# Predicting the Acceptance of Unit Guide Information Systems

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## Abstract

*Information Systems can play an important role in ensuring and improving the quality of education provided. However, lack of acceptance of these information systems and resistance of technology innovations by the end users limit the expected benefits of the system. This research attempts to identify the key determinants for the acceptance of the Unit Guide Information Systems (UGIS) in the Australian higher education sector. The technology acceptance model (TAM), social cognitive theory (SCT) and model of PC utilization (MPCU) are combined to provide a new framework for this analysis. Results of the study are consistent with the technology acceptance factors for explaining the behavioural intention of the academics. The study also shows the effects of application specific self-efficacy, application specific anxiety and social influence on the acceptance of UGIS. Implications of the results are discussed within the context of unit guides and curriculum mapping.*

**Keywords**

Anxiety, Self-Efficacy, Social Influence, Technology Acceptance, Unit Guides.

## INTRODUCTION

There is increasing pressure in the Higher Education (HE) sector to ensure that universities equip students with the knowledge and skills that will make them valuable members of organisations and society. In addition to the acquisition of knowledge relevant to their domain of study and their future careers, standard bodies such as the Tertiary Education Quality and Standards Agency (TEQSA), professional bodies and employers are expecting graduates to exhibit qualities, skills and understandings such as communication skills, critical thinking, team work, creativity, ethics and social responsibility. These are currently most commonly referred to as *graduate attributes* (GAs) but have also been called: key competencies; transferable skills; generic skills; employability skills (Curtis and McKenzie 2001); soft skills (BIHECC 2007; Freeman et al. 2008); graduate capabilities (Bowden et al. 2002); and generic graduate attributes (Barrie 2004; Bowden et al. 2002).

To ensure that a program of study delivers graduates with the appropriate knowledge and competencies, universities are conducting *curriculum mapping*. Curriculum mapping ensures correspondence between learning outcomes (LOs), learning activities (LAs) and assessment tasks to measure and provide evidence that graduates have attained the intended LOs and GAs appropriate to their discipline and qualification levels (Cleary et al. 2007). This information is often contained in a Unit Guide (UG). A UG outlines the unit content, its learning objectives, assessments and rules governing the teaching and learning in that unit. Additionally they tend to include other components such as teaching staff details and teaching activities and learning resources. They may be known under many different names such as course/unit outlines, study guides, course guides, unit plan, course finder, syllabus, learning guide or course/unit catalogue.

To support the complex activity of curriculum mapping and to address existing adhoc practices and problems associated with unit guides (UGs) such as knowledge loss, duplication of effort and curriculum gaps (Jones 2009), many institutions are introducing a new class of information systems (IS) to support the development of UGs. These systems are usually bespoke applications with institution specific names. More generally they may be called Unit Guide Tools or Curriculum Mapping Tools (Oliver and Whelan 2010). For this study, we are calling such systems *Unit Guide Information Systems* (UGIS). A key motivation for UGIS is to improve and assure the quality of the education provided. To achieve this important goal, the UGIS must include appropriate functionality and controls and the intended users must utilise the tool. While most institutions have systems in place to handle UG, a central computer-based system UGIS are just emerging. At many institutions, including our own, a UGIS to support the development of UGs and manage curriculum mapping will be deployed across the university in second semester in 2012. Some institutions already have systems in place e.g. GAMP

(Graduate Attribute Mapping Program) at Murdoch; CPM (Curriculum Program Mapping) at UQ; CCMAP (Curtin Curriculum Mapping) at Curtin and ReView at UTS. Many other institutions do not have a UGIS in place yet. Given the newness of these systems, it is not surprising that the acceptance of UGIS has not been previously studied. Due to the importance of these systems and their novelty when compared to other education-based systems, the objective of this study is to fill the above identified gap. Our study asks the following research questions:

1. What features do UGIS contain/need?
2. Can we create a Technology Acceptance Model (TAM) to predict acceptance of UGIS?

In the following section we review relevant literature and theories on technology acceptance. Following that we present our research method, hypotheses and the Technology Acceptance Model for Unit Guide Information Systems (TAMUGIS). Then, survey results are presented followed by discussion, limitations and conclusions.

## LITERATURE REVIEW

Universities in Australia are investing a substantial amount of financial and human capital towards developing and implementing technology solutions that will help them to achieve their organizational objectives. Technology acceptance in the educational setting has been studied extensively examining different aspects of technology acceptance using a variety of theoretical perspectives (El-Gayar et al. 2011; Park 2009). We introduce several of the attitude-intention based theories that have been used to explain different technology acceptance scenarios.

### Technology Acceptance Model (TAM)

Among the well-known models related to technology acceptance and use is the technology acceptance model (TAM), originally proposed by Davis in 1986. TAM has been proposed as an adaptation of the theory of reasoned action (TRA) to specifically explain technology usage behaviour (Legris et al. 2003). Davis (1989) and Davis et al. (1989) proposed TAM to explain why a user accepts or rejects information technology (IT) by adapting TRA. TAM provides a foundation to show how external variables influence belief, attitude, and intention to use. The original TAM (Davis 1989) shows the two particular beliefs posited by TAM: perceived usefulness (PU) and perceived ease of use (PEOU). Perceived usefulness/PU (performance expectancy) is defined as the potential user's subjective likelihood that using a specific information system would increase his/her job performance within an organisational context. Perceived ease of use/PEOU (effort expectancy) refers to the degree to which the potential user expects the target system to be effort free.

