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Applying Technology Acceptance Model to measure online student residential management software acceptance

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ABSTRACT

The purpose of this study is to apply the technology acceptance model developed by Davis (1989) to examine the acceptance of online-based Student Residential Management Software by university on-campus housing student residents. The study examines students' experience of using online-based software, which is believed to influence the perceived ease of use, the perceived usefulness, and the behavioural intention to use such software. The results of this study were then compared to the findings of other past studies that had applied and/or tested TAM. The study participants were selected from a university in Western Australia that had implemented Student Residential Management Software and had used it for about two semesters. A total of 227 valid questionnaires were collected, and structural equation modelling was conducted to examine the research hypotheses. The findings provide practical implications for university residential administrators and the developers and designers of residential management software for students. Further, from a theoretical perspective, this study highlights the confirmation of the technology acceptance model in the context of student residential housing management.

Keywords: behavioural intention to use technology, property management software, perceived usefulness, student residential management software, technology acceptance model

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INTRODUCTION

Rental Housing Management software has been used by commercial residential companies in Australia for a relatively long period. Such software helps housing managers (and other stakeholders) to effectively manage housing-related data, improve the efficiency and quality of information management and standardise management (Li and Xiong, 2017). Technology advancement has transformed the property management job from mainly paperwork tasks to more of a strategic position (Halvitigala and Gordon, 2014). The functions performed using rental housing management software include managing tenant databases, rent payments, financial records, vacant properties, maintenance workflow and record keeping; generating various reports; and facilitating communication with tenants and other external entities (Halvitigala and Gordon, 2014).

Further, student housing facilities at universities are adopting or have adopted housing management systems (herein referred to as Student Residential Management Software [SRMS]). Hence, this study was inspired by the installation of an online-based SRMS at Curtin University student housing. The SRMS acquisition process took considerable time, probably because the housing department wanted to ensure that they were selecting the appropriate software. The implementation was completed in October 2017 following a lengthy deliberation period. November 2017 to January 2018 were used as the trial/learning period in readiness for the February intake of students, but the actual learning period was a little longer.

A thorough literature review revealed that substantial research has been conducted regarding student housing and housing management software applications for non–SRMS housing real estate. However, the literature on SRMS acceptance is limited, as discussed in this section. In this regard, Pollock et al. (2003) examined the challenges of using software designed for commercial real estate in a student housing setting. They found that the software lacked sufficient functionalities to support the day-to-day activities of student housing performed by the managing staff. For example, the software was not designed to manage the high student turnover and conference attendees/visitors.

Further, numerous studies (Najib and Abidin, 2011; Navarez, 2017; Sanni-Anibire and Hassanain, 2016; Ulyani et al., 2011) have investigated students' satisfaction with their university/college on-campus housing facilities. Other studies have focused on the demand for student on-campus housing (Ong et al., 2013), the trends and preferences of students regarding student housing (La Roche et al., 2010) and the future of student housing (McBride, 2017).

Moreover, several studies (Easthope, 2014; Gommans et al., 2014; Kirmani et al., 2017; Li and Xiong, 2017) have considered the design and implementation of rental

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property software. These studies collected information from real estate stakeholders, and then translated the information into requirements through analysis and consultation with them. The requirements were then used to develop rental housing management systems that aimed to improve managers' (management team) working experience by standardising most (if not all) management tasks (e.g. rental application process, rental payment control, inspections and rental renewal reminders); another aim was to use the available space/storage more efficiently by reducing the use of paper, which, in turn, would make real estate an environment-friendly business.

In addition, Nandhini et al. (2018) examined the development of rental housing management systems. However, their aim was not only to help managers with their day-to-day tasks, but also to assist potential tenants to find houses for rent/purchase within a specified location. They expected the system to help forge a better relationship between tenants/buyers and real estate entities.

Other studies (Halvitigala and Gordon, 2014; Muir and Burgess, 2019) have investigated the use of rental management systems in the real estate industry. For example, Muir and Burgess (2019) explored the use of digital technology by the commercial real estate sector in three areas: the access to properties, the management of properties and the lived experience. Muir and Burgess noted that some pockets of society are digitally disenfranchised owing to the cost involved in using digital technology; for example, they may be unable to receive updates regarding their rent via a mobile application for a residential management system because they could not afford internet access. Halvitigala and Gordon (2014) revealed that small real estate companies have invested heavily in information technology, and in particular, on residential property management systems.

They found that real estate companies are satisfied with the ability of the residential property management systems to merge mail, store data, grow with the company (scalability) and retrieve information.

