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Empirical validation of the importance of employees' learning motivation for workplace e-learning in Taiwanese organisations

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E-learning systems, adopted by organisations for employee training to enhance employees' performance, are characterised by self-directed, autonomous learning. Learning motivation is then of importance in the design of e-learning practices in workplace. However, empirical study of the alignment of e-learning with individual learning needs and organisational goals is an area with limited research. This study intends to clarify the importance of learning motivation in employees' e-learning systems use behaviour, based on the information systems success model. Data from one hundred and eighty-five employees who used e-learning systems in their work environment were gathered in Taiwan and analysed with PLS. Results showed that employees' learning motivation, reflecting their learning needs and strengths, influenced perceived usefulness and satisfaction with e-learning, and their use of the systems, which enhanced their task performance. The results validated the importance of employees' learning motivation and the need for alignment of employees' learning needs and organisational goals in e-learning training. The clarification can help facilitate an organisation's human capital management, and contributes to further advancement of the information systems success model.

Introduction

In a competitive environment, finding ways to use employee training and learning to help enterprises to adapt to changes the external environment is an important issue. With the prospect of cost-effective investment in e-learning training, many enterprises have adopted e-learning systems for employee training to assist in their human capital management in recent decades (e.g. Wang, Wang & Shee, 2007). Through use of e-learning systems, employees can transfer what they have acquired from the training to their jobs and thereby increase their productivity (e.g. Chen, 2010). This helps employees' renewals of knowledge and skills while also reducing knowledge gaps between what the organisations have and what they need in keeping competitiveness.

However, e-learning in workplaces still remains a fragmented, complex, and challenging area (Wang, 2011). The impact of organisational training contexts on new entrants' e-learning training has been verified, but e-learning in workplaces is still confronted with a highly complex set of factors, such as learners, activities, outcomes, etc. (Chen, 2012; Collin, 2006; Wang, Ran, Liao & Yang, 2010). The alignment of the learning with employees' individual learning needs and organisational goals in a systemic way also lacks clarification in existing studies (Collin, 2006; Wang et al., 2010). E-learning provides learning more learner-centred than instructor-oriented, and workplace learning involves adult learning that emphasises employees' rational

motivation in learning to meet their needs. Learning motivation which indicates human stimulated needs driving individuals to act to meet those needs, is then of importance in the design of e-learning practices for employees' self-directed learning in work environments (Cross, 1982; Houle, 1979; Rubenson, 1991). Consequently, it raises an important issue clarifying the impact of learning motivation on employees' e-learning training.

The information systems (IS) success model, which captures both the technological dimension and the human dimension of human use of information systems/services, provides a systematic theoretical foundation for investigating employees' learning outcomes from e-learning systems (DeLone & McLean, 2003; Seddon, 1997; Wang et al., 2007; Wu & Wang, 2006). This study is therefore theory based on a model for empirical clarification of the impact of learning motivation in employees' e-learning training. It provides a theoretical basis reflecting the impact of employees' other perceived net benefits involved in e-learning system usage (Seddon, 1997; Seddon & Kiew, 1996). This study therefore adopts this model to clarify the importance of learning motivation in employees' self-directed, autonomous e-learning training for productivity. The clarification seeks to improve understanding of employees' e-learning use in the changed training environment in workplaces, and also the alignment of the learning with employees' learning needs and organisational goals in e-learning training.

Literature background

E-learning systems for employee training

E-learning refers to learning experiences gained through use of information technology, and focuses on the broadest view of learning that goes beyond the traditional learning paradigms (Rosenberg, 2006; Tsai, Shih & Feng, 2008). It is also characterised by self-directed, autonomous learning, which refers to the process whereby learners systematically achieve learning goals by themselves (Markus & Wurf, 1987; Schunk & Zimmerman, 1994). Through e-learning systems, learners can study course contents in an independent manner. They can also decide when to study, the sequence of the content to study, and the amount of time to spend for self-education, without time and space barriers (e.g. Blake & Butcher-Green, 2009; Newton & Doonga, 2007).

