School Administration And Management Systems Adoption and Use: TAM Extension

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SCHOOL ADMINISTRATION AND MANAGEMENT SYSTEMS ADOPTION AND USE: TAM EXTENSION

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Abstract

School administration and management system (SAMS) is designed to match the structure, management tasks, instructional processes and special needs of the school. Despite initiatives meant to widen the use and availability of management information systems and other generic software productivity tools, some schools in South Africa are still using the manual management and administrative information systems. There is disproportionate operational, adoption, and use of information systems in developing countries. This paper reports on a research in progress on the adoption and use of SAMS in South African schools. The aim of the research is to explore and describe the critical social, cultural and organisational and contextual factors which may influence the successful implementation, adoption and use of school administration and management systems in South African schools. TAM is employed as theoretical basis of the paper. The pilot study results are reported. The computer literacy and SAMS training of users is which are facilitating conditions are very low.

1. INTRODUCTION

Information and communication technologies (ICTs) are central to the changes taking place throughout the world. Changes brought about by ICTs, also manifest in educational institutions and settings. For example, advances in ICTs have dramatically changed the way learners learn, the way teachers teach and the way educational administration is done. This has opened up new learning opportunities and provided access to educational resources well beyond those traditionally available (South Africa, 2004:6).

Developing countries like South Africa, are lagging behind in the use of School Administration and Management Systems (SAMS), partly because of constrains in skills, expertise, spatial barriers, fiscal constraints, computer equipment and other capacity related limitations (Visscher: 2001; South Africa, 2004:6).
Paper files and record books used in the manual systems in schools can easily be lost or misplaced. Manual systems which have worked in the past are no more effective. It takes too much time and effort to keep the manual registers and files used in the schools up to date (Mokwena, 2010). To calculate the student’s promotion marks manually with pen and calculator consumes valuable time which could be spent on more productive work. Should there be a mistake on one student’s mark it affects the entire schedule and the teacher has to recalculate the marks again. With fatigue mistakes creep in. The manual checking of these marks by the school administrators is inefficient and ineffective. To keep up with changes in education the manual systems are too slow to keep pace. Computerized information systems make it easy to keep pace with the changes as alterations can be done at the press of a button.

2. ICT in South African schools

Bialobrzeska and Cohen (2006), contend that information and communication technology (ICT) projects in South African schools do not succeed because the principals are often not properly informed about what ICTs can or cannot do. This often hampers their ability to manage the introduction of ICTs into their schools. There is a need to provide support for principals and other senior managers in managing the integration of computers and related resource in their schools. This view is further captured in the white paper on e-education South Africa (2004:21), “Education leaders do not yet fully appreciate the benefits of e-learning and e-administration for institutions… It is important that educational leaders at all levels of the system are provided with the necessary support to enable them to manage the introduction of ICTs and the related change process”

Gülbahar (2007) argues that, although computers are powerful tools for improving the effectiveness of instruction, improper technology planning usually causes loss of time, energy and fiscal resources. This causes the decision makers to hesitate about the benefits of and contribution of technology.

Educational leaders need to be well informed and supported to introduce and sustain computer usage for administrative and management activities in the schools. A clear project plan is inevitable in the smooth and successful implementation and use of
school administration and management systems. It is not sufficient to have a room full of computers to reap the benefits of technology. It is a misperception that School Administration and management Systems (SAMS) introduction merely entails purchase and installation of hardware and software, accompanied by some introductory training (Telem, 1996; Bialobrzeska & Cohen, 2006).

3. Defining SAMS

SAMSs are designed and implemented to provide educational administrators with tools to support them in a variety of pedagogical and administrative activities (Telem, 1996). In the literature different terms are used to explain or define the School Administration and Management System. (Visscher, 1991:1) uses the term Computer Assisted School Administration (CASA), and defines CASA as “the use of computers for administration and management activities in schools”. Visscher (1996) also uses the term computer-assisted school information systems (SIS). Telem (1996) employs the term School Administration and Management System (SMIS), and asserts that, “school management information system (MIS) is designed to match the structure, management tasks, instructional processes and special needs of the school”.

Bisaso et al., (2008), make use of the term Computerized Information systems (CISs) for education, Visscher, Fung and Wild (1999) employ the term School Administration and Management System SAMS as used for the system in Hong Kong. The same term is used by the South African Department of Education (South Africa, 2006) and is defined as a “robust computer application specifically designed to meet the management, administrative and governance needs of schools”.

For the purpose of this paper the term School Administration and Management System (SAMS) will be used to refer to both CISs and CASA and SMIS.

