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The link between post-implementation learning motivation and enterprise resource planning system usage: a pilot study.

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Abstract

This study develops a conceptual model of the relationship between post implementation learning and enterprise resource planning system (ERP) usage. It equally proposes perceived usefulness, perceived ease-of-use and mastery-goal orientation as the dimensions of post implementation learning motivation. A pilot study and comprehensive review of the literature on enterprise systems and information usage was conducted in this study. Based on the suggested relationships between the cognitive dimensions of post-implementation motivation and ERP system usage, a reliability test of the internal consistency of the proposed measurement instruments was validated by a pilot test

Keywords: ERP system, perceived ease-of-use, perceived usefulness, post-implementation learning motivation, mastery-goal orientation.

1 Introduction

Investment in enterprise systems (ES) since the 90s has continued unabated. Essentially, increases in investment are due to the quest for control of huge market share through competitive advantage and the efficient business process capabilities of ES packages. ES are modularly arranged integrated software systems that manage core business data and information across units and departmental functions of an organisation (Arasanmi, Wang, Singh, 2016). ES such as enterprise resource planning (ERP) packages like SAP, Oracle and Microsoft Dynamics are complex and expensive information system platforms, which are quite often difficult for end users to learn and use.

The effective post-learning implementation usage of the ERP system depends on the skills of the end-user. This encourages organisations to make heavy financial investment in ERP system implementation training. In spite of the huge financial commitment in end-user training, some ERP implementations have failed (Adam & O'Doherty, 2003) to yield the desired organisational results. These failures have been attributed to under-utilisation behaviour, opposition from users and inadequate transfer of skills (Marler et al., 2006; Jasperson, Carter, & Zmud, 2005; Arasanmi, Wang & Singh, 2016).

Implementation training is a pervasive method that has been widely used to minimise end-users' acceptance problems (Umble, Haft, & Umble, 2003). End-user implementation training teaches the end user skills and required knowledge. It is crucial for an organisation to provide implementation learning to the end-user to derive the maximum benefits from the ERP system (Jasperson et al., 2005). It seems the neglect of this important phase in the implementation, partly explains the limited utilisation behaviour among end-users and the ensuing failures. It is clear that there is minimal use of learning and training constructs in information systems (Olfman & Bostrom, 1991; Shayo & Olfman, 1994; Marler et al., 2006). In fact, few studies have assessed the link between training or training related constructs and technology usage at post implementation stage (Arasanmi, Wang & Singh, 2016; Marler et al., 2006). More worrisome is the fact that studies on the end-user's post-training behavioural performance in terms of transfer of IS learning in task terrain are very limited (Arasanmi, Wang & Singh, 2016). Therefore, there is a need for research on post implementation learning issues in information systems (IS).

Post implementation learning connotes continuous learning after the implementation of an information system (Chou, Chang, Lin & Chou (2014). The complex features of an ERP system often limit the degree

to which end-users are able to absorb relevant knowledge before actual usage (Yi & Davis, 2003). Hence the need for continuous learning which will lead to a more effective use of the systems (Doll, Deng, & Scazzero, 2003) as a result of the acquisition of more skills required for effective processing of tasks on the system. While the provision of post-implementation learning is essential, the expected results may be affected where the end-user's post implementation learning motivation is inadequate. It is noted that prior research on post-implementation learning has maintained some silence on this important issue. Even notable IS theory, such as the Technology Acceptance Model (TAM) have not stipulated the positions of training and/or components of training during, pre or post implementation phase of information systems deployment. This paper aims to shed some light on the post-implementation learning motivation in this context. Accordingly, the main research question of this paper is:

How does post-implementation learning motivation influence the end-user's performance behaviours in an ERP system context?

Consequently, this study aims to explain the link between post-implementation learning motivation and ERP system usage. Additionally, the study also aims to establish the dimensions of post-implementation learning motivation, as well as to validate the measurement model through partial least square-structural equation modelling (PLS-SEM) using SmartPLS 3.2.3.
This study will contribute to the ES research literature; by providing insights on the drivers of implementation learning motivation and the role of post-implementation learning motivation (PILM) on post-training behaviours (ERP usage) in terms of the use of acquired skills. Secondly, this paper will highlight the importance of PILM on ERP usage as a measure of post-implementation learning behaviour. There is a paucity of studies on the linkage between the components of IS training and the post-implementation usage.
The paper proceeds as follows: Section 2 presents the literature and the operational definitions, research framework and research method. Section 3 presents the results of the pilot test of the psychometrics of the constructs and the conclusion and how the study will proceed in the future.