Recently, e-learning systems have been increasingly adopted by organisations for employee training for cost reduction reasons. In workplaces, employees are adults who have good self-concept, and usually they have a clear understanding of their learning needs and can learn independently (Eggen & Kauchak, 1994; Slavin, 1994). Employees are then expected to increase their performance through undertaking self-directed, autonomous e-learning training. However, current development of e-learning tends to focus on technical issues of design, and most e-learning applications may not perform well in motivating users to learn (Wang et al., 2010). Conflicts between an organisation's aim to invest in e-learning systems for human capital management and employees' needs for renewal of knowledge and skills may then arise if the alignment of the learning with individual learning needs and organisational goals is not achieved (Wang et al., 2010).

Learning motivation has been shown to be important in learning behaviour and learning outcomes in a largely independent environment (e.g. Chen & Chih, 2011;

Houle, 1979; Tempelaar, Gijselaers, Van de Loeff & Nijhuis, 2007). It refers to learners' activating force to choose learning goals and perform in a way that will achieve these goals; it also indicates the extent to which their needs will be met by performing the activity (Cross, 1982; Rubenson, 1991). Task performance indicates the outcomes that organisations expect from employees when performing their tasks (Borman & Motowidlo, 1993; Kirkpatrick, 1994; Wang et al., 2010). Thus, to clarify the alignment of e-learning with employees' learning needs and organisational goals in self-directed, autonomous e-learning training, this study is motivated to validate the impact of learning motivation upon employee use of e-learning systems in workplaces.

The IS success model

To indicate the success of information systems (IS), DeLone and McLean (1992) conducted a comprehensive review of IS success literature and proposed the IS success model. Ten years later, they proposed an updated IS success model recognising e-commerce environments, and the basic structure is similar to that of its original model (DeLone & McLean, 2003). However, to clarify the combined process and causal explanations of the IS success model of DeLone and McLean (1992), Seddon (1997) proposed another adaptation of the model. He took part of the model into the process and variance model: the partial behavioural model of IS use and the IS success model, and then linked the two models with a construct: the individual, organisation, and societal consequences of IS use. The model is shown in Figure 1.

