

How locus of control influences students' e-satisfaction with self-service technology in higher education

Mr Bill Chitty*
Murdoch University

Dr. Steven Ward
Murdoch University

Terry Noble
Murdoch University

Leela Tiangsoongnern
Director of DBA/MBA and MA (IMC) Programs
DPU International College
Thailand

Abstract

Self-service technology (SST) for online learning is an efficient method to deliver higher education content. It may not however, be an effective means of encouraging some students to take control of their learning processes, and co-produce their educational outcomes. This research examines the factors that influence students' readiness to adopt SST as a means of accessing higher education content. The results of a student survey have been analysed using Partial Least Squares to evaluate various research hypotheses. The results of Australian and Thai data suggest that students' internal locus of control has a positive influence on their perceived value of SST, while students' external locus of control has a negative influence on their adoption of SST.

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Introduction

The value of Australia's export education industry in 2007 was about \$12.6 billion with around \$12.2 billion (97%) being delivered on-shore from international students (RBA Bulletin 2008). International students who are enrolled in Australian higher education institutions, may adopt a more passive approach to their education (an external locus of control), than Australian students (Koongsompong 2006). International students may prefer to learn in group based settings, such as tutorials or study groups, with direct contact with the lecturer, rather than individually accessing on-line learning management systems that use SST (Chan 1999 and Moore and Wang 2007). This suggests that international students have a strong *external* locus of control, and are more likely to believe that their education results will be determined by the education provider. Other students with a strong *internal* locus of control, adopt active roles as co-producers in the education process, and are more likely to believe that it is their efforts that produce satisfactory education outcomes. The challenge for higher education providers is that not all students engage with, and learn from, education content that is provided by SST in the same way (Scanlon 2009).

Literature Review

Readiness to adopt new technology If the role of users in SST delivery process is unclear to them it will be a major deterrent to them using the technology for the first time (Meuter, Bitner, Ostrom and Brown, 2005). If students are forced to use SST to access online education content, it may cause them to become dissatisfied with the education provider. It has also been suggested that a choice of service delivery, online or via direct contact with staff, will influence their readiness to adopt self service technology (Reinders, Dabholkar and Frambach 2008).

A readiness to adopt a new SST can be considered within the broader context of the technology acceptance model (TAM) as used in information science, (King and He 2006; Hernandez, Jimenez and Martin 2008; Hashim 2008 and Li, Qi, and Shu 2008). Under this model, constructs such as perceived ease of use and usefulness, will influence a consumer's readiness to adopt technology. Therefore the first hypothesis is:

H1: Readiness to accept new technology will have a positive effect on students' adoption of SST.

Compatibility is a general perception about how SST can help students' access information. Compatibility is similar to the 'technology readiness' construct proposed by Parasuraman (2000) in service marketing, which refers to consumers' readiness to adopt and use new technology. Compatibility is a general perception about how SST can help students access information. That leads to the second hypothesis:

H2: Compatibility will have a positive impact on the students' willingness to adopt SST.

Innovativeness. Innovators are generally the early adopters of a new service (Flynn and Goldsmith, 1993). For this research, part of the domain specific innovativeness scale that was developed by Goldsmith and Hofacker (1991) was used to determine the level of student compatibility with using SST to access the on-line learning management system. The fourth hypothesis therefore is:

H3: The innovativeness of users will have a positive effect on their willingness to adopt SST.

Adoption of innovation is an acceptance of SST as the means to produce a service that is independent of direct interactions with service providers (Meuter et al. 2005). The current research model assumes that SST is suitable for delivering education content on-line, and that the antecedents of adoption, as shown in Figure 1 are; *readiness to adopt new technology*, and the individual consumer differences of *compatibility*, *perceived risk* and *innovativeness*. The fifth hypothesis therefore is:

H4: *Users adoption of innovation will have a positive impact on their perceived value of using SST.*

Perceived value is defined as being a function of *what* users receive from the service, which is the technical quality, and *how* the service is delivered, which is the functional dimension (Gronroos, 2000). For education content that is delivered using on-line SST, Heinonen, (2004), argues that the “what” and “how” dimensions are related to traditional services, and that to understand technology based self-services ‘temporal and spatial dimensions’ must be included in the perceived value construct. Temporal dimensions are the times when the consumers can access the service, while the spatial dimensions include location and ease of access. The sixth hypothesis is:

H5: *The perceived value of SST will have a positive effect on user e-satisfaction.*

e-Satisfaction and Satisfaction Consumers compare their perceptions of using SST with their pre-service expectations, and determine whether their post-service experiences have satisfied their particular needs (Oliver, 1997; Shankar, Smith and Rangaswamy, 2003). This may lead to further evaluations of the service provider (in this case the university).

