



## Adoption of Twitter in higher education – a pilot study

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Twitter has experienced a tremendous growth since its inception and is considered as an effective and simple social medium for communication. Despite its huge uptake, less is known about the usage of Twitter as a learning tool especially within higher education. This study investigates the adoption of Twitter in an e-Commerce unit in an Australian higher education institution. Building on Twitter's inherent social features, an extension to Davis's original Technology Acceptance Model (TAM) is devised by including intrinsic and extrinsic motivation behaviours as predictors of Twitter usage. The empirical evaluation does not provide support to the original TAM constructs of usefulness and ease-of-use but reveals enjoyment and social norms as the strongest predictors. The study implications suggest a mind-shift in the adoption of Web 2.0 tools as compared to that of traditional Web technologies, i.e., Web 2.0 is more about enjoyment and social presence and not merely about how useful or easy-to-use a technology is.

Keywords: Twitter, Technology adoption, Motivation, TAM, Web 2.0, Higher education.

### Introduction

Micro-blog is a kind of Weblog that is restricted to 140 characters per post but is enhanced with social networking facilities (McFedries, 2007). One of the earlier studies on micro-blogging highlights three distinct features: information sharing; information seeking; and, friend-ship wide relationships (Java, Song, Finin, & Tseng, 2007). Other studies such as Humber et al (2008); Krishnamurthy et al (2008); and, Naaman et al (2010) found Twitter to be highly social. These features make micro-blogging worth investigating in higher education (Ebner, Lienhardt, Rohs, & Meyer, 2010) especially given the importance of social presence in current education setting. Although Twitter user accounts have reached over 200 million worldwide, documentation of its use within the higher education has been somewhat limited.

This paper aims at investigating adoption of Twitter in an e-Commerce unit in an Australian higher education institution. In order to achieve our goals we chose to use Technology Acceptance Model (TAM) as the baseline. TAM is considered as the most researched model in Information Systems (IS) research to investigate adoption

of new technology and posits that user perceptions of usefulness and ease-of-use determine attitudes towards using a technology which further leads to usage intentions (Davis, Bagozzi, & Warshaw, 1989).

Web 2.0 is mostly about social interactions and exchange of information. The link between web 2.0 tools, social interaction and enjoyment within the higher education setting has been widely documented (C. Hsu & Lin, 2008). Similar inherent features are also seen in Twitter (Wigand, 2010) but the intention to adopt Twitter as part of higher education has not been investigated much in higher education. Therefore, we extended TAM by including intrinsic and extrinsic motivational behaviours in terms of perceived enjoyment and subjective norms respectively. Given the trends and the huge web 2.0 uptake in higher education for pedagogical usage it is therefore important to assess the motivations behind certain technological usage. In that direction, this research is expected to shed some light towards helping educators to better design and deliver teaching and learning activities involving Twitter.

## **Background**

Twitter is the fastest growing Web 2.0 technology in comparison to all micro-blogging platforms (CrunchBase, 2011). Micro-blogging became quickly popular due to its communication features which allowed the exchange of information in 140 characters or less with the ability to include hypertext links. Comparatively, though there has been an increase in the usage of Twitter at higher education worldwide, a report from Faculty Focus in 2010 has noted that Twitter's potential has yet to be harnessed (Faculty-Focus, 2010). Most higher education institutions are currently using Twitter for sharing information among peers and as a real time news source but there has been little or limited examples of pedagogical use. Therefore, our work intends to extend research on Twitter usage in higher education by looking at the motivation and the social influence Twitter provides. Research has linked the importance of social presence to a range of critical factors such as student satisfaction and development of a community of peers (Dunlap & Lowenthal, 2009). Twitter could facilitate this by allowing them interact with other students and possibly the wider online community in real time, thus enriching the student experience, particularly the "social presence" aspect.

To investigate the adoption of Twitter, we adopted Technology Acceptance Model (TAM) from IS research. TAM is considered as being robust and parsimonious for predicting user adoption of a variety of new technologies (Raaij & Schepers, 2008). In order to investigate the impact of student motivation on Twitter adoption we extended the original TAM by including perceived enjoyment and subjective norms (representing intrinsic and extrinsic motivation constructs respectively) as key predictors of Twitter adoption in addition to TAM's key constructs of perceived usefulness, perceived ease-of-use, and behavioural intention.