Thus, this review shows that many studies have been conducted on the housing sector (both on commercial real estate and student housing). However, to the best of the author's knowledge, there is hardly any research on the acceptance of SRMS in students' on-campus residential housing. In addition, most of the literature on housing management systems has mainly focused on the management/staff side. Thus, this study aims to investigate the acceptance of the SRMS from students' viewpoint.

To address the aforementioned gap, this study employed the technology acceptance model (TAM) of Davis (1989). Structural equation modelling (SEM) was applied to examine and validate the hypothesised relationships related to the perceptions of university on-campus student housing residents regarding the behavioural intention (BI) to use an online-based SRMS.

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The remainder of this paper is structured as follows. The next section describes the theoretical background of the study. Then, the research design section discusses the survey instrument, the research model and the hypotheses, and the sample selection process. The next section presents the results of the data analysis, followed by a section on the key findings of the study. Next, the contribution of the study and its theoretical and practical implications are provided. A discussion on the study's limitations and potential future research directions concludes the paper.

THEORETICAL BACKGROUND

The TAM is the most widely used framework in the information systems (IS) field for investigating the acceptance of information systems/technology (Diop et al., 2019; Durodolu, 2016). TAM development started in 1985 as Davis PhD dissertation. It was developed based on another popular theory termed the theory of reasoned action (TRA; Fishbein, 1967; Fishbein and Ajzen, 1975) in the social psychology field, which explains individuals' behavioural actions based on their behavioural intentions. Thus, the TRA was designed to explain human actions in general, whereas the TAM was designed to explain users' acceptance of information systems/technology (Davis, 1989).

The TAM posits that people's actual use of a technology system is influenced by how useful the technology is (or will be) to their task(s) and how easy to use the technology is (or will be). According to the TAM, the actual use of technology is determined by the behavioural intention to use (BIU).

In turn, behavioural intention is determined by both attitude towards using technology and perceived usefulness (PU), such that perceived usefulness not only influences behavioural intention but also directly influences the attitude towards using technology. In addition, perceived ease of use (PEU) has a direct influence on both perceived usefulness and attitude towards using technology.

The TAM also suggests that external factors influence the perceived usefulness and the perceived ease of use, which, in turn, affects the intention to use technology and the actual use of technology (Abdullah and Ward, 2016).

Venkatesh and Davis (1996) reasoned that to understand technology acceptance and usage, it is important to study and understand the external factors (antecedents) that help to shape the two main constructs of TAM, perceived usefulness and ease of use.

Figure 1 depicts the original TAM (Davis, 1989). According to Davis (1989), perceived usefulness is 'the degree to which a person believes that using a particular system would enhance his or her job performance' p. 320 and perceived ease of use is 'the degree to which a person believes that using the system will be free of effort' p. 320.

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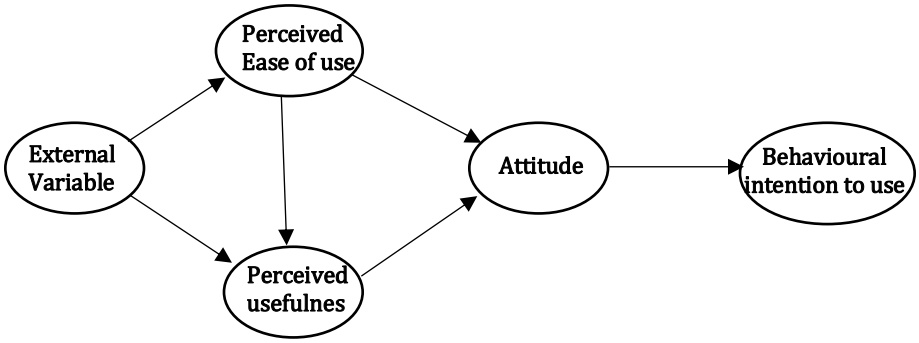
The TAM is considered a mature model for investigating and explaining technology adoption and usage (Lane and Stagg, 2014). Its validity has been proved empirically for a wide range of technologies in numerous studies (Al-Ghaith, 2015; Alharbi and Drew, 2014; Wu and Wang, 2005).
Despite its wide use in the IS field, the TAM has hardly been used to predict and explain SRMS usage.