There may be a direct link between satisfaction with SSTs (e-satisfaction) and satisfaction with the organisation.

H6: *e-satisfaction with SST will be positively related to the satisfaction with the service organisation.*

Locus of control (LOC) is an important predictor of goal orientated actions in both psychology (Lefcourt 1981; Levenson 1973; Rotter 1966, 1975; and Skinner 1996) and marketing (Bradley and Sparks 2002 and Busseri, Lefcourt, and Kerton 1998). The locus of control for a service, such as education, refers to the future oriented beliefs about the value of the service outcome. In the case of a service (see Bradley and Sparks 2002), such as education the locus of control may have a direct effect on students’ adoption of SST which in turn may influence the way that students accept control over the co-production of their education. Students with an *internal* locus-of-control are likely to adopt an active role that is based on their abilities and efforts, as co-producers in the education processes. Therefore the next two hypotheses are:

H7: Those students with an internal LOC are more likely to adopt SST.

H8: Those students with an internal LOC will have a high perceived value of SST.

In contrast, students with an *external* locus-of-control are likely to believe that their education results are determined by the education provider or by fate. The expectations of these students are more likely to be satisfied when the education provider takes control of their education and directs their learning (Moore and Wang 2007). Those students with external LOC are less likely to adopt SST and will not value it highly, since they will perceive their education outcomes to be the result of actions of the service provider, or powerful others, chance and not themselves (Beyth-Marom, Saporta and Caspi 2005; Drennan, Kennedy and Pisarski 2005, and Oyedele and Simpson 2007). Therefore:

H19: Those students with an external LOC are less likely to voluntarily adopt SST.

H10: Those students with an external LOC will have a low perceived value of SST.

Methodology

A survey of marketing students at a regional Australian University produced 144 usable responses. The response rate was 44%. The sample consisted of 70% women, 53% Australian students, almost all (92%) were 25 years or younger. Respondents were spread across all years of study, with around 32% being in their second year of university study.

The measurement scales of *Readiness to adopt*, *Compatibility*, *Perceived risk* and *Innovativeness* were adapted from previous research (Ward, Chitty and Graham 2007), while the *Locus of Control* scales were modified from research by Bradley and Sparks (2002). Table 1 shows the measurement properties of the major scales of the study; Alpha reliabilities averaged .76 and ranged from .63 to .88. The average variance extracted (AVE) for all measures were above the criteria of .50 (see Fornell and Larcker 1981). The composite reliability measures, similar to the construct reliability measures of Bollen (1989), showed that each latent construct was well represented by the observed measures and ranged from .73 to .91 and averaged .74. Communality measures were all above the acceptable level of .50, for each latent variable (Fornell and Larcker 1981).

The reported use of self learning technologies was positively skewed (1.77) and had a kurtosis of 2.89. The log of the number of the number of times of use was used to transform this variable more towards a normal distribution.

The data were analysed using Partial Least Squares (SMART-PLS2.0) (Ringle and Alexander, 2005). This included validating the measurements, and testing support for the hypotheses of interest. Partial Least Squares (PLS) has many advantages, including outer model formulation which allows for the specification of both reflective and formative modes, as well as categorical variables, and can be used with smaller sample sizes, unlike conventional structural equation modelling (O’Cass and Pecotich, 2003). Maximization of variance explained (or R^2 values), in all dependent variables is the primary objective of PLS (Hulland, 1999).