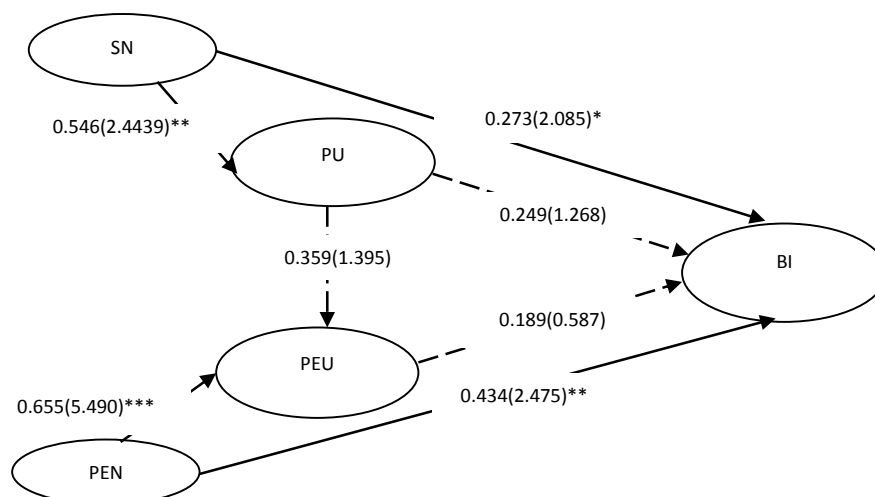
## **Methodology**

Participants for the study were made up of second year undergraduate students from a local higher education institution. As part of their program students were required to undertake an e-Commerce unit which ran for 12 weeks. They were exposed to micro-blogging and were encouraged to use Twitter as part of weekly tutorial. The usage of Twitter was not assessed as part of the unit but was monitored by the instructor constantly. The survey was conducted at the end of the semester where all students were invited to take part and out of 45 students 27 responded. All the constructs used in the survey were adopted from the previously published scales.

## Results

The proposed model (as shown in Figure 1) was tested using the PLS (Partial Least Squares) approach, which is considered as a powerful tool in analysing structural models involving multiple constructs and multiple indicators. PLS is also considered an effective approach as compared to LISERAL or EQ when sample sizes are small (Cavusgil, Sinkovics, & Ghauri, 2009), like in our case.

All our constructs demonstrated a good level of reliability and validity. For example, the factor loadings for all our constructs were greater than the threshold of 0.60 as suggested by Chin (1998). The t-values also provide evidence for convergent validity. In our case, all the values exceeded the threshold of 1.96 as suggested by Gefen and Straub (2005). Internal consistency also appeared significant for all of our constructs since the composite reliability values exceeded the minimum of 0.70 as suggested by Nunnally and Bernstein (1994). Discriminant validity was met using the Fornell and Larcker test, where the square root of the AVE (Average Variance Extracted) of each construct exceeded the correlation shared between that construct and other constructs in the model as suggested by Fornell and Larcker (1981).



**Figure 1: PLS results for extended TAM**

The structural model was evaluated by examining the significance of path coefficients and the variance explained ( $R^2$ ) by the dependent variables. Figure 1 summarises the PLS results for students' intentions to use Twitter. The strength and significance of each relationship are represented by the path coefficient values, with t-values in parentheses. The solid lines represent significant relationships while the dotted lines represent insignificant relationships.  $R^2$  is indicated next to each dependant variable (BI, PU and PEU).