3.1 SAMS in South African schools

SAMS, was designed by the National department of Education to provide schools with a cost effective, easy to use and fully integrated computer solution containing all aspects of school management requirements. SAMS is described as a robust computer application specifically designed to meet the management, administrative and governance needs of public schools in Southern Africa (South Africa, 2006).
SAMS also boost a time table module to assist schools with the complicated task of allocating educators to subjects to classes. Another good attribute is that it has been designed with the non-computer literate users in mind. It therefore uses button interface and user prompting mechanism instead of a complicated menu structure (South Africa, 2006).

SAMS has been made available to provinces. Every province is responsible for the implementation of this system in their schools. The strategy chosen by the Limpopo Province was to first implement the system in what is known as Dinaledi (star) schools. There is low or non-use of SAMS in these schools (Mokwena, 2010). The purpose of this paper is find out which factors influence the school personnel low or non-use of SAMS.

4. The benefits of School Administration and Management Systems

Research in various countries,(e.g. Turkey: Demir, 2006:1; Israel: Telem, 1999, 2001; and America: Demir, 2006:2) confirms that school administration and management systems increases organizational and managerial effectiveness. Efficiency in decision making increases at schools where school information management is used. School administration and management systems reduce workload and make management process more efficient and enable school managers to use their time more efficiently. School managers can make more efficient decisions when they get correct and up-to-date information from MIS (Demir 2006:2, Visscher et al., 1999; Telem, 1996:85).

Using technology effectively in administrative activities could provide more access to information resources, lead to innovative administrative approaches and also increase administrative efficiency. Technology plays an important role in promoting effectiveness in both administrative and teaching and learning processes (Gülbahar, 2007:944). If SAMS is so beneficial to the school’s administration and management why is there a low or non-use by South African school personnel?
5. **Theoretical Framework**

Theories, stress the importance of going beyond the observable phenomena to deeper, hidden layers of reality, in order to define concepts and identify general laws as well as principles, which can help systematize and explain the chaotic flux of observable facts (Ågerfalk, 2004).

Good use of theory helps in designing the study more effectively, as well as being useful for generalizing the end results (Kogg, 2002). Theories in research function in three ways: firstly they prevent our being taken in by flukes, secondly they make sense of observable patterns in a way that can suggest other possibilities and thirdly theories shape and direct research efforts, pointing towards likely discoveries through empirical observation (Babbie, 2001).

IS research should be established on cumulative tradition using referent disciplines and theoretical arguments as a foundation (Thompson et al., 1991). An appropriate reference theory employed in research guides research design and aids the researcher to identify appropriate independent variables and intervening variables that relate to utilization and provides a definition of utilization (Babbie, 2001; Trice & Treacy, 1988).

The prolific stream of research on information systems use takes a variety of theoretical perspectives (e.g., Thompson et al., 1991; Lee et al., 2004:752; Briggs et al., 1998). These theories include: Task Technology Fit model (e.g., Dishaw & Strong, 1997); Diffusion theory (e.g., Mao, 2002), The Theory of planned Behavior (e.g., Mathieson, 1991; Taylor & Todd, 1995), Activity Theory (e.g., Kekwaletswe, 2005) and Technology Transition Model (e.g., Briggs et al, 1998). These theories have been acknowledged in the IS research because they enable researchers to gain insight into the peoples’ reaction towards computers as well as factors behind those reactions.

Information systems researchers have long investigated why, and how individuals interact with information technology (Robert et al., 2007). The acceptance of new technologies has long been an area of inquiry in the MIS literature. The acceptance of
computer applications is one example of technologies which have been investigated (e.g., McCloskey, 2006; Chang et al, 2008; MA, 2004; Mokwena, 2010).

Venkatesh et al. (2003) identified nine user acceptance models. These models are:
(1) Theory of Reasoned Action (TRA), (2) Technology Acceptance Model (TAM),
(3) Motivation Model (MM), (4) Theory of Planned Behavior (TBP), (5) Combined TAM and TPBC (C-TAM-TBP), (6) Model of PC Utilization (MPCU), (7) Innovation Diffusion Theory (IDT), (8) Unified Theory of acceptance and use of Technology (UTAUT) and (9) Social Cognitive Theory (SCT).

Of all the theories, TAM is considered the most influential, powerful, and parsimonious and commonly employed theory for describing an individual’s acceptance of information systems (Lee et al., 2004). TAM has been chosen as the model appropriate for this research. This study is based on TAM.