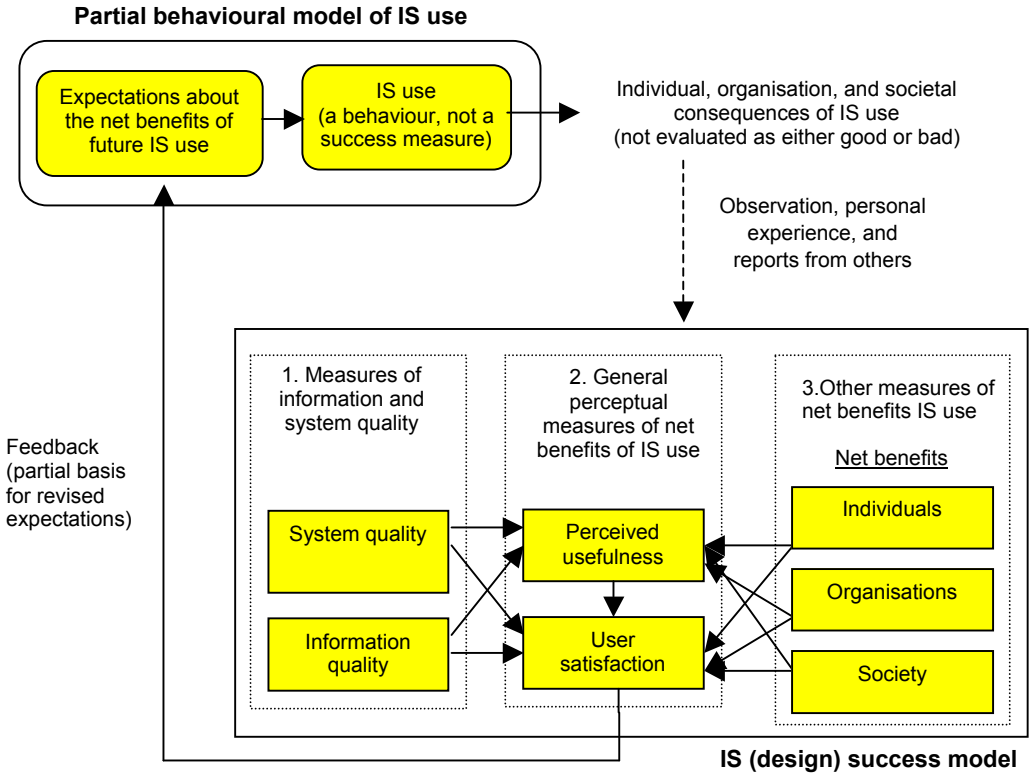


Figure 1: The re-specified IS success model of Seddon (1997)

The adapted IS success model by Seddon (1997) explains the relationship between the process and variance models in the original IS success model, while still reflecting the essential values of the original model by DeLone and McLean (1992). Besides, it adds the dimension of perceived usefulness, reflecting users' perceived instrumental value of information systems, and indicates the possibility of other constructs to improve the use of the system through perceived usefulness and user satisfaction (Seddon, 1997; Seddon & Kiew, 1996). This study is thus theoretically constructed based on the model for empirical clarification of the impact of learning motivation in employees' e-learning training.

Characterising the importance of learning motivation in employees' e-learning

Cognitive psychologists elaborate that the occurrence of learning lies in changes of the inner psychological structure of learners who choose to give meaning to the learning experience; an environment only provides potential stimulus to encourage learning (Bandura, 1977). Thus, learners play a key role in learning. A learner's inner psychological structure refers to a learner's cognition of natural and social world and exists in the form of symbols. When new experiences change a learner's inner psychological structure, learning occurs. In order to make learning occur, it is helpful to provide general principles in an appropriate context to match learners' inner psychological structure and assist them in applying what they have learned to new problems (Bandura, 1977; Gredler, 1992; Griffin & Griffin, 1996; Roblyer, 2004).

E-learning provides modern learning that is more learner-centred than lecturer-centred (Lee, Yoon & Lee, 2009; Tsai et al., 2008). Employees thus have greater control over their learning/training process through e-learning. By using various forms of symbols, e-learning systems may provide simulation courses for employee training; they may also provide courses introducing general rules or specific knowledge for employees to learn. And through the use of these systems, trainees may give meaning to their learning experience; by so doing, they can change their inner psychological structures. Learning then occurs and assists trainees to apply what they have learned to their tasks (Gredler, 1992; Bandura, 1977; Griffin & Griffin, 1996; Roblyer, 2004).

In workplaces, e-learning systems are expected to provide general principles to match employees' inner psychological structure for training. Employees can then use the systems to learn independently and autonomously, and decide on when to use them to accomplish their learning goals. When they give meaning to the experiences, their inner psychological structure changes and learning occurs. Thus, if employees are willing to accept the systems and take responsibility for their training, the change in their inner psychological structure aids their training/learning transfer to work, as expected in employee training (Chen, 2010; Chen, 2012; Wexley & Latham, 1981).

Motivation indicates human stimulated needs that drive individuals to act, in order to meet those needs (Cross, 1982; Houle, 1979; Rubenson, 1991). It also reflects an individual's expected value for an activity. The higher the expected value is, the stronger the degree that needs can be met by performing that activity. In andragogy, learning motivation also drives an adult's voluntary learning and active participation in learning/training activities (Houle, 1979; Tempelaar et al., 2007). It refers to an activating force leading individuals to choose learning/training goals and perform in a way that will achieve these goals. With expectations by reason of the learning value, the force, i.e. the strength of behaviour, is determined (Cross, 1982; Rubenson, 1991).