Figure 1. Technology Acceptance Model (TAM) (Davis, 1989)



RESEARCH DESIGN

Survey Instrument

A survey instrument was developed based on the original TAM presented in Figure 1. The instrument has a total of 28 items divided into two main sections. Section 1 consists of items that gathered data on the demographic characteristics of the respondents. It contains seven items, namely, gender, age, the level of education, the course of study enrolled, the level of experience on using online-based software, whether respondent is a native English speaker and the level of English proficiency for non-native speakers.
Section 2 was constructed using various TAM constructs found in the literature. This approach helped to ensure that content validity was achieved. Section 2 has 21 items measured in accordance with the original TAM (see Figure 1).
The measured items are perceived ease of use (seven items), perceived usefulness (nine items), attitude towards usage (two items) and behavioural intention to use (three items). In line with published TAM instruments in the literature, the constructs asked respondents to indicate a degree of agreement. A five-point Likert

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scale ranging from 'Strongly disagree' to 'Strongly agree' was adopted for respondents to indicate their responses. The items were then re-evaluated and repeating and/or ambiguous items were eliminated.

According to Davis (1989), the validity of a measurement scale should be built from the outset, instead of testing for validity after constructing the instrument. To ensure that the content validity of the scales is attained, the instrument items must represent the concept using which generalisations are to be made (Amoroso and Hunsinger, 2009). One way of ensuring content validity is through pretesting an instrument. Pretesting survey instruments helps to minimise the likelihood of constructs been misinterpreted, hence improving accuracy of the respondents' responses

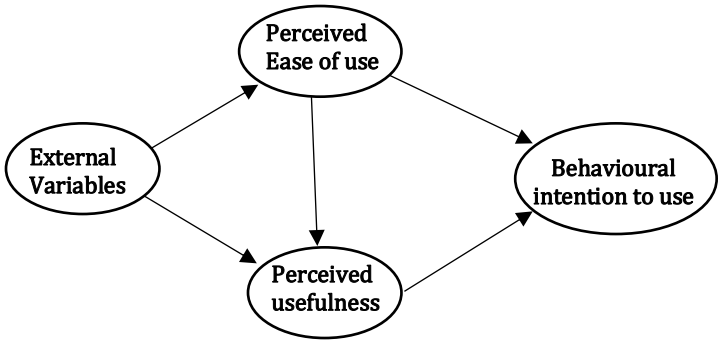
(Hilton, 2017). To establish content validity, the instrument was pretested by seven on-campus student residents. Then, the items were modified as appropriate based upon these respondents' responses, comments and views expressed in a set of informal discussions.

Informal discussions were used to make respondents feel relaxed and free to express their opinions.

Research Model

The research model was developed based on the principal component analysis (PCA) explained in section 4.2 with the three retained components. In the research model, users' experience is treated as an external variable where it is expected to influence perceived ease of use and perceived usefulness. Perceived ease of use is said to influence perceived usefulness, whereas behavioural intention to use the SRMS is influenced by both perceived ease of use and perceived usefulness (EXP=>PEU; EXP=>PU; PEU=>PU; PEU=>BIU; PU=>BIU). Figure 2 depicts the model adopted for this research

Figure 2. Research model



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The model reliability was assessed for each TAM measure using Cronbach's alpha (Cronbach, 1951, 1988). All the three retained components exhibited excellent internal consistency by exceeding the recommended minimum reliability level of 0.70 (Nunnally, 1975), indicating that the construct reliability was acceptable. The calculated Cronbach alpha were PEU = 0.83, PU = 0.92, BIU = 0.92. This also indicated that the items in each component had only one underlying construct (Hair et al., 2014).
In addition, the composite reliability of the model was assessed. According to Hair et al. (2014), composite reliability measures the internal consistency of the measured items that represent a latent construct. The value of the composite reliability of the latent variables ranged between 0.85 and 0.92 (PEU = 0.85, PU = 0.92, BIU = 0.92). These values exceeded the recommended acceptable limit of 0.70, indicating acceptable composite reliability.

Convergent validity and discriminant validity were used to measure the validity of the measurement model. Convergent validity was measured by assessing the average variance extracted (AVE) for each latent variable. The AVE values were all above the threshold value of 0.50, indicating convergent validity (Hair et al. 2014). The calculated AVE values were PEU = 0.53, PU = 0.66 and BIU = 0.70.
To examine discriminant validity, the latent variable correlations were compared with the square root of the AVE from the individual factors (Fornell and Larcker, 1981). Table 1 shows the latent variable correlations and the square root of the AVE. The square root of the AVE is shown diagonally on the table. All the square roots of the AVE were greater than the latent variable correlations, indicating discriminant validity.

Table 1. Latent Variable Correlation

	PEU	PU	BIU
PEU	**0.731**		
PU	0.481	**0.814**	
BIU	0.614	0.621	**0.837**

Hypotheses

Based on the research model, eight hypotheses were developed in line with the literature. The hypotheses are presented in the next seven subsections.