Although by design TAM is generic to user acceptance of technology and supported considerably by empirical studies (Hu et al. 2005; Venkatesh and Davis 2000), it has been criticized for its parsimony. To address this issue, several model extensions (TAM2, UTAUT-unified theory of acceptance and use of technology and TAM3) have been attempted (Riemenschneidera et al. 2003; Venkatesh and Bala 2008; Venkatesh et al. 2003).

### Social Cognitive Theory (SCT): Self-Efficacy and Anxiety

Usually, in addition to perceived usefulness and perceived ease of use, some other constructs from related theories were included into the TAM. Among these constructs *self-efficacy* and *anxiety* is studied frequently with respect to the social cognitive theory (Chin and Todd 1995; Hsu et al. 2008; Irani et al. 2009; Kotrlik and Redmann 2009; Shah et al. 2011; Taylor and Todd 1995a; Taylor and Todd 1995b; Venkatesh 2000). In line with the literature, for this research we have used UGIS specific self-efficacy and UGIS specific anxiety to capture the internal control and the emotional aspect of the technology acceptance and usage.

*Self-Efficacy* The dictionary meaning of self-efficacy (SE) is people's judgments of their capabilities to perform a given task. But in technology acceptance literature (Agarwal et al. 2000; Marakas et al. 1998; Venkatesh 2000; Venkatesh and Davis 1996) computer self-efficacy (CSE) is a multi-level construct operating at two different levels (1) At the general computing level (general CSE) and (2) At the specific application level (application-specific self-efficacy). *General CSE* is defined as an individual's judgment of efficacy across multiple computer domains and *application-specific self-efficacy* is defined as an individual's perception of efficacy in using a specific application or information system within the domain of general computing. In this study, UGIS specific self-efficacy (UGIS-S-SE) is defined as the personal confidence in using the UGIS.

*Anxiety* In general, use of technology often has unpleasant side effects, which may include strong, negative emotional states that arise during interaction with computers. Frustration, confusion, anger, anxiety (ANX) and similar emotional states can affect not only the interaction itself, but also productivity, learning, social relationships, and overall well-being. According to Saade and Kira (2006) there are three types of anxieties: trait anxiety, state anxiety and application or concept-specific anxiety. Shah et al. (2011) define computer anxiety as a state of mind of being fearful or apprehensive when using or considering the use of a computer. Howard and Smith (1986) defines technology anxiety as the tendency of a person to experience a level of uneasiness over his/her impending use of a computer. These researchers have attempted to predict those who will experience computer anxiety by identifying factors that links with its occurrence. Often, factors such as age, gender, ethnicity, previous computer experience, self-efficacy, learning styles, and computer attitude are posited as factors influencing computer anxiety. In this study, UGIS specific anxiety (UGIS-S-ANX) is defined as the feeling or tendency that is associated with a person's interaction with using the UGIS.

**Model for PC Utilization (MPCU) and Social Influence**

There is very little research to compare the effect of social influence (SI) on technology usage behaviour. Critiques of TAM and related theories have also suggested that insufficient attention is paid to social factors. Hence, the dimension of social influence (SI) might be an important factor while conducting research on acceptance of technology (Kim et al. 2006). Social influence has been called different names such as social factors, subjective norms or social norms in different theories (TRA, TAM2, TPB, Combined-TAM-TPB, Diffusion of Innovations Theory-DIT, MPCU and UTAUT). We prefer to include the social influence from MPCU because the introduction of new technology (IS in this case) can exert profound effects on the performance of employees (Srite 2006). Thompson et al. (1991) adapted and refined Triandis' (1977) model for IS contexts and use the model to predict PC utilization. Venkatesh and Davis (2000) developed the TAM2 (a revised model of TAM) model that explores the antecedents of perceived usefulness. Their research sought to describe how perceived usefulness and usage intentions, taking into account SI, affects technology acceptance.

Mazman et al. (2009) highlights different studies including SI as an external factor. Concurring with Shen et al. (2006) that education is a social activity, in this study we aimed to explain the role of SI in the acceptance of UGIS. Within our proposed model (see next section), SI is salient only in mandatory settings. Ajzen and Fishbein (1975) and Venkatesh et al. (2003) definitions of SI are adopted in this study. As a result, SI is defined as the perceived external pressure that individuals feel in the process of being informed about innovation; their decision to use it and the degree to which an individual perceives that important others believe he/she should use the new system. In this study, SI refers to the degree to which a teaching staff/academic/unit convenor perceives that their colleagues, Head of Departments-HODs, Deans believe he/she should use UGIS.

## THE RESEARCH MODEL AND HYPOTHESIS

Based on the previous research, a theoretical model was developed. Figure 1 shows the research model with 7 constructs (concepts/latent variables/unobservable variables). According to Bagozzi and Philipp (1982), a theory may contain three different types of concepts: theoretical, derived and empirical. To make the model simple to comply with space constraints, empirical concepts (indicators/measurement items/manifest variables/observable variables) are excluded from the figure. The arrows linking constructs specify hypothesized causal relationships in the direction of arrows.