In Seddon's (1997) IS success model, it indicates the possible impact of other net benefits of individuals, organisations, and society on users' perceived usefulness and user satisfaction, which motivate them to use information systems/services. The study by Seddon and Kiew (1996) also demonstrates empirically that user involvement, reflecting users' opinions about the relevance of the system to their own goals, influences their perception of the system as useful and satisfying. Later, Fraser and Salter's study (1995), being similar to that of Seddon and Kiew's (1994), provides consistent results. User involvement refers to users' subjective psychological state that reflects the importance or relevance of specific or general information systems to them. Learning motivation is also a subjective psychological state which indicates users' expected value in performing learning activities, and drives adults' voluntary learning and active participation in training activities (Boshier, 1978; Houle, 1979; Pintrich, 1987; Pintrich & DeGroot, 1990). As a result, if employees are willing to take responsibility for their own learning, their perceptions of the system's usefulness and user satisfaction increase and motivate their further use of e-learning systems that aids their training/learning transfer to work (Chen, 2010; Chen, 2012; Wexley & Latham, 1981). Therefore, based on the IS success model, this study intends to empirically clarify the impact of learning motivation on the users' perceived usefulness and user satisfaction in their e-learning system use.

Research hypotheses

The connection of the technological dimensions and human dimensions of e-learning systems: Information quality, system quality, perceived usefulness, and user satisfaction

In general, e-learning systems provide content for user learning through various media. However, current developments tend to focus on technical issues of design regarding information technology (Wang et al., 2010). From the socio-technical viewpoint, both the technological dimensions (i.e., system quality and information quality) and the human dimensions (such as perceptions of usefulness and user satisfaction) should be captured in the IS success model (Wu & Wang, 2006). Hence, based on the re-specified IS success model (Seddon, 1997; Wu & Wang, 2006), the following hypotheses are proposed.

H1: Employees' perception of technological quality is significantly associated with their perceived system use motivation of e-learning systems.
H1a: Employees' perception of information quality is significantly associated with their perceived usefulness of e-learning systems.
H1b: Employees' perception of information quality is significantly associated with their user satisfaction with e-learning systems.
H1c: Employees' perception of system quality is significantly associated with their perceived usefulness of e-learning systems.
H1d: Employees' perception of system quality is significantly associated with their satisfaction with e-learning systems.

Perceived usefulness and user satisfaction in motivating e-learning system use

Through e-learning systems that implement and support training, employees gain knowledge, skills and a new attitude regarding their jobs. Without understanding the benefits (i.e. perceived usefulness and user satisfaction), employees may not use the system. They could be kept from obtaining important information or knowledge, and

be left with no clear direction on how to move on in their jobs. In the IS success model, both usefulness and user satisfaction are shown to be important perceived benefits that motivate users' system use (Chen, 2012; Wang et al., 2007; Wu & Wang, 2006). Furthermore, perceived usefulness, indicating users' extrinsic motivator for instrumental value in using computer technology, impacts upon user satisfaction (Davis, Bagozzi & Warshaw, 1992; Venkatesh, 2000). Therefore, hypotheses about perceived usefulness, user satisfaction, and system use are proposed as follows.

H2: Employees' perceived system use motivation and use of e-learning systems are significantly interrelated.
H2a: Employees' perceived usefulness is significantly associated with their use of e-learning systems.
H2b: Employees' user satisfaction is significantly associated with their use of e-learning systems.
H2c: Employees' perceived usefulness is significantly associated with their user satisfaction of e-learning systems.

Perceived net benefits aroused by e-learning system use

Literature has shown that employees who are well trained also have good job performance (Whitfield, 2000). Although the evaluation of employees' training outcomes, or the means by which the effect (or value) of trainees' training on the business or environment is measured, such as through increased sales and improved productivity, is important, the objective measurement of net benefits of information systems, such as cost reduction or increased sales, may be lacking because of environmental intervention and intangible system impact (Kirkpatrick, 1996; Wang et al., 2010; Wu & Wang, 2006). Therefore, users' perceptions are commonly adopted as a measurement of the beneficial consequences from system use, in empirical studies based on the IS success model (Chen, 2010, 2012; Wang et al., 2007; Wang et al., 2010; Wu & Wang, 2006).

Task performance indicates the outcomes that organisations expect from employees when performing their tasks (Borman & Motowidlo, 1993; Kirkpatrick, 1994; Wang et al., 2010). Employees' task performance is then not only adequate to be measured as an outcome of employees' use of e-learning systems but also an adequate goal that organisations quest for in employees' e-learning training. Therefore, the following hypothesis is proposed.