Surprisingly, none of the original TAM relationships was supported by the data as the effect of perceived ease-of-use (PEU) and perceived usefulness (PU) on behavioural intention (BI) appeared insignificant. PEU also didn't influence BI though PU. However, both perceived enjoyment (PEN) and subjective norms (SN) directly and indirectly influenced BI (students' intentions to use Twitter), with coefficients of  $0.617 (0.434 + 0.655 \times 0.189 + 0.655 \times 0.359 \times 0.249)$  and  $0.409 (0.273 + 0.546 \times 0.249)$  respectively. In addition, perceived enjoyment and subjective norms also directly influenced PEU and PU respectively. The positive relationships imply that the more the students enjoy using Twitter and exhibit social influence the more likely they will perceive Twitter ease-to-use and useful and ultimately adopt it. Overall, perceived enjoyment (PEN) appeared to be the strongest determinant that influenced students' intentions to use Twitter. The proposed structural model explained 80% of students' intentions to use Twitter, which is a highly significant finding.

## Discussion

The aim of this study was to examine adoption of Twitter in a higher education setting by analysing the impact of intrinsic and extrinsic motivational behaviours on Twitter usage. This was achieved by formulating an extended TAM including perceived enjoyment and subjective norms as significant predictors of Twitter usage. The empirical evaluation of the proposed model provides several insightful findings. First, perceived enjoyment being the strongest predictor implies that the more the students perceive Twitter enjoyable, the more likely they will perceive it easy-to-use and ultimately adopt it. A number of previous studies have also confirmed the significant role of enjoyment in adopting new technology (see (Lee, Cheung, & Chen, 2005); (Wigand, 2010); (Chang & Chin, 2011); and, (C. L. Hsu & Lu, 2004) ). Second, subjective norms being the second strongest predictor also implies that the students value their peers' opinion about usefulness and intentions of using Twitter. Finally, the original TAM constructs failed to influence the adoption of Twitter, which is in sync with some recent technology adoption studies such as Heijden (2004) and Holsapple & Wu (2007) highlighting the inability of TAM to explain adoption to today's highly interactive, social and multi-user technologies.

This study has made several useful contributions. First, it contributes to the adoption of Web 2.0 technologies, especially Twitter adoption within higher education. Although some attempts have been made to analyse Twitter adoption in Government organisations (Wigand, 2010); mass convergence and emergency events (Hughes & Palen, 2009); and the enterprise (Gunther, Krasnova, Riehle, & Schondienst, 2009), this study is the first to examine Twitter adoption in an Australian higher education context. Second, the study reveals that the adoption patterns of Web 2.0 technologies are more focused on enjoyment and social presence rather than 'usefulness' and 'ease-of-use', which had been more prominent in explaining adoption of first generation of Web technologies such as email or Web sites. Third, the strong impact of intrinsic motivation (enjoyment) on Twitter usage also highlights the learning patterns of today's students who prefer to have the element of enjoyment in their learning activities and are more likely to use an educational technology if it's fun or enjoyment. Nevertheless, today's learners also value their friends' opinion (subjective norms) when adopting a technology as evident in our study. This also implies that in order to provide a richer learning experience for students, educators must include enjoyment and social presence elements as key ingredients of their learning objects. Finally, the study re-iterates the need to perform more technology adoption research around Web 2.0 in order to evaluate the insignificant role of traditional TAM constructs.

A key limitation of our study is the small sample size. We intend to conduct similar studies in larger cohorts to strengthen our findings. Another limitation is the self-reported data which might have caused common method bias (CMB) in the study. However, the conduct of Harman's single factor test did not confirm the presence of CMB in our data. The complete details of un-rotated factor analysis are not included in the paper due to space limit but available upon request.

## Conclusion

The study provides some early insight into the usage and adoption of Twitter in a higher education context. The empirical evaluation of the proposed model highlights inability of traditional TAM constructs in explaining the adoption of Web 2.0 technologies thus reiterating the need to conduct more studies on Web 2.0 adoption. The study reveals the dominance of intrinsic motivation over extrinsic motivation in explaining the adoption of Twitter and argues the need for elements of enjoyment and social presence in designing academic activities. Once a technology is received well and is deemed enjoyable the likelihood of extending it to further educational usage is high. In this light, the paper brings an important contribution towards the usage of Twitter in higher education that may pave way to further utilisation of Twitter for pedagogical usage. We also aim to conduct similar studies in other courses and among cross institutions / cultures in order to get a better understanding of the adoption of Twitter in higher education settings.

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