2 Literature review

2.1 Post-implementation learning motivation (PILM) as antecedent of ERP usage

In this paper, post implementation learning motivation (PILM) is defined as *"the desire of the end-user to continuously learn the features, functions and processes of an information system after the implementation training'.*

Research from motivational perspectives shows that learning motivation affects the willingness to learn and the extent to which the end-user expends his or her effort in the learning situation (Noe & Wilk, 1993). The motivation for continuous post IS learning is *sine qua non* to improved skills and the acquisition of adequate skills required by the end-user for subsequent post-implementation training performance on the system (i.e., ERP usage). It is imperative to understand the drivers of post implementation learning motivation because the motivational processes and actions during and after implementation learning, affect learning outcomes, such as skill acquisition, skill and knowledge transfer and system usage. Continuous learning is even more expedient in the ERP setting because of the heightened frustrations of end-users during the implementation training phase (Boudreau, 2002). Knowledge of the predictors of post-implementation learning motivation among end-users in ERP post implementation is therefore crucial.

Post learning motivation indicates the end-user's willingness to persistently learn the features and the functional components of the system. It represents the degree of persistence associated with the learning of the components of the system after the implementation. Post learning motivation depicts the end-user's behaviour in engaging and persisting in his or her effort to understand the deep use of the system.

Social cognitive theory argues that the individual motivational pattern determines learning acquisition. Learning motivation has been found to affect learning effectiveness (Colquitt, LePine, & Noe, 2000; Chiaburu & Marinova, 2005). Research suggests that actions and choices individuals make in learning activities, determine the post learning outcomes (Klein, Noe, & Wang, 2006). The end-user's dispositions, in a way, affect the actions and goals achievement in the learning environment.

PILM seeks to make the end-user learn more and become more engaged in exploiting the system's key features. It further enhances the assimilation, acceptance and deep usage behaviours of end-users. Learning motivation is regarded as a criterion for effective task performance (Calvert, 2006; Robey,

Ross, & Boudreau, 2000); especially in situations where learning is instrumental to better post learning performance (Chiaburu & Tekleab, 2005). Therefore PILM indicates the end-user's favourable disposition and commitment towards the use of the system after implementation (Stone & Henry, 2003).

2.2 Cognitive predictors and IS usage

The study operationalised perceived usefulness, perceived ease-of-use, and mastery goal orientation as antecedents of PILM and ERP system usage. Cognitive variables deal with individual perception, disposition and prior experience (Lippert & Forman, 2005). Drawing from technology acceptance model and goal orientation theory, perceived usefulness and perceived ease-of-use and mastery goal orientation are operationalised as cognitive antecedents of PILM.

Basically, perceived usefulness (PU) and perception of ease-of-use (PEU) are affective reactions. Training and psychology literature see these variables as reaction outcomes of training intervention that affect performance behaviours in different settings. This paper operationalised these variables in the context of IS implementation training outcomes and argues that, IS training outcomes such as PU and PEU will enhance the PILM of the end-users. PU and PEU have been associated with IS use (Campeau & Higgins, 1995; Igbaria, Zinatelli, Cragg & Cavaye, 1997).

Igbaria, Zinatelli, Cragg & Cavaye (1997) established that IS training is an effective strategy that significantly influences the end user's perception of usefulness in IS terrain. PU connotes the end-user's belief that using a particular system would enhance his or her job performance (Davis, 1989). On the other hand, PEU (Davis, 1989) represents the degree of belief that using a computer-based system is free of effort. PEU is the perception of the cognitive effort needed to learn and use an information system (Gefen, 2003). PEU as a reaction outcome of training plays a significant role in the end-user's acceptance behaviour in a post-technology learning environment (Amoako-Gyampah & Salam, 2004; Marler et al., 2006). Research shows a positive relationship between perceived usefulness, perceived ease of use and technology performance (Lippert & Forman, 2005).

Meanwhile, mastery goal orientation (MGO) is a personal variable which indicates a strong quest for learning and acquisition of skills in the learning environment. MGO is the motivational inclination of an individual to learn, in task and achievement situations (Dweck, 1986). MGO is an exceptional desire for the acquisition of skills and the development of some level of competency in a learning environment (Arasanmi, Wang & Singh, 2016). Research suggests that mastery oriented individuals learn more due to their self-efficacy and belief in their capability to excel in a task-related environment; including learning and task performance domains (Gravil & Compeau, 2003). Chou, Chang, Lin & Chou (2014) found a positive relationship between self-efficacy and implementation learning on ERP system usage.