H3: Employees' use of e-learning systems is significantly associated with their task performance.

The impact of learning motivation

Finally, Seddon's (1997) IS success model indicates the possible impact of other net benefits on users' perceived usefulness and user satisfaction, which motivate them to use the system. If employees are willing to take responsibility for their learning, their perceptions of e-learning system's usefulness and user satisfaction increase and motivate their further use of the system. Therefore, based on the IS success model, this study intends to attest to the impact of employees' learning motivation on their perceived usefulness and user satisfaction with e-learning systems.

In addition, learning motivation drives adults' voluntary participation in training activities (Boshier, 1978; Houle, 1979). It refers to an activating force leading individuals to perform learning activities and thus can affect users' use of e-learning systems directly (Pintrich, 1987; Pintrich & DeGroot, 1990). Therefore, this study also clarifies the impact of learning motivation on systems usage. The following hypotheses are proposed.

H4: Employees' learning motivation improves their perceived system use motivation of e-learning systems.
H4a: Employees' learning motivation improves their perceived usefulness of e-learning systems.
H4b: Employees' learning motivation improves their user satisfaction of e-learning systems.
H5: Employees' learning motivation is positively associated with their use of e-learning systems.

The conceptual research model for this study is shown in Fig. 2.

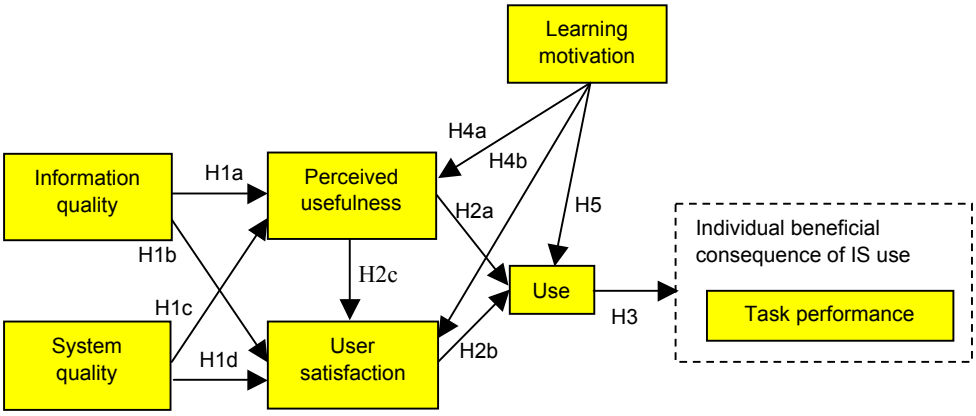


Figure 2: The conceptual research model

Research method

Measurements

In order to validate the impact of employees' learning motivation in their use of e-learning in workplaces, this study adopted the survey method. The construct measurements included: learning motivation, information quality, system quality, perceived usefulness, user satisfaction, system use, and task performance. All construct measures and operational definitions were based on existing instruments and literatures. All measurements were self-reported by employees, using a Likert seven-point scale ranging from (1) strongly disagree to (7) strongly agree. For measuring task performance, the measurement of users' perception was also adopted for the lack of objective measurement of net benefits from the information systems (Wu & Wang, 2006). Among different assessments of performance measures, self evaluation by the employees was still acceptable and a valuable reference (Campbell, Dunnette, Lawler & Weick, 1970; Shore & Thornton, 1986), and was therefore adopted

in this study. The operational definitions for each construct are described below, and pertinent questions are listed in Appendix A.

Information quality and system quality
The general definitions and measures of both information and system qualities in traditional IS studies were adopted in this study. Information quality indicates the users' perception of completeness, adequateness, and clarity of the information and format in the output of e-learning systems (Wu & Wang, 2006; Rai, Lang & Welker, 2002). System quality was defined as users' perception of easy operation, responsiveness and stability in using the systems (Chen, 2010; Wang et al., 2007).

