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# A systematic analysis of the theory of reasoned action, the theory of planned behaviour and the technology acceptance model when applied to the prediction and explanation of information systems use in mandatory usage contexts

Patrick Rawstorne

*University of Wollo*

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A SYSTEMATIC ANALYSIS OF THE THEORY OF REASONED  
ACTION, THE THEORY OF PLANNED BEHAVIOUR AND THE  
TECHNOLOGY ACCEPTANCE MODEL WHEN APPLIED TO THE  
PREDICTION AND EXPLANATION OF INFORMATION SYSTEMS  
USE IN MANDATORY USAGE CONTEXTS

A thesis submitted in fulfilment of the requirements for the award of  
the degree

Doctor of Philosophy

from

University of Wollongong

by

Patrick Rawstorne

B.A. (Hons.)

The Department of Psychology

2005

## CERTIFICATION

I, Patrick R. G. Rawstorne, declare that this thesis, submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the Department of Psychology, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Patrick R. G. Rawstorne

December 2005

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# Abstract

Socio-cognitive theories such as the 'theory of reasoned action' (TRA), the 'theory of planned behaviour' (TPB), and the 'technology acceptance model' (TAM) have provided researchers with a theoretical framework to guide many of the studies that have sought to predict and explain end-user adoption and acceptance of information systems. Many of these studies were conducted in usage contexts in which individuals had a choice about their use of an information system. However, the increasing trend among organisations to computerise their work places has changed the scope of work activity. More industries are now requiring their employees to use an information system and to do so in prescribed ways. This amounts to mandatory usage. These workplace trends pose conceptual/theoretical, methodological and research validation issues for the use of the TRA, TAM and TPB.

A conceptual/theoretical issue that threatens to challenge the validity of the TRA and TAM in mandatory information systems (IS) usage contexts is based on the notion that mandatory behaviour is outside an individual's volitional control. If this is the case, it clashes with an underpinning assumption of the TRA and TAM that these theories were designed to predict and explain behaviours under volitional control. The TPB, on the other hand, has been suggested as a solution to this potential problem as it has the theoretical capacity to predict and explain behaviours low in volitional control. Despite these problematic issues, there is a paucity of published studies in the IS literature that have addressed mandatory usage within the framework of the socio-cognitive theories. Of the rare studies that have addressed mandatory usage, most were based around the framework of the TAM. There is also an absence of IS research that has examined the assumption that mandatory behaviours are low in volitional control.

One of the methodological concerns about using the TRA, TAM and TPB in mandatory IS usage contexts was that the key variable for predicting behaviour in these theories was considered potentially unsuitable in mandatory contexts. In the general literature, and to a lesser extent in the IS literature, usage intentions are strongly associated with behaviour. Due to the paucity of studies based in a mandatory usage context, it was unclear whether the association between usage intentions and behaviour would be weakened when the usage context was mandatory. There was reason to expect that it would be weakened. The reasoning was based on the view that if a potential end-user was asked whether they intended to perform a mandatory

behaviour they would be likely to answer in the affirmative. It was proposed that a way of overcoming a skewed measure of usage intentions would be to replace that variable with another that was less likely to be skewed but which would still be capable of predicting behaviour. One variable that appeared to fit these criteria was *symbolic adoption*, which refers to the extent to which a potential end-user has mentally accepted the adoption of an IS as a good idea and is enthusiastic about using it.

Another methodological concern was that in mandatory usage contexts it was considered neither sufficient nor sensible to measure usage behaviour based on whether people used the system or not (i.e., no/yes). It was argued that it would be potentially more important to have a dependent variable that measured aspects of usage behaviour. Moreover, since usage behaviour is multidimensional (Doll & Torkzadeh, 1998), there would be benefits to organizations if the TRA, TAM and TPB could predict and explain multiple IS usage behaviours. To date, there is a relative absence of IS research that has examined the capacity of these three theories to predict and explain multiple mandatory usage behaviours prospectively.