Table 1: Measurement Properties

Scale and items and loadings of latent constructs	Measurement stats		Mean (Std Deviation)	Alpha Reliability
	Composite reliability	Communality		
<i>Readiness to Adopt SST</i> (4 items) AVE=.67 Capable to use (.90) Confident to get information (.81) Helps provide control over learning need (.80) Information on use of SSTs clear to me (.80)	.91	.67	26.47 (5.60)	.88
<i>Compatibility</i> (3 items) AVE=.70 Accessing SST saves time and effort (.89) Use a lot of SSTs with other organisations (.73) Compatible with the way I like to access information (.90)	.88	.71	15.31 (3.60)	.79
<i>Innovativeness</i> (4 items) AVE=.55 I am the first of my friends to use SST (.70) Compared to my friends I use a lot of SST (.81) If I heard about a new SST, I would probably use it (.65) I will try a new SST, even if I am not familiar with it (.81)	.83	.55	17.98 (4.21)	.74
<i>Log of Adoption of SST</i> Number of times used SST in a semester	-	-	3.78 (1.00)	-
<i>Perceived Value</i> (3 items) AVE=.66 SST is the best way to manage education services (.80) SST performs consistently (.77) Using SST I can find the academic information I need (.86)	.85	.66	14.37 (3.20)	.75
<i>E-Satisfaction</i> (4 items) AVE=.70 University is professional in providing higher education (.86) I trust university to act in my best interests (.74) SST satisfies my need for academic information (.87) Overall satisfaction with SST (.87)	.90	.70	20.23 (4.13)	.85
<i>Satisfaction with University</i> (5 items) AVE=.62 University satisfies my learning needs (.81) Value my education from university (.73) Satisfied with academic program (.76) I would choose this university again (.76) I would recommend this university (.86)	.89	.62	20.30 (4.56)	.86
<i>Internal Locus of Control</i> (4 items) AVE=.54 It is Important that university takes responsibility for education standards (.61) My skills and abilities influence results (.86) I will obtain better results if I work hard (.85) My grades reflect my effort (.59)	.82	.54	23.26 (3.52)	.71
<i>External Locus of Control</i> (2 items) AVE=.73 Luck plays a role in the grades I receive (.87) Education is a game of chance (.84)	.73	.73	5.41 (2.32)	.63

Results

The PLS results showed support for **H1**, Readiness to adopt leads to adoption of SST $\beta=.29$, $p < .05$), **H5** (perceived value of SST is directly related to e-satisfaction, $\beta=.72$, $p < .01$, $r^2=.52$), **H6** (e-satisfaction is positively related to the satisfaction with the organisation, $\beta=.67$, $p < .01$, $r^2=.44$), **H7** (internal locus of control is a positive predictor of the perceived value of SST, $\beta=.34$, $p < .05$) and **H9** (external locus of control is negatively related to the adoption of SST, $\beta= -.16$, $p < .05$). Support was not found for **H2**, Compatibility predicts the adoption of SST, **H3**, Innovativeness leads to the adoption of SST, **H4**, Adoption of SSTs leads to perceived value, **H7** Internal LOC is associated with the adoption of SST and **H10**, External LOC is negatively associated with perceived value of SSTs. The model predicts well the level of e-satisfaction with SSTs, $r^2=.52$, quite well the satisfaction of university, $r^2=.44$, but not the level of perceived value, $r^2=.19$ and adoption or actual use of SSTs, $r^2=.15$. Other factors such as the learning styles (group versus individual) within the cultural frame of reference of students may better predict their levels of adoption and perceived value with SST (see Moore and Wang 2007). This is the subject of future research with additional data. The results were partially replicated in a study of 217 Thai business students at large university in Bangkok. In

particular support in the second study was found for **H7** (internal locus of control is a positive predictor of the perceived value of SST, $\beta=.41$, $p < .05$) and **H9** (external locus of control is negatively related to the adoption of SST, $\beta = -.14$, $p < .05$).