5.1 Technology Acceptance Model (TAM)

TAM was developed with two major objectives in mind. First to improve researchers understanding of user acceptance processes, second to provide a theoretical basis for a practical user acceptance testing methodology that will enable system designers and implementers to evaluate proposed new systems prior to their implementation (Davis, 1986). A substantial theoretical and empirical support has accumulated in favour of TAM, and numerous studies have found that TAM consistently explains a substantial proportion of the variance in usage intentions and behavior (Venkatesh & Davis, 2000).

TAM is an adaptation of the Theory of Reasoned Action (TRA) and is one of the most successful models in the Information Systems literature for predicting user acceptance and usage behavior. It is based on TRA developed in Social Psychology by Fishbein and Ajzen (1975). TRA is a general system designed to explain almost every type of behaviour.
TRA assumes that behavior can be predicted on the basis of a person’s behavioral intentions. Intention is determined personally and socially. The theory was designed to model how specified behavior under volitional control is produced by beliefs and attitude, and intentions towards performing that behavior. TRA specifies that this intention is produced by the individual’s attitude and the individual’s perception of social pressures to perform that behavior, or the social norm (Ajzen and Fishbein, 1980). TRA assumes that human beings usually behave in a sensible manner so that they might obtain favorable outcomes and meet the expectations of others (Simon & Paper, 2007). TAM theorizes that the effect of external variables (e.g., system characteristics, development process training, etc) on intention to use is mediated by perceived ease of use and perceived usefulness (Venkatesh & Davis, 2000). It assumes that an individual’s information systems acceptance is determined by two major variables: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU).

Perceived usefulness is defined as:” the degree to which a person believes that using a particular system would enhance his or her job performance”. Perceived Ease of Use is defined as:” the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989). If a user has to choose between two applications he/she is likely to choose the one which is perceived to be easy to use if it helps with the task at hand. The usefulness-usage relationship is relatively stronger compared to ease of use-usage relationship. This is because users are inclined to firstly accept an application because of its functionality and secondarily for its ease of use. Perceived usefulness is also influenced by perceived ease of use (Venkatesh & Davis, 2000). Users are often willing to cope with some difficulty of use if the system provides critically needed functionality (Davis, 1989).
TAM did not maintain its original form. Like an organic being it continues to evolve (Lee et al., 2004; Venkatesh, 2000). Research employing TAM focus on three broad areas (Venkatesh & Bala, 2008; Lee et al., 2004):

- Some studies replicated TAM and focused on the psychometric aspects of TAM constructs.
- Other studies provided theoretical underpinning of the relative importance of TAM constructs namely, perceived usefulness and perceived ease of use.
- Other studies extended TAM by adding additional constructs as determinants of TAM constructs.

Most researchers who have applied TAM in their studies have adapted it to suite their particular study e.g. McCloskey (2006). This study aims to extend TAM with additional constructs as determinants of PU and PEOU.

6. The research problem and questions

This study extends TAM by adding social, organisational and individual factors as well facilitating conditions as determinants of PU and PEOU of SAMS. The aim of this study is to explore and describe the factors which may determine the successful implementation, adoption and use of school administration and management systems in South African schools.

This study is guided by the following research questions:
RQ1: What are the social, cultural and organizational factors that explain the behavior of school personnel towards using SAMS in the South African school setting?

RQ2: What is the relative importance of these factors in determining SAMS use by school personnel?

7. Research model and hypotheses

Figure 2: Research methodology summary

The following are hypotheses on which this study is based:

- **H1A**: There will be a positive correlation between Social factors and Perceived usefulness of SAMS
- **H1B**: There will be a positive correlation between Social factors and Perceived ease of use of SAMS
- **H2A**: There will be a positive correlation between Individual factors and Perceived usefulness of SAMS
- **H2B**: There will be a positive correlation between Individual factors and Perceived ease of use of SAMS
- **H3A**: There will be a positive correlation between Organizational factors and Perceived usefulness of SAMS
- **H3B**: There will be a positive correlation between Organizational factors and Perceived ease of use of SAMS
- **H4A** There will be a positive correlation between Social factors and Perceived usefulness of SAMS
- **H4A** There will be a positive correlation between Social factors and Perceived ease of use of SAMS

8. **Research methodology**

Table 1 shows the summary of the research methodology. A short discuss of each attribute is presentenced in the section Sections 8.1 to 8.4

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**Table 1: Research methodology summary**

8.1 **Nature of research**

There are three common types of research in social sciences (Babbie, 2005): exploratory, descriptive, and explanatory. Exploratory research is generally conducted to develop initial rough understanding of some phenomenon. A descriptive research is undertaken to describe the precise measurement and reporting of the characteristics of some population or phenomenon under study. An explanatory research is conducted to discover and report some relationships among different aspects of the phenomenon under study (Pinsonneault & Kraemer, 1993; Babbie, 2005).