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Experience and Perceived Ease of Use

Experience is 'the best-studied moderator variable in TAM' (King and He, 2006, p. 747). Several studies (Amoroso and Hunsinger, 2009; Lane and Stagg, 2014; Lee et al., 2013; Zabukovsek and Bobek, 2013) have investigated experience as an external factor in relation to technology acceptance and/or usage. Experience was found to positively influence the perception of ease of use by Hackbarth et al. (2003) and Lane and Stagg (2014). Hackbarth et al. (2003) studied spreadsheet adoption and usage, whereas Lane and Stagg (2014) studied the adoption of iPads by university staff. The findings from these studies indicate that the experienced users of a particular technology are more likely to find that, or a similar, technology easier to use. However, Zabukovsek and Bobek (2013) found that the influence of experience on perceived ease of use was not significant. Of note, they studied the influence of experience on ease of use through the conceptual factor, personal characteristics and information literacy (PCIL). They examined organisations' adoption and use of ERP. In this study, experience is defined as the experience a user of the SRMS has with online-based software/applications. Thus, it is hypothesised that

H1: Experience in using online-based software would positively influence the perception of ease of use of a web-based SRMS.

Experience and Perceived Usefulness

Several researchers (Abdullah and Ward, 2016; Amoroso and Hunsinger, 2009; Lymperopoulos and Chaniotakis, 2005) studied the influence of experience on the perceived usefulness of technology.
Abdullah and Ward (2016) proposed a general extended TAM for e-learning, Amoroso and Hunsinger (2009) studied the acceptance of internet technologies by consumers and Lymperopoulos and Chaniotakis (2005) studied the factors affecting the acceptance of the internet as an intelligent marketing tool.
Although Amoroso and Hunsinger (2009) did not find a significant relationship between experience and perceived usefulness, Lymperopoulos and Chaniotakis (2005) and Abdullah and Ward (2016) found experience to positively influence perceived usefulness. Thus, it is hypothesised that

H2: Experience in using online-based software would positively influence the perceived usefulness of a web-based SRMS.

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Perceived Ease of Use

As stated earlier, perceived ease of use refers to users' perception of the amount of effort they expect will be required in learning and using a new technology. Past studies (Alharbi and Drew, 2014; Amoroso and Hunsinger, 2009; Farahat, 2012; Saade at el., 2007) have suggested that the perceived ease of use of technology directly influences its perceived usefulness, the attitude towards using technology and the behavioural intention to use technology. In turn, the behavioural intention to use technology influences the actual technology use. Davis at el. (1989) found that perceived ease of use influences usage through its influence on perceived usefulness through the attitude towards using the internet. Regarding the behavioural intention to use technology, Davis et al. (1989) revealed that the perceived ease of use has a direct influence on individuals' intentions to use computers. Similarly, Alharbi and Drew (2014), Amoroso and Hunsinger (2009) and Farahat (2012), Rafique et al. (2020) found that perceived ease of use influences users' intention to use online-based systems. Hossain et al. (2017) also found that perceived ease of use influences perceived usefulness but does not significantly influence users' intention to use online-based technology. Despite opposing findings regarding the influence of perceived ease of use on other constructs, in this study perceived ease of use is considered an essential construct of TAM, and as suggested by King and He (2006), perceived ease of use has a direct influence on the behavioural intention to use an online-based technology/system.
Thus, it is hypothesised that

H3: Users' *perceived ease of use* of the web-based SRMS *has a significant positive influence on their perceived usefulness* of this SRMS.

H4: Users' *perceived ease of use* of the web-based SRMS has a significant positive influence on their behavioural intention to use this SRMS.

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Perceived Usefulness

Perceived usefulness refers to users' perceptions regarding whether a particular technology would improve their performance when performing their job-related duties (Davis et al., 1989). In the context of this study, perceived usefulness is considered the ability of SRMS to reduce the amount of time it would have taken a student to complete a student–housing related task, such as paying rent, reporting maintenance, submitting a condition property report, booking/reserving equipment and updating their details. For example, if a refrigerator stops working late at night (when students were completing an assignment), they could report the incident immediately instead of having to wait until 8:30am the next morning when they may also be supposed to be in class. Users' behavioural intention to use technology is significantly influenced by their perceived usefulness of the technology in accomplishing their duties (Lee et al., 2013). Therefore, perceived usefulness is regarded as an important indicator for predicting the user's technology acceptance (Camille et al., 2020; Davis, 1989; Hsu and Lu, 2004; Lee et al., 2013; Venkatesh and Davis, 2000). Therefore, it is hypothesised that:

H5: Users' *perceived usefulness* of the web-based SRMS *has a significant positive influence on their behavioural intention* to use this SRMS.