Figure 1: Conceptual Model and Results SST and LOC: Australian University

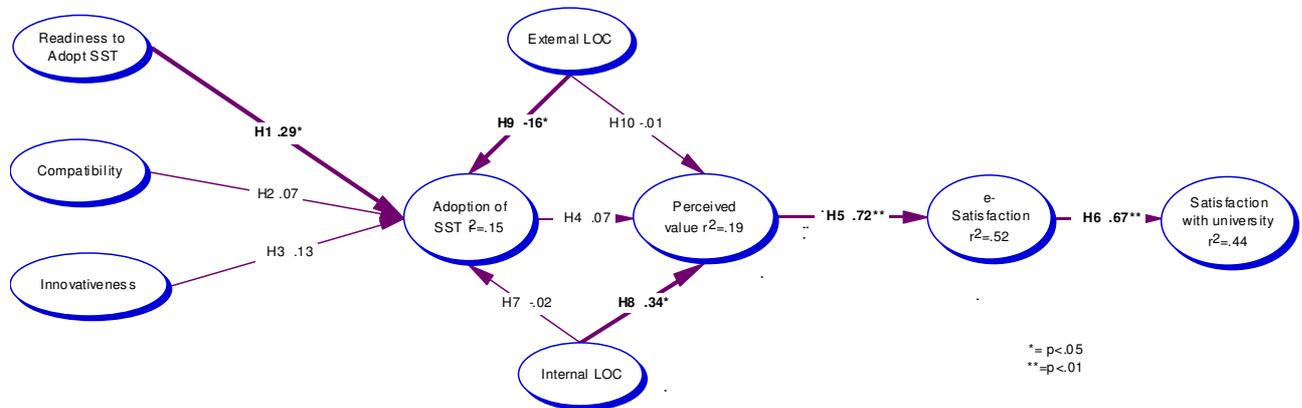
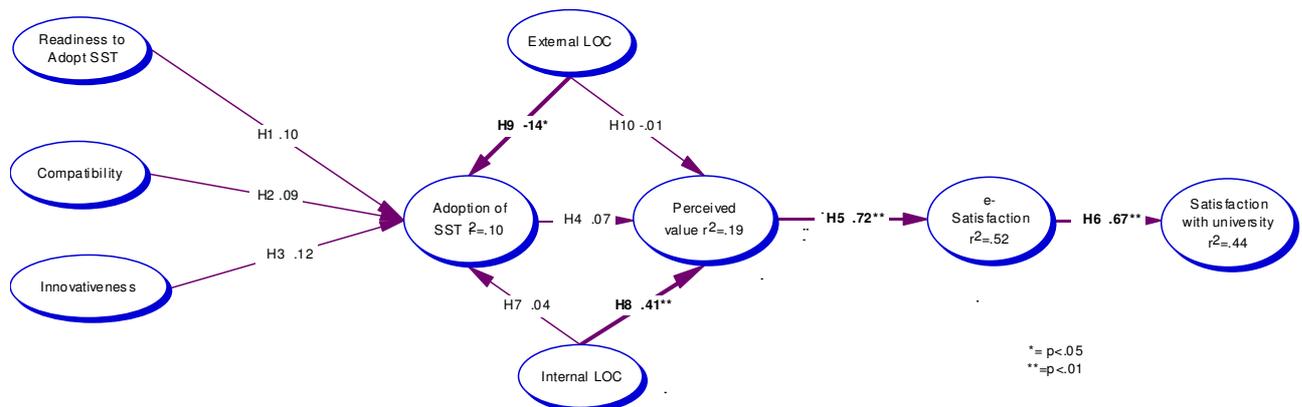


Figure 2: Results SST and LOC: Thai University



Discussion

Results of the Australian study showed students' readiness to adopt are an important factor in their level of use of SST. So there is a task for university academics and administrators to encourage students to be ready to adopt and use SSTs. This may start as part of a university induction course which encourages the trial of SST and shows the benefits of SST to students. Both studies showed that students with an external locus of control are reluctant to adopt SST and may prefer face-to-face teaching. Students in Australia and Thailand with an internal locus of control value the use of SST, this however, does not seem to be a reason for them to adopt SST. Importantly students with an external LOC may require additional help in the use of SST by staff, as they are unlikely to find out how to do this otherwise. Other factors which may predict uptake and value of SST could also include the learning styles of students', the educational infrastructure of the provider and the amount of academic staff support. The issue of SST e-satisfaction is an important issue given the strong link shown in both studies between it and the overall satisfaction with the university.

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