Since the primary purpose of this study is to identify the social, individual, and organizational critical success factors that may explain the behavior of school personnel towards using school administration and management systems in the school settings, the nature of this study is exploratory, explanatory and descriptive.
8.2 Unit of analysis

Units of analysis primarily investigated in social science are individuals, groups, organizations and social artifacts (Babbie, 2005). Regardless of the unit of analysis, the units for data collection in survey research are usually individuals (Pinsonneault & Kraemer, 1993). Since this study is interested in the factors that may influence an individual’s behavior to use SAMS, the unit of analysis is an individual. In this study the individuals are school personnel (the principal, deputy principal teaches and clerk/secretary) who are targeted to use SAMS in the school environment.

8.3 The time dimension

Time plays an important role in the design and execution of research (Babbie, 2005). Researchers can choose to make observations more or less at one time or over a long period of time (Babbie, 2001). Researchers have basically two options in terms of time dimension: cross-sectional and longitudinal. Cross-sectional studies are carried out once and represent a snapshot in time (Cooper & Schindler, 2003). It is therefore considered that a cross-sectional approach is most appropriate and feasible for this study as it involves large scale survey of schools in a rural environment. The system under study (SAMS) is also subject to change over time.

8.4 Data collection methods

In general data collection effort is often guided by relevant existing theories (De Vreede, 1999). Survey method was the method used in the development of TAM and most subsequent studies have employed survey as the primary method of data collection and quantitative data analysis methods for the data collected through structured questionnaires.

The choice of data collection method, such as mail questionnaire, telephone interviews, or face to-face interviews, is significant because it affects the quality and cost of the data collected.

Choosing a specific method depends on financial resources and the circumstances of the research (Kerlinger, 1986; Kim, 1996). Mail survey is probably the best method available to collect original data from a sample population too large to observe
directly (Babbie, 2001). Self-administered questionnaires method in which the questionnaires are hand-delivered to the schools was employed in this study.

This paper reports on the pilot study conducted in three schools which represent the type of school in which the main survey is going to take place. Data has been collected by means of questionnaires from the three schools in Capricorn district Limpopo province. Respondents are school personnel (the principal, deputy principal, teachers and secretary/clerk). 30 questionnaires 10 per school were hand delivered to the schools and collected after a week. Of the 30 questionnaires 21 were filled in when they were collected from the schools. 18 returned questionnaires were acceptable for analysis.

9. Data analysis and discussion

The data of main survey will be analyzed with correlation and regression analysis statistical techniques. Due to the size of the data of the pilot study, a descriptive analysis of the data was carried out. Of the 18 respondents, 10 (56%) were males and 8(44%) females. In terms of SAMS training only 10 (56%) received formal training.

In relation to computer experience one (5.6%) had no computer experience, 8 (44%) had up to four years computer experience and 33% (6) had up to 10 years experience, 11% (2) possessed 14 years computer experience and only one (5.6%) had 15 or more years of computer experience. The experience with SAMS was spread as follows: (5) 28% had no SAMS experience; 7 (39%) had 1-2 years experience; respondents with 3-6 years SAMS experience were 5 (27%) and respondents with seven or more year of SAMS experience was only one (5.6%)

Regarding SAMS user types, 5 (28%) of school personnel regard themselves as non-users, 7 (39%) are novice users, (3) 17% novice saw themselves as frequent users, (2) 11%. Were expert casual users and only one (6%) was an expert frequent user. In regard to frequency of SAMS usage in days, 20% (3) used SAMS five days in a week, 13% (2) four days, another 13% used SMAS three times, 7% only 1 used for days and the majority 47% used SAMS once a week.
Of the (56%) 10 who received formal SAMS 5 (40%) where trained for five days or more, 2 (20%) received training for 4 days, and 3 (30%) were trained for 1 day.

From the data presented above it is clear that the SAMS experience and frequency of SAMS use is low. The majority of the respondents regard themselves as either not using SAMS (28%) or novice users (39%). More than 50% were trained for less than 3 days. The levels of computer literacy were very low in this group which should suggest more time of training on computer literacy.

The Pilot study has clearly indicated that facilitating conditions (which are defined as the degree to which school personnel believe that organizational and technical infrastructure exist to support the use of SAMS) are very important in the adoption and use of SAMS by school personnel.  

This is work in progress towards PhD.
References