Perceived usefulness, user satisfaction, and system use
The measures of the constructs of perceived usefulness, user satisfaction, and system use were mainly based on the studies of Seddon and Kiew (1996), Rai, Lang and Welker (2002), and Wu and Wang (2006). The operational definition of perceived usefulness refers to users' perception of using e-learning systems to improve their job performance. User satisfaction was defined as users' overall satisfaction with e-learning systems, and system use indicates users' use and dependence on e-learning systems.

Self-evaluated task performance
With the diversity of courses provided by e-learning systems, this study adopted task performance to measure the benefits of e-learning systems use. Task performance is defined as the outcomes that organisations expect from employees when performing their tasks (Borman & Motowidlo, 1993; Kirkpatrick, 1994). The measurement was based on Borman & Motowidlo (1993), and was self-evaluated by employees (Shore & Thornton, 1986; Campbell et al., 1970).

Learning motivation
Many studies have clarified the origins of learning motivation and also empirically verified learning motivation of adults (e.g., Boshier, 1978; Cross, 1982; Kao, 2009; Pintrich & Schunk, 2002; Rubenson, 1979). While most measurements measure adult motivation for continuous education, e-learning systems adopted by organisations are for employee training. Therefore, in exploring the impact of learning motivation in employees' use of e-learning systems, this study adopted the three constructs: professional advancement, learning achievement and influence of others, based on definitions from the literature. The measurements adopted in this study were mainly based on studies by Boshier (1978), Morstain and Smart (1974), and Cross (1982).

The questionnaire was established prior to a formal survey. The pre-study results from twenty respondents indicated that the measures could be easily understood. The questionnaire was then used in the formal survey. The questions are shown in Appendix A.

Data collection

To gather data, questionnaires were issued to organisations that had publicly announced their investment in e-learning systems, or had applied governmental subsidies to adopt e-learning systems in Taiwan, such as banks, governments, high-tech manufacturers, etc, in a period over two months. Because some respondents indicated that they did not use e-learning systems at work, only those organisations whose employees indicated that they actually used e-learning systems in their jobs

were targeted. In the questionnaire, respondents were asked to answer questions based on their most frequently used e-learning system. In order to attract valid respondents, this study provided valuable coupons for drawing lots. Of about three hundred questionnaires issued, a total of one hundred and eighty-five were validated. Descriptive statistics are given in Table 1.

Table 1: Descriptive statistics (N=185)

Description		Frequency	Percent
Gender	Male	106	57.3%
	Female	79	42.7%
Years of computer use	Less than 5 years	21	11.4%
	6-10 years	62	33.5%
	Above 10 years	102	55.1%
Education	High school	20	10.8%
	College/ university	117	63.2%
	Graduate school (above)	48	25.9%
Organisation employee numbers	Below 100	30	16.2%
	100-499	30	16.2%
	500-1999	16	8.7%
	2000 or more	109	58.9%
Age	20-30	50	27.0%
	21-40	48	25.9%
	41-50	42	22.7%
	Above 50	45	24.3%
Job category	Administration/ sales	94	50.8%
	Technical/ engineering	91	49.2%
Organisation industry	Traditional manufacturing	39	21.1%
	High-tech manufacturing	18	9.7%
	Financial services	72	38.9%
	Government	23	12.4%
	General services	28	15.2%
	Others	5	2.7%
Total number		185	100%

The average level of use of e-learning systems by respondents was about five (5.02) on a 7-point Likert scale (Table 2). The results indicate that these respondents had experience in using e-learning systems in workplaces and were valid respondents for this study. Most of the respondents indicated that they used e-learning systems providing courses on job information (63.2%); others used e-learning systems providing courses about job technology (23.8%), a general introduction to the job (9.2%), or language (3.8%). Data on the purposes for using e-learning systems is presented in Table 3.