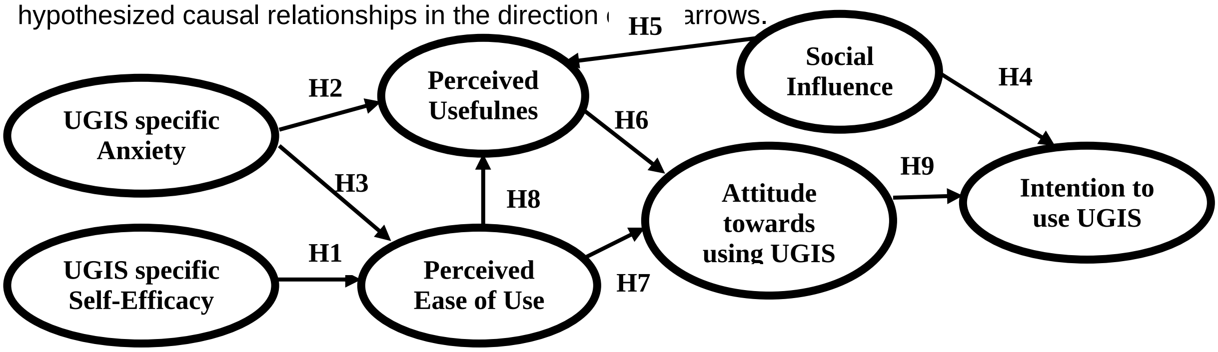


Figure 1: The Research Model

Based on the discussion above and considering that self-efficacy, anxiety and social influence may impact perceived usefulness, perceived ease of ease, attitude and intention and that this impact varies depending on the characteristics of the IS (here it is UGIS) used and the context it is used, we hypothesize that:

**H 1:** UGIS specific self-efficacy will have a positive influence on perceived ease of use.
**H 2:** UGIS specific anxiety will have a negative influence on perceived usefulness.
**H 3:** UGIS specific anxiety will have a negative influence on perceived ease of use.
**H 4:** Social influence will have a significant influence on intention to use UGIS.
**H 5:** Social influence will have a positive influence on perceived usefulness of UGIS.
**H 6:** Perceived usefulness will have a positive influence on attitude towards using UGIS.
**H 7:** Perceived ease of use will have a positive influence on attitude towards using UGIS.
**H 8:** Perceived ease of use will have a positive influence on perceived usefulness.
**H 9:** Attitude towards using UGIS will have a positive influence on intention to use UGIS.

# RESEARCH DESIGN AND METHODOLOGY

To test the proposed research model the survey method was used for data collection and the model was assessed using the partial least squares (PLS) approach to structural equation modelling. The researchers chose PLS because it: best applies if the phenomenon to be investigated is relatively new and it makes fewer demands regarding sample size than other methods; does not require normally distributed variables (Urbach and Ahlemann 2010). In line with our above research questions, the survey has been developed to:

1. To check the academics attitudes and intentions of the acceptance of the UGIS regarding the process of curriculum mapping.
2. To identify the influence of external variables in the acceptance of UGIS.

The research was conducted by [withheld for review] a university, which has recently implemented an online UGIS for curriculum mapping. A total of 400 Learning and Teaching Associate Deans and Head of Schools were contacted at 39 Australian universities. They were asked to distribute the survey in their faculties/schools/departments. Each contacted person received a copy of the following documents:

- A Recruiting Email – containing the link to the survey.
- An Information & Consent Form following the survey questions. This explained the nature of the research, and emphasized the confidentiality of their responses.

To explain our technology acceptance framework, we have adapted various theoretical concepts/constructs from TAM, SCT & MPCU. We believe that the combination of technology acceptance models, offer greater explanatory effect as compared to use of a single theory. The selection of constructs was based on characteristics, requirements, issues, attitudes and other features identified in the literature as relevant to the domain of UGs and curriculum mapping. The fundamentals of these models are selected for best description of attitude/intention of academics regarding the process of curriculum mapping and towards using UGIS.

### Instrument

The online survey was designed in Qualtrics (Qualtrics Labs 2009), based on technology acceptance constructs validated in prior research (Venkatesh et al. 2003). Minor modifications were made to fit the study context. The variables measured include; perceived usefulness (PU), perceived ease of use (PEOU), UGIS specific anxiety (UGIS-S-ANX), UGIS specific self-efficacy (UGIS-S-SE), attitude towards using UGIS (ATT-UGIS), intention to use UGIS (INT-UGIS) and social influence (SI). The survey was divided into 4 sections. (1) Demographic Information (2) UG tool Information (3) UG tool evaluation (4) Other considerations about UG tool/template. All questionnaire items were measured using a 5-point Likert scales ranging from 1 = strongly disagree to 5 = strongly agree with a middle neutral point. The questions for section 3 can be found in Appendix A.

### Pilot Study and Data Collection

The initial questionnaire was tested via a small voluntary pilot study with unit convenors in our own institution to ensure that items were adapted appropriately to the study context. The final version of the questionnaire (41 items for 7 constructs) was written to avoid ambiguous questions and minimize length of time to complete the survey. The final survey instrument was delivered using the Web to ease participation and data collection. Data was collected from December 13, 2011 to June 22, 2012. Two reminders were sent out after every 5 weeks.

### Analysis of Respondents

A total of 184 responses were collected. After being screened for usability and reliability, 134 responses were found to be complete and usable (50 were dropped because they were blank). We note two factors that may have affected the number of responses received and perhaps account for the large number of blank responses.