The influence of Gender on Perceived Ease of Use, Perceived Usefulness

Previous studies (Akinbobola and Adeleke, 2016; Amoroso and Hunsinger, 2009; Calisir et al., 2009; Gefen and Straub, 1997; Ma, 2010; Venkatesh and Morris, 2000) have examined the influence of gender on the adoption and usage of technology with varying results. Ma (2010) revealed that men place a greater emphasis on perceived ease of use in relation to perceived usefulness than women do, whereas women place greater emphasis on perceived ease of use in relation to intention to use than men do. In examining gender differences in the perception and use of email services, Gefen and Straub (1997) found that the perceptions of technology differed between men and women; men rated perceived ease of use higher than women did. Further, Venkatesh and Morris (2000) found that men's decision to use a particular technology was heavily influenced by their perception of usefulness of the technology, whereas women's decision was influenced by their perception of ease of use and subjective norms. However, gender was found to have no influence on perceived ease of use in studies by Akinbobola and Adeleke (2016) and Alfadda and Mahdi (2021). It is thus hypothesised that:

H6: Men will rate the perceived ease of use of the web-based SRMS higher in relation to its perceived usefulness than women will.

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H7: Women will rate the perceived ease of use of the web-based SRMS higher in relation to the intention to use it than men will.

Several researchers (Akinbobola and Adeleke, 2016; Amoroso and Hunsinger, 2009; Gefen and Straub, 1997; Sun, as cited by Amoroso and Hunsinger, 2009, p. 55) have investigated the relationship between gender and perceived usefulness of technology. Gender is said to mediate perceived usefulness and user acceptance (Sun, as cited by Amoroso and Hunsinger, 2009, p. 55). According to Akinbobola and Adeleke (2016), gender is among a group of factors that together positively influence perceived usefulness. In contrast, Amoroso and Hunsinger (2009) and Alfadda and Mahdi (2021) did not find gender to have an influence on perceived usefulness. Gefen and Straub (1997) found that there is a difference in the perception of technology usefulness between women and men, in that women value perceived usefulness more than do men. Venkatesh and Morris (2000) found that men valued perceived usefulness more than women did when deciding to use a new technology. As a result, in this study it is hypothesised that

H8: Men will rate perceived usefulness of the web-based SRMS higher than women will in relation to the behavioural intention to use SRMS.

Population Sample/sampling

In a perfect world, researchers would prefer to use the entire population of interest, but in most cases, it is impossible for various reasons (Etikan et al., 2016). A population is the complete list of all the subjects of interest for a study (Donley, 2012). Sampling is the process of selecting a portion of the entire population of interest (Burns, 2000). This study used opportunity (also known as convenience) sampling to recruit its participants. It is widely used in social science research (Adapa and Cooksey, 2013; Alharbi and Drew, 2014; Amoroso and Hunsinger, 2009; Davis, 1989; Gao et al., 2011; Hossain et al. 2017; Lin and Wu, 2002). Opportunity sampling is a nonprobability sampling technique in which the sampling elements are selected through procedures other than mathematical random procedures (Neuman, 2006). In this study, the target population sample obtained had to meet the following practical criteria: (a) a Curtin University on-campus resident; (b) geographical proximity (i.e. the student resident had to be in Perth in the vicinity of the on-campus housing at the Curtin University at some point when the survey was conducted); (c) availability (i.e. the student resident had the time to complete the survey); and (d) the willingness to participate in the study. The main reason for using the nonprobability sampling technique is that the researcher had to follow the guidelines/protocol attached (stated in the permission letter) to the permission for recruiting participants by the Associate Director of Housing services. The researcher was instructed that the 'survey form must be

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located in the Common Room of the residence' and that the survey information should be made available to student residents, who then could individually choose to participate or not.

Therefore, in an attempt to recruit as many participants as possible, the information calling for student residents to participate in the survey was made available via common room notice boards, individual housing Facebook pages and word of mouth. As a *token* of appreciation for *participants'* time, each *survey participant* was awarded two mini chocolate bars upon returning a completed questionnaire.

As per the guidelines, from 10 October 2018 to 4 November 2018, a total of 327 survey packs were placed in the student residents' housing's common rooms. A return box was also placed next to the survey packs for students to return their completed questionnaires, akin to casting a vote into the ballot box. Of the 327 questionnaires distributed, 230 were returned. Three questionnaires were returned unanswered or partially answered and hence were deemed unusable for the purpose of this research. The three unusable questionnaires were removed from the initial 327 distributed, resulting in 324 actual distributed questionnaires.