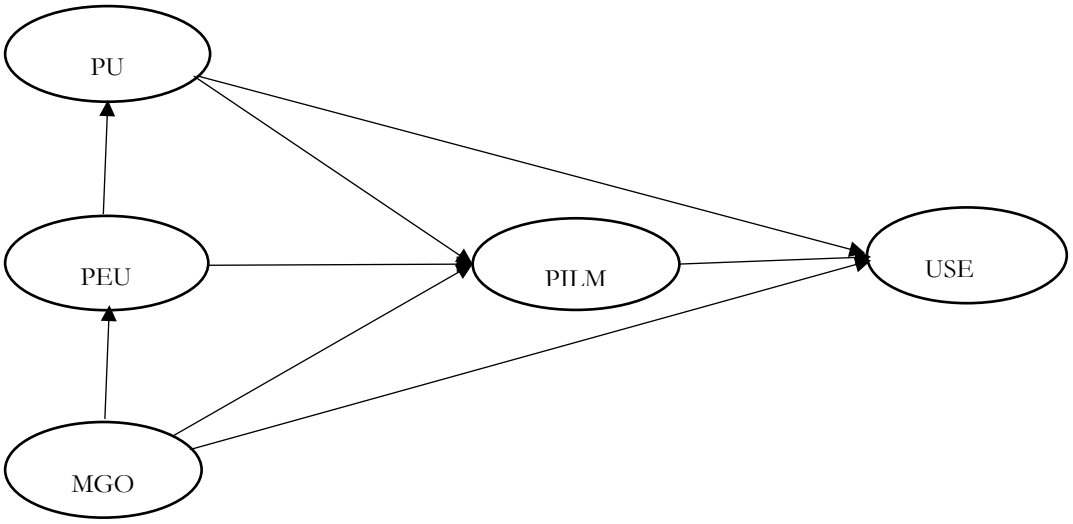

Figure 1: Conceptual framework of the study

3 Research framework

Drawing from available evidence from IS and psychology literature (Klein, Noe & Wang, 2006; Chou et al., 2014), Figure 1 proposes that PU, PEOU and MGO will influence PILM and ERP usage. The model equally argues that PILM will also influence ERP system usage among the end-users.

Several studies have assessed the relationship between perceived ease–of-use, perceived usefulness, and mastery goal orientation in IS use. Many of these factors were found to affect end-users' behaviour in the post learning environment (Amoako-Gyampah & Salam, 2004; Marler et al., 2006; Chou et al., 2014; Gravil & Compeau, 2003). This paper operationalised PU and PEU as training outcomes, even though Technology Acceptance Model (TAM) based IS studies do not operationalise these factors in the context of (reaction) outcomes of IS training. The IS studies have shown that PU and PEU affect IS usage (Compeau & Higgins, 1995; Igbaria, Zinatelli, Cragg & Cavaye, 1997; Amoako-Gyampah & Salam, 2004). Similarly, PEOU was found to influence end-users' acceptance behaviour (Amoako-Gyampah & Salam, 2004; Marler et al., 2006). Following the logic of these prior studies, it is posited that PU and PEU will associate with PILM and ERP usage as a measure of post implementation learning performance.

Research also suggests that mastery-oriented individuals learn more due to their self-efficacy and belief in their capability to excel in difficult learning and task environments. Arasanmi, Wang & Singh (2016) examined the influence of MGO on the end-user's ability to transfer acquired skills in the post-ERP system environment. The study found a positive relationship between MGO and the end-user's desire to apply the learning in the task environment. Therefore, it is assumed that MGO will influence end-user's perception of ease-of -use.

Gravil & Compeau (2003) opined that mastery-goal oriented characters learn more in a learning environment and perform well in difficult task domains. Mastery-oriented individuals are high in their quest for knowledge and new skills (Ford, Smith, Weissbein, & Gully, 1998). MGO individuals possess the capability to cope in tough learning environments (Ford, Smith, Weissbein, & Gully, 1998). Since MGO end-users are much more motivated to learn in the training environment, it is expected that they will equally increase their post-implementation learning performances (ERP task situation) by putting their skills to use. The model argues that MGO will affect an end-user's ERP system usage.

Lastly, Chou et al., (2014) assessed the relationship between implementation learning and ERP system usage and found a significant correlation between the two variables. This model proposed that PILM will influence post-learning performance on the ERP system. Since a motivated learner is a better learner they are more likely to acquire more skills during the implementation learning. Hence, it is assumed that the end-user with learning motivation will exert more effort in the post-learning work setting by applying the learned skills on the ERP system.