Firstly, only a limited number of institutions have deployed UGIS. Part of our goal was to determine just what current UGIS contained. For some institutions/departments, curriculum mapping is achieved via the use of a spreadsheet that is not automatically integrated with the unit guide. Nevertheless, we wanted to capture the technology being used and the features that were currently being offered. Secondly, to recruit lecturers and unit convenors as participants, L&T Associate Deans and Head of Schools acted as a third party to pass on the invitation. Table 1 shows the breakdown of the 400 individuals who were sent invitations, showing how many from each state and how many universities in each state were included. In column 4 we have included 2008 numbers of academic persons in each state to get an idea of the total population. Column 5 indicates how many complete responses we received from each state. The overall rate is the number of responses for the state as a percentage of the number of invitations for that state. However, that does not clarify how many responses were the results of one individual passing on the invitation. Faculty responses are the number of faculties within a university and state that had one or more responses. This is an indicator of how many of the original 400 recipients actually passed our survey on. This allows us to calculate the faculty response rate. The final column is the average of the overall and faculty response rates. We see that measuring the response rate using overall or faculty unique responses the response rate is between 34-37% nationally.

Table 1: Summary of Responses by State and Faculty

| | State | # of Unis | Contacted | Academic Persons (per 2008 survey) | Total Responses | Overall Rate | Faculty Responses | Faculty Response Rate | Average Response Rate |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ACT | 2 | 15 | 1929 | 11 | 73% | 4 | 36% | 55% |
| 2 | NSW | 11 | 185 | 13792 | 50 | 27% | 21 | 42% | 35% |
| 3 | NT | 1 | 6 | 387 | 0 | 0% | 0 | 0% | 0% |
| 4 | QLD | 8 | 40 | 7293 | 11 | 28% | 3 | 27% | 27% |
| 5 | SA | 3 | 13 | 3194 | 9 | 69% | 2 | 22% | 46% |
| 6 | TAS | 1 | 6 | 1042 | 3 | 50% | 3 | 100% | 75% |
| 7 | VIC | 8 | 78 | 11769 | 40 | 51% | 13 | 33% | 42% |
| 8 | WA | 5 | 57 | 4209 | 10 | 18% | 3 | 30% | 24% |
| | Total | 39 | 400 | 43615 | 134 | 34% | 49 | 37% | 35% |

We received numerous emails from academics who thought the study was very interesting and important. Some commented that they did not have such a tool but were interested to know more. The 50 individuals who did not complete the study may fall into this category. After the deletion of empty records 134 observations were left for subsequent data analysis. Table 2 shows the summary of some characteristics of our respondents.

Table 2: Summary of Respondents Demography

| Gender | Australian | Position | | Current Role | Units Convened |
|---|---|---|---|---|---|
| Male | ACT 11 (9%) | Professor | 12 (8.9%) | Convenors | Undergraduate |
| 55 (41%) | NSW 50 (37%) | Assoc/Professor | 24 (18.0%) | 93 (69.4%) | 61 (45.5%) |
| | NT 0 (0%) | Senior Lecturer | 34 (25.4%) | Teaching Staff | Post graduate |
| | QLD 11 (8%) | Lecturer | 43 (32.1%) | 27 (20.2%) | 6 (4.5%) |
| Female | SA 9 (7%) | Ass/Assoc Lecturer | 2 (1.5%) | Missing | Both 51 (38.0%) |
| 79 (59%) | TAS 3 (2%) | Adjunct | 3 (2.2%) | 14 (10.4%) | Others 6 (4.5%) |
| | VIC 40 (30%) | Others | 12 (8.9%) | | Missing |
| | WA 10 (7%) | Missing | 4 (3.0%) | | 10 (7.5%) |

Because of the low response rate to the survey, it is necessary to test the internal validity of the instrument for non-response bias. This study used a suitable sample that was not random but self-selected (convenience sample); it was not possible to test non-response bias by comparing the respondents and non-respondents as we did not know who received the invitation. Instead, non-response bias was assessed by using the Linear Extrapolation Method (Armstrong and Overton 1977; Lahaut et al. 2003) comparing the responses of early (n= 85) and late respondents (n= 99). No significant differences could be determined between the groups (t-Test, $p<0.05$). This suggests that non-response bias was not a major concern in this study.

**Statistical Procedure**

Data collected via the online survey instrument was recorded first in MS Excel. The statistical analysis method used for this study was partial least squares (PLS), a second generation statistical technique for conducting structural equation modelling (SEM) based analysis. PLS follows a component-based approach and does not depend on multivariate normal distribution, interval scales or a large sample size (Gong et al. 2004; Yi and Hwang 2003). PLS is more prediction oriented and seeks to maximize the variance explained in constructs. Given the prediction oriented nature of this research and the relatively small sample size compared to the number of variables, the PLS path modelling is more suitable for testing the hypothesis in this study. All PLS analyses was performed using Smart PLS 2.0 (Ringle et al. 2005).

## DATA ANALYSIS, MODEL VALIDATION AND RESULTS

### The Measurement Model (Outer Model) – The Reflective Way

Reliability Analysis - The measurement model is assessed by estimating the internal consistency reliabilities. *Internal consistency* is evaluated using (1) Composite reliability (CR) or Cronbach's alpha and (2) Indicator reliability. This study assessed the significance level of indicators and path coefficients using the bootstrapping procedure with 200 sub-samples. Five items from PEOU (PEOU4-PEOU7, PEOU9) and four items from

UGIS-S-SE (UGIS-S-SE2 - UGIS-S-SE5) and one item from SI (SI3) were dropped, since very small and insignificant item loadings were present (Chua et al. 2004; Li and Ku 2011). Table 3 shows that all of the internal consistency reliabilities are above 0.70, loadings are in the acceptable range and the t-value shows that they are significant at the 0.05 level.