Therefore, the response rate (227 from 324 questionnaires) for usable questionnaires was 70%. This response rate was significantly high for an IS survey (Segars, 1997).

The characteristics of the sample respondents are provided in Table 2.

DATA ANALYSIS AND RESULTS

Demographics of the Survey Respondents

Among the respondents, 59% were female and 39.6% male; 0.9% identified themselves as neither female nor male (see Table 2). The gender representation of the respondents is representative of the gender distribution of higher education students in Australia, where 57% of higher education students are female (Australian Bureau of Statistics, 2014). Most of the respondents (88%) were in the 'Less than 25' age category, which is consistent with the studied population. Almost every respondent (92%) had at least moderate experience in using online-based software/applications.

Instrument Construct Validity

The 21 items of the TAM scale were subjected to principal component analysis (PCA) using SPSS version 26. Prior to performing the PCA, the suitability of data for factor analysis was assessed. The inspection of the correlation matrix revealed the presence of many coefficients of .3 and above.

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The value of the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 92, which is in the marvellous range according to Kaiser and Rice's (1974) evaluation guiding table, and Bartlett's Test of Sphericity (Bartlett, 1951, 1954) reached statistical significance ($p < .001$), supporting the factorability of the correlation matrix.

The PCA revealed the presence of four components with eigenvalues exceeding 1, explaining 48.85%, 9.95%, 7.41% and 4.97% of the variance, respectively. An inspection of the scree plot revealed a break after the third component. To assist in the interpretation, the oblimin rotation was performed. The rotated solution revealed the presence of a simple structure (Thurstone, 1947), with three components showing many strong loadings and most of the variables loading substantially on only one component. Five variables (PU2, PU6, PEU2, PEU4, and PEU6) cross-loaded on more than one component with a difference of less than 0.2. Therefore, these variables were dropped (Gänswein, 2011; Ismail and Yusof, 2010).

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Table 2. Demographics of Respondents

Demographics	Amount	Percentage
Gender		
Female	134	59.0
Male	90	39.6
Other	2	0.9
Age		
< 25	200	88.1
25–30	25	11.0
31–39	2	0.9
40–49	0	0
≥ 50	0	0
Education		
English course	1	0.4
Bridging course	4	1.8
Diploma	13	5.7
Undergraduate	188	82.8
Postgraduate	11	4.9
Research (Master or PhD)	10	4.4
Experience in using online-based applications		
Low	18	7.9
Moderate	207	91.2
High	2	0.9

A second PCA was performed on the remaining 16 items of the TAM scale using SPSS version 26. Many coefficients were above .3, the KMO value was 91 and Bartlett Test of Sphericity was statistically significant ($P < 001$); hence, the data were considered suitable for factor analysis. Three components were retained following an inspection of the item loadings (see Table 3). The highest loading items on each component were identified and were used to name the components

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(Pallant, 2011). The three components were termed Perceived Ease of Use (PEU), Perceived Usefulness (PU) and Behavioural Intention to Use (BIU).

Table 3. Pattern Matrix

	Component		
	PEU	**PU**	**BIU**
PEU6	.846		
PEU1	.826		
PEU2	.818		
PEU5	.783		
PEU4	.737		
PEU3	.722		
PU5		−.892	
PU1		−.877	
PU8		−.872	
PU3		−.757	
PU9		−.632	
BIU1			.828
BIU2			.699
PU2			.684
BIU3			.661
PU6			.590

Structural Model Analysis

SEM was performed to test the fit between the research model (Figure 2) and the obtained data. The SEM and the model testing analysis were performed using AMOS 26. For the overall model, the data supported most of the individual causal paths hypothesised using the TAM, with exception of the EXP influence on PEU and the EXP influence on PU. PEU had a direct and significant effect on PU, with a standard path coefficient of 0.49 ($p < 0.001$). PEU also had

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a direct and significant effect on residents' intention to use SRMS, with a standard path coefficient of 0.41 ($p < 0.001$). PU had a significant direct positive effect on residents' intention to use SRMS, with a standard path coefficient of 0.42 ($p < 0.001$). As already stated, the influence of EXP on PEU and PU was not statistically significant.

The model was then analysed using female-only and male-only data to ascertain the gender differences in the effect of each construct in the model. Similar to the path results for the complete sample data, the influence of EXP on PEU and PU in the model for both datasets was not statistically significant. However, compared with men, women placed slightly more emphasis on PEU in determining PU (with path coefficient 0.47 for women; 0.43 for men). Conversely, men weighted PU strongly in determining the behavioural intentional to use (BIU) the SRMS than women did (0.50 for men; 0.31 for women). Men also weighted PEU strongly in determining the behavioural intentional to use (BIU) the SRMS than women did. However, the difference was not as pronounced as in the case of PU and BIU, with 0.44 for men and 0.41 for women. Table 4 provides a summary of the path coefficients for each causal path in the models.