The major research question in the thesis sought to determine whether the TRA, TAM and TPB would predict and explain multiple prospective mandatory IS usage behaviours. A secondary research question examined whether the skewness in a measure of usage intentions would hamper the successful prediction and explanation of mandatory behaviour and, if so, whether *symbolic adoption* would outperform usage intentions in the prediction and explanation of usage behaviour. To answer these research questions, a series of studies was conducted using a strict methodology that involved testing the three theories true to theory by constructing scales for the TRA and TPB based on salient beliefs that were elicited from a subset of each sample; writing questionnaire items consistent with Ajzen and Fishbein's (1980) correspondence rules in action, context, target and time; and employing a longitudinal design in which the measurement of usage intentions and usage behaviour were separated in time.

Four studies were conducted in two types of organisations: (i) an Australian university, and (ii) Australian hospitals. Each study was conducted solely in the one type of organisation (either a university or a hospital) and was focused solely on one type of IS in each organisation. End-users were undergraduate students and nurses, in the university and hospital environments respectively. IS usage behaviours were the dependent variables that the three theories were being tested to predict and explain. Although the type of software varied across the studies, personal computers formed the hardware in each study. The degree to which the adoption and usage environments were mandatory varied across the studies. Participants completed

questionnaires on two occasions: before implementation and after they had been using the system for about two to three months. The structural models for the three theories were analysed using structural equation modelling with partial least squares estimation.

The results showed that despite the skewness in the measure of usage intentions, the TRA, TAM and TPB significantly predicted and explained prospective mandatory IS usage behaviour, albeit by explaining a relatively small amount of variance in behaviour. This weaker explanation of behaviour in comparison with other studies in the IS literature was attributed to predicting prospective, rather than current or retrospective, behaviour as well as predicting multiple, rather than single, IT usage behaviours. An unexpected finding was that when mandatory and voluntary usage behaviours were compared in the same study, the mandatory behaviour was predicted and explained more successfully than the voluntary usage behaviour. It was concluded that mandatory behaviour may be more stable than voluntary behaviour in the early stages of an IS implementation. This characteristic may mean that mandatory behaviours can be predicted more successful longitudinally than voluntary behaviours.

While many end-users had strong intentions to use the particular IS in each study, a sizeable proportion had negative attitudes about such use. To examine whether these end-users developed positive attitudes about the IS after using the system, as suggested by cognitive dissonance theory (Festinger, 1957), Study 4 compared pre and post-implementation perceptions about the IS. The results were counter to the research hypothesis. Rather than showing improved attitudes and perceptions of the usefulness and ease with which the system could be used, participants' attitudes and perceptions of usefulness decreased over time. This decrease was attributed to overselling the benefits of the IS to employees, which may have created expectations that could not be matched by subsequent use of the IS.

In comparing the three theories across the four studies, each explained a similar amount of variance in usage behaviour. However, the TPB explained the most variance in usage intentions. The TAM was the easiest model to apply, since the scales did not have to be constructed from elicited beliefs, as they did for the TRA and TPB. The choice of these three theories and associated models will therefore depend on the priorities of the researcher or stakeholder.

Finally, this thesis has conceptually clarified and empirically verified that the type of volitional control that may be absent when usage is mandatory, is a different volitional control than was envisaged by Ajzen (1985, 1991) when he developed the TPB. As such, the TPB may perform as well in voluntary usage contexts as it does when usage is mandatory.



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# List of Special Names and Abbreviations

FULL NAME	ABBREVIATION OR ACRONYM
Attitude toward the behaviour	Attitude
Behavioural expectation	BE
Behavioural intention	BI
Enterprise resource planning systems	ERP systems
Information systems	IS
Information systems satisfaction	ISS
Information technology	IT
Nurse care plan	NCP
Partial least squares	PLS
Perceived behavioural control	PBC
Perceived ease of use	PEU
Perceived usefulness	PU
Perceived voluntariness	PV
Social Learning Theory	SLT
Structural equation modelling	SEM
Subjective norm	SN
Symbolic adoption	SA
Technology acceptance model	TAM
Theory of planned behaviour	TPB
Theory of reasoned action	TRA