Table 3: Factor Loadings and Reliabilities

| **Construct** | **Original # of items** | **Items Remained with Loadings** | | | | **CR** | **AVE** |
|---|---|---|---|---|---|---|---|
| ATT-UGIS | 4 | ATT1(0.85) | ATT2(0.81) | ATT3(0.85) | ATT4(0.87) | 0.911 | 0.720 |
| INT-UGIS | 4 | INT1(0.92) | INT2(0.92) | INT3(0.88) | INT4(0.78) | 0.932 | 0.775 |
| PEOU | 9 | PEOU1(0.84) | PEOU2(0.90) | PEOU3(0.87) | PEOU8(0.85) | 0.924 | 0.754 |
| PU | 8 | PU1(0.87) | PU2(0.87) | PU3(0.78) | PU4(0.89) | 0.954 | 0.724 |
| | | PU5(0.90) | PU6(0.72) | PU7(0.88) | PU8(0.86) | | |
| SI | 5 | SI1(0.83) | SI2(0.69) | SI4(0.70) | SI5(0.83) | 0.849 | 0.586 |
| UGIS-S-ANX | 4 | ANX1(0.90) | ANX2(0.80) | ANX3(0.79) | ANX4(0.87) | 0.908 | 0.713 |
| UGIS-S-SE | 7 | SE1(0.82) | SE6(0.89) | SE7(0.79) | | 0.875 | 0.701 |

Validity Analysis - The measurement model is assessed by estimating the construct validity. *Construct validity* is comprised of convergent validity and discriminate validity. *Convergent validity* is the degree to which similar constructs are related; while *discriminant validity* is the degree that different constructs are different from each other. Table 3 shows the constructs strong convergent validity, since they each had an Average Variance Extracted (AVE) of more than 0.5, which is the suggested threshold (Fornell and Larcker 1981). Convergent validity was also demonstrated because the items loaded highly (loading > 0.70) on their associated constructs in Table 3. For satisfactory discriminant validity, the AVE from the construct should be greater than the variance shared between the construct and other constructs in the model (Fornell and Larcker 1981). Table 4 shows the correlation matrix, with the inter-construct correlations off the diagonal and the square root of AVE on the diagonal. The results suggested an adequate discriminant validity of the measurements.

Table 4: Correlation of Constructs*

| **Construct** | **ATT-UGIS** | **INT-UGIS** | **PEOU** | **PU** | **SI** | **UGIS-S-ANX** | **UGIS-S-SE** |
|---|---|---|---|---|---|---|---|
| ATT-UGIS | **0.8490** | | | | | | |
| INT-UGIS | 0.5299 | **0.8805** | | | | | |
| PEOU | 0.5640 | 0.5431 | **0.8686** | | | | |
| PU | 0.8358 | 0.6430 | 0.6560 | **0.8510** | | | |
| SI | 0.4207 | 0.4862 | 0.4800 | 0.5263 | **0.7659** | | |
| UGIS-S-ANX | -0.1481 | -0.2680 | -0.4925 | -0.2597 | -0.2611 | **0.8447** | |
| UGIS-S-SE | 0.0634 | 0.1244 | 0.5023 | 0.1866 | 0.3350 | -0.3639 | **0.8376** |

* Diagonal elements (in **Bold**) are the square roots of the AVE of the reflective scales. Off diagonal elements are correlations between construct.

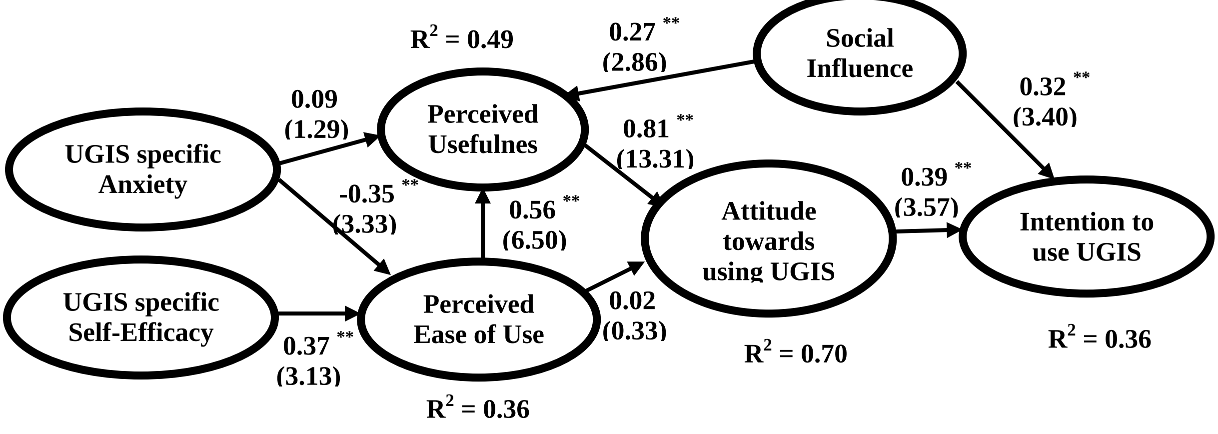


Figure 2: PLS Results for the Proposed Model. Path coefficients (t statistics) are provided for each link.
Notes: *p<0.05 and **<0.01.

### The Structural Model (Inner Model)

The structural model is assessed by estimating: (1) *Path Coefficients*, which indicated the positive or negative relationships between the dependent (endogenous) and independent (exogenous) constructs and the strength of these relationships. (2) *R-square Value*, which represent the amount of variance of the dependent constructs explained by the independent constructs.