Table 4. Comparison of Path Coefficients between Female and Male Participants

			Females	Males	Significance level
PEU	<---	EXP	0.04	0.06	Not supported
PU	<---	PEU	0.471	0.429	Supported
PU	<---	EXP	0.022	0.06	Not supported
BIU	<---	PU	0.306	0.499	Supported
BIU	<---	PEU	0.411	0.441	Supported

DISCUSSION OF KEY FINDINGS

This section discusses the key findings of this study based on the eight hypothesised relationships tested in the research model. Four hypotheses (out of eight) are supported, two are not supported and two are statistically not significant. Table 5 summarises the results of the first five hypothesis testing.

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Table 5. Hypotheses Testing Results

No.	Hypotheses	*T* value	Significance level
H1:	Experience in using online-based software would positively influence the perception of ease of use of a web-based SRMS.	0.355	0.722 (not significance)
H2:	Experience in using online-based software would positively influence the perceived usefulness of a web-based SRMS.	0.042	0.967 (not significant)
H3:	Users' *perceived ease of use* of the web-based SRMS *has a significant positive influence on their perceived usefulness* of this SRMS.	6.137	*** (supported)
H4:	*Users' perceived ease of use* of the web-based SRMS has a significant positive influence on their behavioural intention to use this SRMS.	5.763	*** (supported)
H5:	Users' *perceived usefulness* of the web-based SRMS *has a significant positive influence on their behavioural intention to use* this SRMS.	5.735	*** (supported)

H1: The finding that experience was not statistically significant was in contrast to that of Hackbarth et al. (2003) and Lane and Stagg (2014), who found experience to positively influence the adoption of spreadsheets and iPads, respectively. By contrast, this finding supports Zabukovsek and Bobek's (2013) finding that the influence of experience on the perceived ease of use is not significant in adopting and using technology. This finding for H1 may be indicative of how easy to use the SRMS application is, such that even users with no experience were able to use it properly. This finding is also supported by the range of respondent responses for PEU (3.9 to 4.2) on a 5-point Likert scale.

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H2: This finding confirms that of Amoroso and Hunsinger (2009), who found that there was no significant relationship between experience and perceived usefulness, but it is in contrast with the findings of Lymperopoulos and Chaniotakis (2005) and Abdullah and Ward (2016).

H3: This hypothesis was supported with a *t*-value of 6.137 and a strong level of significance. This finding corroborates those of Hossain et al. (2017), who also found that the perceived ease of use influences perceived usefulness. One way of interpreting this finding is that users are able to observe the usefulness of the web-based SRMS in accomplishing their tasks if/when the web-based SRMS is not difficult to use or is completed.

H4: This hypothesis was supported with a *t*-value of 5.763 and a strong level of significance. This finding is consistent with those of previous studies (Alharbi and Drew, 2014; King and He, 2006) that also found that the perceived ease of use has a direct influence on the behavioural intention to use online-based technologies/systems. This finding suggests that users might be more willing to use a technology if they believe that it is easy to use. Judging from the respondents' responses, SRMS was easy to use (with the average rate ranging from 3.9 to 4.2), and hence, they indicated that they were willing to use it in the future (BIU average range was from 3.6 to 3.9).

H5: This hypothesis was supported with a *t*-value of 5.735 and a strong level of significance. The findings regarding H5 show that perceived usefulness positively influences on-campus university residents' behavioural intention to use (BIU) a web-based SRMS. This finding is consistent with those of previous studies that found the behavioural intention to use technology is influenced directly by users' perceived usefulness and users' intention to use a technology (Lin and Wu, 2002; Saade et al. 2007; Van der Heijden, 2004). On observing the range of the respondents' responses regarding perceived usefulness (3.46 to 3.86), although it is not as high as those of perceived ease of use, still it suggests that residents found SRMS useful in dealing with residential matters.

The data were then grouped into female and male groups for further analysis. The analysis results for the two groups were then compared to determine whether the hypotheses were supported. Table 6 summarises the results of the gender-based hypothesis testing (H6 – H8). A Chi-square test was also performed to determine whether there is a connection between variables at 1% level of significance.

H6: The data did not support this hypothesis. The finding regarding H6 shows that university on-campus female residents rated perceived ease of use (PEU) slightly higher than did university on-campus male residents in relation to perceived

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usefulness (PU). Perceived ease of use explains 47% of the PU web-based SRMS, whereas only 43% of PU is explained by ease of use for men.