Construct	Items operationalisation	Source
Perceived ease-of-use	Learning to use the ERP system is clear and understandable	Davis (1989)
	Interacting with the ERP system is easy	
	It is easy to become skilful at using the ERP system	
Mastery goal orientation	If I don't succeed on a difficult task, I try harder next time	Santhanam et al. (2008)
	I tend to set fairly challenging goals for myself in learning situations	
	I always challenge myself to learn new concepts	
Post-implementation leaning motivation	I will always be interested in learning the ERP system training materials during the implementation learning.	Yi & Davis (2003); Al-Eisa et al. (2009)
	I will try to learn the ERP system as much as I can during the implementation learning.	

	I will continue to learn the ERP system implementation learning	
Perceived usefulness	Using the ERP system improves my job performance	Davis (1989)
	Using the ERP system improves my productivity.	
	Overall, the ERP system is useful in my job	
ERP usage	I use the ERP system intensively everyday	Liang et al. (2010); Mouakket (2010)
	I use the ERP system frequently everyday	
	I spend a lot of time using the ERP system	

Table 1. Operationalisation of items

4 Pilot study

Several studies have vehemently argued for the role of IS training interventions on end-users' positive behaviours and attitudes toward the deployed system. This study highlights the neglected issue of post implementation learning motivation in ERP system deployment, particularly its role on end-users' acceptance and performance behaviours. It is believed that end-users' difficulties in using the system can be mitigated through post implementation motivation. This conceptual model proposed PU, PEU and MGO as cognitive factors that can trigger learning motivation of among end-users.

This study collected data from ERP end-users through a survey. The self-report is an appropriate method of data collection in IS (Mouakket 2010; Amoako-Gyampah & Salam 2004). The collected data were screened for threats to the quality of the collected data. A total of 80 participants were used in this pilot study. The assessment of items' reliability and validity was conducted through partial least square-structural equation modelling (PLS-SEM) using SmartPLS 3.2.3.

Basically, the items AVE, composite reliability, discriminant validity criteria comprising heterotrait-monotrait ratio (HTMT) (Henseler et al. 2014) and Fornell-Larcker were conducted. The loadings and AVE achieved the desired benchmarks of 0.7 and 0.5 respectively. The additional test of Fornell and Larcker's (1981) discriminant validity of the constructs show that the latent constructs shared more variance with their indicators than other latent constructs in the model. The HTMT criterion, as a robust discriminant criterion (Henseler et al. 2014) shows that the correlation among variables met the 0.85 benchmark. The statistical details of the factor loadings, discriminant and construct validity are captured in Tables 1 and 2 below.

Table 1. Discriminant validity: Heterotrait-Monotrait ratio criterion

	1	2	3	4	5
ESU					
MGO	0.308				
PEU	0.604	0.464			
PILM	0.605	0.646	0.595		
PU	0.515	0.380	0.622	0.677	

Table 2. Psychometric properties & discriminant validity: Fornell- Larcker criterion

	CR	Cronbach alpha	AVE	Construct	ESU	MGO	PEU	PILM	PU
ESU	0.834	0.883	0.625	ESU	**0.862**				
MGO	0.732	0.887	0.813	MGO	0.308	**0.805**			
PEU	0.831	0.897	0.831	PEU	0.533	0.363	**0.865**		
PILM	0.808	0.897	0.870	PILM	0.521	0.494	0.489	**0.850**	
PU	0.703	0.846	0.648	PU	0.396	0.284	0.486	0.520	**0.790**

Note 1: Diagonal elements in bold are the square roots of average variance extracted (AVE). The off-diagonal elements are the correlations among constructs. For discriminant validity, diagonal elements should be larger than the off-diagonal elements.

5 Conclusion

This study presents a model of post-implementation learning motivation, an important issue in ERP system implementation. The study included a pilot to establish the reliability of the measurement instruments of the dimensions of post-implementation learning motivation. Research studies affirmed the importance of learning as a crucial factor in ERP implementation success. However, several ERP system implementations have failed in realising the expected benefits due to the limited utilisation of the system as a result of lack of requisite skills. This study makes significant contributions to the theory; the conceptual model will help in establishing the predictors of post-implementation learning motivation, as well as highlighting the role of post implementation learning motivation on ERP usage. This study further explains the theoretical linkages between PU, PEOU and MGO and post-implementation learning motivation. The managerial implications of this study reveal the centrality of learning motivation as a strategic mechanism by which organisations can realise post-ERP system implementation benefits. More so, this study shows that post-implementation learning motivation is a way of minimising opposing and reluctant behaviours associated with inadequate knowledge and deficient skills required for deep use in the ERP system context. An understanding of the dimensions of implementation learning motivation will assist greatly in ameliorating the problems associated with the end-user's acceptance and performance behaviours in this area.

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