In short, the $R^2$ shows the predictive power of the model and the path coefficients should be significant and directionally consistent with the hypothesis. Overall, our research model was able to report 70 % of the variance in attitude towards using UGIS (ATT-UGIS), 36 % of the variance in intention to use UGIS (INT-UGIS), around 36 % of the variance in perceived ease of use (PEOU) and 49 % of the variance in perceived usefulness (PU). The negative value of path coefficient between UGIS specific Anxiety and Perceived Ease of Use means that UGIS specific Anxiety has negatively associated with (or related to) Perceived Ease of Use, which provides evidence for hypothesis 3. According to the path coefficients and t-test values shown in Figure 2, we found sufficient evidence for each hypothesis we posed earlier except for H2: UGIS specific anxiety will have a negative influence on perceived usefulness (path coefficient = 0.09, t = 1.29, p>0.05) and H7: Perceived ease of use will have a positive influence on attitude towards using UGIS (path coefficient = 0.02, t = 0.33, p>0.05). Table 5 shows a summary of the hypothesis testing results.

Table 5: Summary of Hypothesis

| **Hypothesis** | **Support (Statistically significant)** |
|---|---|
| H1: UGIS-S-SE → PEOU | Yes |
| H2: UGIS-S-ANX→ PU | No |
| H3: UGIS-S-ANX→ PEOU | Yes |
| H4: SI→ITU-UGIS | Yes |
| H5: SI→ PU | Yes |
| H6: PU→ATU-UGIS | Yes |
| H7: PEOU→ATU-UGIS | No |
| H8: PEOU→ PU | Yes |
| H9: ATU-UGIS→ITU-UGIS | Yes |

## DISSCUSSION

In this study we examined the technology acceptance model for UGIS using TAM, SCT and MPCU. Based on data collected from 39 Australian universities, the support and evidence for the hypothesized model was evaluated. The results showed that the proposed model is significant and will help us to explain the relationships between different aspects of the acceptance of UGIS. More specifically, our study shows that academics use UG tools/templates mainly because they perceive them as useful tools to improve their performance and productivity and will enhance their image among their colleagues and management. Social Influence had both a direct and indirect effect on Intention to use UGIS, but the direct effect was dominant. Figure 2 shows higher strength of the effect on Intention to use UGIS (0.32) than on Perceived usefulness (0.27). It is worth noticing that the direct effect of UGIS specific anxiety on perceived ease of use was significant (p <0.01) as compared to the direct effect of UGIS specific anxiety on perceived usefulness, which is not significant. Since UGIS specific anxiety is a kind of individual confidence/emotion towards using a new IS, it is understandable that the anxiety would have a direct and strong impact on ease of use intuitively. The results agree with what TAMUGIS postulated.

We suggest the use of training programs, newsletters, active operational support and appropriate organizational support to improve the self-efficacy of the potential users and in easing the anxiety and reducing possible attitudinal barriers to the use of UGIS. Again, SI affects the acceptance and use of technology and HE institutions should pay attention in advance to create a friendly environment for the transfer of successful IT.

## LIMITATIONS AND CONCLUSION

This empirical analysis of the proposed TAMUGIS has some limitations. Firstly, there are numerous factors affecting the acceptance of new information systems, but in our study we just focused on three factors as seen in our model. We intend to study the effects of other potential determinants in future research. Secondly, the survey was conducted across Australian universities only. We can extend this study by doing an International survey inviting many universities from other countries to participate.

This study is a first attempt to investigate the technology acceptance of UGIS and provides a better understanding of the individual user's acceptance to use a unit guide information system. The findings of this study strongly suggest that technology acceptance is affected by the attitude of the academics towards UGIS. Intention to use UGIS was found to be mainly affected by individual's perception about both usefulness and social influence. It shows that in order to evaluate the academics acceptance of using UGIS, improvement in self-efficacy and reducing anxiety can enhance the acceptance by the academics. In addition, this study also shows that academics are more likely to feel social pressure to use UGIS if they believe that their colleagues and top management think they should use them.

## APPENDIX-A: Questions Used in Section 3 of Survey (UGT=Unit Guide Tool)

| Indicators | Definition | Indicators | Definition |
|---|---|---|---|
| PU1 | Improves the quality of the work | ITU-UGI | I intend to use the UGT frequently next semester. |
| PU2 | Enables to do tasks quickly | ITU-UGIS2 | I intend to use the UGT regularly next semester. |
| PU3 | Enables to do Curriculum Mapping | ITU-UGIS3 | I intend to use the Unit Guide Tool next semester to assist me, for example, to prepare unit content, LO, GA, LA, assessments etc. |
| PU4 | Enhances effectiveness on the job | ITU-UGIS4 | I intend to use the UGT for Curriculum Mapping next semester. |
| PU5 | Useful in my job | ATU-UGIS1 | Using the IS, a good idea |
| PU6 | Spend less time in Curriculum Mapping | ATU-UGIS2 | Specifically, using the IS for Curriculum Mapping is a good idea |
| PU7 | Increases my productivity | ATU-UGIS3 | Makes work more interesting |
| PU8 | Makes it easier to do my job | ATU-UGIS4 | Like working with the IS |
| PEOU1 | Easy to become skilful at using | UGIS-S-ANX1 | I feel apprehensive about using UGT. |
| PEOU2 | Interaction with the IS clear and understandable | UGIS-S-ANX2 | I feel apprehensive about using UGT for Curriculum Mapping. |
| PEOU3 | Easy to remember how to perform tasks using the IS | UGIS-S-ANX3 | I hesitate to use the UGT for fear of making mistakes I cannot correct. |
| PEOU4 | Using the IS takes too much time from my normal duties | UGIS-S-ANX4 | The UGT is somewhat intimidating to me. |
| PEOU5 | Working with the IS, so complicated; it is difficult to understand what is going on | UGIS-S-SE1 | I could complete the job using the UGT on my own /without support. |
| PEOU6 | Using the IS involves too much time doing mechanical operations(e.g., data input) | UGIS-S-SE2 | I could perform Curriculum Mapping using UGT on my own / without support. |
| PEOU7 | It takes too long to learn how to use the IS to make it worth the effort | UGIS-S-SE3 | I could complete the job using the UGT, if I could call someone for help if I got stuck. |
| PEOU8 | I (would) find it easy to use | UGIS-S-SE4 | I could complete the job using the UGT, if I had a lot of time to complete the job for which the IS provided. |
| PEOU9 | I (would) find it easy for Curriculum Mapping | UGIS-S-SE5 | I could complete the job using the UGT, if I had just the built-in help facility for assistance. |
| SI1 | I anticipate I will use the UGT because of the proportion of co-workers who use UGT. | UGIS-S-SE6 | I could complete the job using the UGT, if I had never used an information system like it before. |
| | | UGIS-S-SE7 | I could complete the job using the UGT; if I had used similar information systems like this one before to do the job. |
| SI2 | I anticipate the organization will support the use of the UGT. | SI4 | I anticipate people who influence my behaviour will think that I should use the UGT. |
| SI3 | I anticipate the organization will support the use of the UGT for Curriculum Mapping. | SI5 | If I use the UGT, my co-workers will perceive me as competent. |

