.717**				
Location (L)	0.451	0.408	**0.762**			
Security (SC)	0.410	0.369	0.303	**0.840**		
Social contact (SO)	0.318	0.335	0.371	0.299	**0.766**	
Visual (V)	0.368	0.383	0.227	0.213	0.193	**0.709**

Note: The square root of the AVE is shown on the diagonals

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6. Discussion

Previous studies support a link between housing preferences and the demographic background of residents (Devlin, 1994, Wang & Li 2006). Thus, in studying student housing preferences, demographic background can be a contributing factor. Students in the temporary residences of residence halls are often seen as homogenous groups with similar needs and requirements. However, the reality is that students' needs and requirements are not exactly the same, and students from different backgrounds might have different needs and requirements. However, it is also true that a typical residence hall rarely satisfies all types of students. Thus, the attributes of an adequate residence hall for students must be found in the students' own responses.

Despite the great importance of understanding of students' preferences for residence halls, this area of study has been overlooked. This study attempts to partially fill this gap by developing a user-friendly instrument to examine students' housing preferences. This study is grounded in a previous study by Khozaei et al. (2011) that developed and validated the student accommodation preferences index (SAPI) with 6 dimensions and 64 items. This instrument was developed as a tool for the study of university students' preferences for on-campus residence halls. The conceptual framework of this instrument was based on the similarity between residence halls and private homes. The original version of the SAPI covered a large number of residence hall attributes and provided the researchers with detailed information. Specifically, the facilities and amenities section of the instrument included a wide range of items. The present study aimed to trim the number of items within the same number of dimensions to produce a shorter version of the instrument that remained valid and reliable. Data were collected from 204 respondents using the original version of the SAPI. Confirmatory factor analysis and other analyses were conducted on the data. The result was a validated and reliable version of the SAPI with only 28 items in 6 factors (Figure 2) : facilities and amenities (5 items), visual (7 items), convenience of the room (5 items), location (4 items), social contact (3 items) and security (4 items). Facilities and amenities included 24hour study rooms, indoor pools (especially for women), fitness rooms, ATMs and storage rooms. The dimension of visual preferences included a beautiful exterior and facade, a new or newly renovated building, proper natural and artificial lighting in students' rooms, attractive interior in students' rooms, new or good-condition furniture in students' rooms, modern and stylish

furniture in students' rooms, and beautiful and stylish furniture in the TV room and other social spaces. The dimension of room convenience consisted of 5 items: mini refrigerator in the room, air conditioner in room, the ability to move furniture and redecorate the room, the potential to divide the room into studying, eating and sleeping spaces, and underbed space that could be used as storage. The location dimension included the following items: proximity to the bus stop, academic facilities, university sports facilities, and the university clinic. The social contact dimension consisted of 3 items: a double shared room, a large area for students to gather, and a sitting room for every few rooms. Finally, the security dimension included the following: requires card access to enter the residence hall, requires card access to enter the room, room doors equipped with viewing devices, and 24-hour security.

7. Conclusion

The student accommodation preferences index (SAPI) can provide a basis for further studies on student housing preferences. This instrument will allow researchers to examine and compare students' preferences in different contexts. This study suggests that further studies be conducted on the role of demographic background on students' preferences. Further studies might also examine the most-preferred items of each dimension and compare them among students.

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