H7: The finding regarding this hypothesis shows that behavioural intention to use (BIU) a web-based SRMS of 41% of women was influenced by perceived ease of use (PEU), whereas the behavioural intention to use a web-based SRMS of 44% of men was influenced by perceived ease of use. Therefore, this hypothesis was not supported by the data. This finding provides support to Gefen and Straub (1997), who identified that men rated perceived ease of use higher than did women. However, it contrasts with the finding of Venkatesh and Morris (2000) that women's decision to use technology is influenced by ease of use more than is that of men.

Table 6. Gender-based hypotheses Results

No.	Hypotheses	*T* value	Significance level
H6: (Male)	Men will rate the perceived ease of use of the web-based SRMS higher in relation to its perceived usefulness than women will.	3.45	*** (not supported)
(Female)	Men will rate the perceived ease of use of the web-based SRMS higher in relation to its perceived usefulness than women will.	4.438	*** (not supported)
H7: (Male)	Women will rate the perceived ease of use of the web-based SRMS higher in relation to the behavioural intention to use it than men will.	4.338	*** (not supported)
(Female)	Women will rate the perceived ease of use of the web-based SRMS higher in relation to the behavioural intention to use it than men will.	3.966	*** (not supported)
H8: (Male)	Men will rate the perceived usefulness of the web-based SRMS higher than women will in	4.361	*** (supported)

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	relation to behavioural intention to use SRMS.		
(Female)	Men will rate the perceived usefulness of the web-based SRMS higher than women will in relation to the behavioural intention to use SRMS.	3.131	*** (supported)

H8: The data supported this hypothesis where it was found that men rated perceived usefulness (PU) strongly in determining behavioural intentional to use (BIU) web-based SRMS than did women. A chi-square test of independence was performed to examine the relation between gender and perceived usefulness. The relation between these variables was significant, χ^2 (1, N = 225) = 8.25, p = .0041. Perceived usefulness explains 50% of the behavioural intention of men to use (BIU) a web-based SRMS, whereas only 31% of BIU of women is explained by ease of use. This finding supports that of Venkatesh and Morris (2000), who found that men tend to value perceived usefulness more than do women when deciding to adopt and use technology.

CONTRIBUTION

This study applied a modified TAM in the Australian university student housing context to investigate the behavioural intention to use (acceptance of) the SRMS from students' point of view. Results of this study were then compared to the findings of the past studies that had used TAM.

The results enhance the external validity of the constructs proposed in the original model. The study adapts the main constructs of the TAM in PU and PEU to measure BIU. In addition, it investigates the influence of experience as an external factor to PU and PEU. Similar to other studies, the findings of this study confirm the influence of PEU on PU, PEU on BIU and PU on BIU. However, unlike some previous studies, it shows no relationship between experience and both PEU and PU.

Further, this study highlights the confirmation of the TAM from the theoretical perspective in the context of student residential housing management.

Thus it provides a useful literature review for others who wish to study TAM in other settings. From a practical viewpoint, universities' residential administrators and software developers could use the model and its findings.

These administrators can use the findings to understand the factors that influence students' usage of residential management software and thus adopt software that is both user-friendly and useful to students if they want the software to be utilised by

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the majority of their on-campus residents. The implication of this study for developers and designers is that it is important to ensure that residential management software/applications for university-based houses are useful and easy to use so that students/residents do not have to spend too much time on understanding how to use the application.

LIMITATIONS AND FUTURE RESEARCH

The findings of this study must be considered in light of its limitations. This study is based on individual perceptions, which, at best, are respondents' estimations that may not reflect objective reality. This study is a snapshot of university on-campus residents' behavioural intentions to use SRMS and was conducted in a short period. Therefore, the results may (or may not) differ if a similar study is conducted over a longer period. For example, the effect of perceived ease of use and perceived usefulness on behavioural intention to use SRMS are almost the same at PEU 0.41 and PU 0.42, and hence, it will be interesting to observe whether this remains the same over time.

In particular, Davis et al (1989) noted that results differed over time, such that the influence of PEU on BIU decreased over time.

Hence, future studies should use longitudinal data and/or be conducted on multiple student housing units across multiple universities. Research on how other variables (such as language, especially since student housing units have a large number of residents for whom English is not the first language) relate to perceived ease of use, perceived usefulness and perceived behavioural intention to use SRMS would be useful. The study was confined to residents of houses of one campus of the Curtin University. Future work could extend this research to other campuses and other universities and provide further validation of the TAM for investigating the behavioural intention to use (acceptance of) the SRMS from both staff and students' viewpoints.

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