## REFERENCES

Agarwal, R., Sambamurthy, V., & Stair, M.R. 2000. "Research Report: The Evolving Relationship between General and Specific Computer Self-Efficacy - an Empirical Assessment," *Information Systems Research* (11), pp 418 - 430.

Ajzen, I., & Fishbein, M. 1975. *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research.* Addison-Wesley, Reading. MA.

Armstrong, J.S., & Overton, T.S. 1977. "Estimating Nonresponse Bias in Mail Surveys," *Journal of Marketing Research* (14), pp 396 - 402.

Bagozzi, R.P., & Phillips, L.W. 1982. "Representing and Testing Organizational Theories: A Holistic Construal," *Administrative Science Quarterly* (27:3), pp 459-489.

Barrie, S.C. 2004. "A Research-Based Approach to Generic Graduate Attributes Policy," *Higher Education Research & Development* (23:3), pp 261 - 275.

BIHECC. 2007. "Graduate Employability Skills," *Graduate Employability Skills Report*).

Bowden, J., Hart, G., King, B., Trigwell, K., & Watts, O. 2002. "Generic Capabilities of Atn University Graduates,").

Chin, W.W., & Todd, A.P. 1995. "On the Use, Usefulness, and Ease of Use of Structural Equation Modeling in

Mis Research: A Note of Caution," *MIS Quarterly* (19:2), pp 237 - 246.

Chua, P.-Y., Hsiao, N., Leea, F.-W., & Chena, C.-W. 2004. "Exploring Success Factors for Taiwan's Government Electronic Tendering System: Behavioral Perspectives from Endusers," *Government Information Quarterly* (21:2), pp 219 - 234.

Cleary, M., Flynn, R., Thomasson, S., Alexander, R., & McDonald, B. 2007. "Precision Consultancy: Graduate Employability Skills," *Prepared for the Business, Industry and HE Collaboration Council*.

Curtis, D., & McKenzie, P. 2001. "Employability Skills for Australian Industry [Electronic Resource] : Literature Review & Framework Development " *Australian Council for Educational Research*).

Davis, F.D. 1986. "A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results," in: *Doctoral Dissertation*. Cambridge, MA: MIT Sloan School of Mgt.

Davis, F.D. 1989. "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," *MIS Quarterly* (13:3), pp 319 - 340.

Davis, F.D., Bagozzi, R.P., & Warshaw, P.R. 1989. "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models," *Management Science* (35:8), pp 982 - 1003.

El-Gayar, O., Moran, M., & Hawkes, M. 2011. "Students' Acceptance of Tablet Pcs and Implications for Educational Institutions," *Educational Technology & Society* (14:2), pp 58 - 70.

Fornell, C., & Larcker, D.F. 1981. "Evaluating Structural Equation Models with Unobserved Variables and Measurement Error," *Journal of Marketing Research* (18), pp 39 - 50.

Freeman, M., Hancock, P., Simpson, L., & Sykes, C. 2008. "Business as Usual: A Collaborative Investigation of Existing Resources, Strengths, Gaps and Challenges to Be Addressed for Sustainability in Teaching and Learning in Australian University Business Faculties," *ABDC Scoping Report*).

Gong, M., Xu, Y., & Yu, Y. 2004. "An Enhanced Technology Acceptance Model for Web-Based Learning " *Journal of Information Systems Education* (15:4), p 365.

Howard, G.S., & Smith, R.D. 1986. "Computer Anxiety in Management: Myth or Reality?," *Communications of the ACM* (29:7), pp 611 - 615.

Hsu, M.K., Wang, S.W., & Chiu, K.K.-S. 2008. "Influence of Attitude, Anxiety and Self-Efficacy toward Statistics and Technology on Statistical Package Software Usage Behavior," *South West Decision Sciences Institute Conference*, Houston, TX

Hu, P.J.-H., Lin, C., & Chen, H. 2005. "User Acceptance of Intelligence and Security Informatics Technology: A Study of Coplink.," *Jrnl of the American Soc. for Information Science and Tech.* (56:3), pp 235 - 244.

Irani, Z., Dwivedi, Y.K., & Williams, M.D. 2009. "Understanding Consumer Adoption of Broadband: An Extension of the Technology Acceptance Model," *Jrnl of Operational Res. Soc.* (60), pp 1322 - 1334.

Jones, D. 2009. "Supporting Curriculum Mapping."

Kim, C., Jahng, J., & Lee, J. 2006. "An Empirical Investigation into He Utilization-Based Information Technology Success Model: Integrating Task Performance and Social Influence Perspective " *Journal of Information Technology* (30), pp 1 - 9.

Kotrlik, J.W., & Redmann, D.H. 2009. "Technology Adoption for Use in Instruction by Secondary Technology Education Teachers," *Journal of Technology Education* (21:1).

Lahaut, V.M.H.C.J., Jansen, H.A.M., Mheen, D.V.D., Garretsen, H.F.L., Verdurmen, J.E.E., & Dijk, A.V. 2003. "Estimating Non-Response Bias in a Survey on Alcohol Consumption: Comparison of Response Waves," *Alcohol & Alcoholism* (38:2), pp 128 - 134.

Legris, P., Ingham, J., & Collerette, P. 2003. "Why Do People Use Information Technology? A Critical Review of the Technology Acceptance Model," *Information & Management* (40), pp 191 - 204.

Li, C.-Y., & Ku, Y.-C. 2011. "The Effects of Persuasive Messages on System Acceptance," *PACIS Proceedings*.

Marakas, M.G., Yi, Y.M., & Johnson, D.R. 1998. "The Multilevel and Multifaceted Character of Computer Self-Efficacy: Toward Clarification of the Construct and an Integrative Framework for Research," *Information Systems Research* (9), pp 126 - 163.

Mazman, S.G., Usluel, Y.K., & Cevik, V. 2009. "Social Influence in the Adoption Process and Usage of Information: Gender Differences," *World Academy of Science, Engineering and Technology* (49).

Oliver, B., & Whelan, B. 2010. "Facilitating National Benchmarking of Achievement of Graduate Attributes and Employability Skills at Course Level," *Teaching and Learning Forum, Perth, Western Australia*).

Park, S.Y. 2009. "An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use E-Learning," *Educational Technology & Society* (12:3), pp 150 - 162.

Qualtrics Labs, I. 2009. "Qualtrics." Provo, Utah, USA.: Qualtrics Labs, Inc.

Riemenschneidera, C.K., Harrisonb, D.A., & Jr., P.P.M. 2003. "Understanding It Adoption Decisions in Small Business: Integrating Current Theories," *Information & Management* (40:4), pp 269 - 285.

Ringle, Marc, C., Sven, & Alexander. 2005. "Smartpls." 2.0 (beta). Hamburg, Germany. from http://www.smartpls.de

Saadé, R.G., & Kira, D. 2006. "The Emotional State of Technology Acceptance," *Issues in Informing Science and Information Technology* (3), pp 529 - 539.

Shah, M.M., Hassan, R., & Embi, R. 2011. "Technological Changes and Its Relationship with Computer Anxiety in Commercial Banks," in: *The 2nd International Research Symposium in Service Management*. Yogyakarta, Indonesia.

Shen, D., Laffey, J., Lin, Y., & Huang, X. 2006. "Social Influence for Perceived Usefulness and Ease of Use of Course Delievery Systems," *Journal of Interactive Online Learning* (5:3), pp 270 - 282.

Srite, M. 2006. "Culture as an Explaination of Technology Acceptance Differences: An Empirical Investigation of Chinese and Us Users," *Australasian Journal of Educational Technology* (14), pp 5 - 26.

Taylor,S., & Todd, P. 1995a."Assessing It Usage:The Role of Prior Experience,"*MIS Quarterly*(19:4),pp561-570

Taylor, S., & Todd, P. 1995b. "Understanding Information Technology Usage: A Test of Competing Models," *Information Systems Research* (6:4), pp 144 - 176.

Thompson, L.R., Higgins, A.C., & Howell, M.J. 1991. "Personal Computing: Toward a Conceptual Model of Utilization," *MIS Quarterly* (15:1), pp 124 -143.

Triandis, H.C. 1977. "Interpersonal Behavior." Brooke / Cole, Monterey, CA.

Urbach, N., & Ahlemann, F. 2010. "Structural Equation Modeling in Information Systems: Research Using Partial Least Squares," *Journal of Information Technology Theory and Application* (11:2), pp 5 - 40.

Venkatesh, V. 2000. "Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model," *Information Systems Research* (11:4), pp 342 - 365.

Venkatesh, V., & Bala, H. 2008. "Technology Acceptance Model 3 and a Research Agenda on Interventions," *Decision Sciences* (39), pp 273 - 315.

Venkatesh, V., & Davis, F.D. 1996. "A Model of the Antecedents of Perceived Ease of Use: Development and Test," *Decision Sciences* (27:3), pp 451 - 481.

Venkatesh, V., & Davis, F.D. 2000. "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies," *Management Science* (45:2), pp 186 - 204.

Venkatesh, V., Morris, M.G., Davis, G.B., & Davis, F.D. 2003. "User Acceptance of Information Technology: Toward a Unified View," *MIS Quarterly* (27:3), pp 425 - 478.

Yi, M.Y., & Hwang, Y. 2003. "Predicting the Use of Web-Based Information Systems: Self-Efficacy, Enjoyment, Learning Goal Orientation & the Technology Acceptance Model," *IJHCS* (59),pp 431-449.

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