Table 2: Respondents' use of e-learning systems (7-point Likert scale; N=185)

Response	Frequency	Percent
1 Totally disagree	0	0.0%
2 Disagree	6	3.2%
3 Slightly disagree	9	4.9%
4	45	24.3%
5 Slightly agree	58	31.4%
6 Agree	50	27.0%
7 Totally agree	17	9.2%

Table 3: Respondents' purposes for using e-learning systems (N=185)

Purpose	Frequency	Percent
Job knowledge	117	63.2%
Job general introduction	17	9.2%
Job technology	44	23.8%
Language	7	3.8%

Data analysis

Having a limited sample size, PLS (partial least square) was adopted for data analysis as it was less demanding on sample size (Beaton, Lings & Gudergan, 2008; Hsieh, Rai & Keil, 2008). PLS is a commonly accepted data analysis method. It adopts the bootstrapping technique for re-sampling, and the partial least square method for coefficient estimation (Chin, 1998; Gefen, Straub & Boudreau, 2000). The sample size compared to the largest path number in research model should be at least five to ten times larger (Chin, 1997; Majchrzak, Malhotra & John, 2005). The sample size of this study was one hundred and eighty-five and the largest path number of the model was eleven. Therefore, it was adequate to adopt PLS for data analysis.

This study adopted *SmartPLS 2.0* for data analysis (Ringle, 2005). The measurement and structural models were both evaluated, and each construct was modeled to be reflective in data analysis.

Convergent validity and discriminate validity

Convergent validity and discriminate validity were first provided to verify construct measures (Komiak & Benbasat, 2006). Cronbach's *alpha* and the underlying factor structure were also justified.

Convergent validity
Convergent validity refers to the consistency with which multiple items measure the same construct. Unidimensionality, the average variance extracted (AVE), and the composite reliability (CR) are adequate indicators in understanding convergent validity of measurements (Bagozzi & Yi, 1988; Steenkamp & Van Trijp, 1991). They, as well as Cronbach's *alpha*, were provided in this study.

About unidimensionality, factor loading (>0.5) and t-value (>1.96) of items were both required. The results of factor loading, as well as AVE, CR and Cronbach's *alpha*, are given in Table 4. The results showed that all the constructs had AVE values higher than 0.5, and all CR values were higher than 0.7 (Chin, 1998; Fornell & Larcker, 1981; Hair, Babin, Money & Samouel, 2003). All question items had acceptable loadings (>0.5) and t-value (>1.96). The results showed the commonly acceptable convergent validity of the measurements. Besides, all Cronbach's *alpha* values were also higher than 0.7, and showed the reliability of all measurements.

Discriminant validity
In measuring discriminant validity, average variance extracted (AVE) and cross-loading could be adopted to understand discriminant validity (Kerlinger & Lee, 2000). The correlation between different constructs should be lower than the square root of the variance extracted from the individual construct (Chin, 1998; Fornell & Larcker, 1981). In addition, the factor loadings belonging to the same construct should be

higher than those of different constructs (Chin, 1998). The results of the AVEs are shown in Table 5. They showed that the square roots of the AVEs of all constructs were higher than their correlation coefficients with other constructs. The results of factor loadings are shown in Appendix B. They showed that each item loaded higher on its principal construct than on other constructs. Overall, the results suggested good measurement properties.

Table 4: Average variance extracted (AVE), composite reliability (CR), Cronbach's *alpha*, and factor loading/weight of construct measurement

Constructs		AVE	CR	*alpha*	IQ	SQ	PU	US	PA	LA	IO	USE	TP	t-value
Information quality (IQ)	IQ1	0.66	0.91	0.87	0.82									28.48
	IQ2				0.84									27.20
	IQ3				0.84									34.95
	IQ4				0.84									38.56
	IQ5				0.72									18.19
System quality (SQ)	SQ1	0.72	0.91	0.87		0.87								36.63
	SQ2					0.85								34.76
	SQ3					0.85								41.12
	SQ4					0.83								27.92
Perceived usefulness (PU)	PU1	0.80	0.92	0.88			0.88							28.18
	PU2						0.87							40.97
	PU3						0.93							75.71
User satisf-action (US)	US1	0.86	0.92	0.84				0.93						92.91
	US2							0.92						56.34
Profession advance-ment (PA)	PA1	0.79	0.92	0.87					0.89					36.87
	PA2								0.89					41.71
	PA3								0.88					40.67
Learning achieve-ment (LA)	LA1	0.85	0.94	0.91						0.93				76.00
	LA2									0.92				60.44
	LA3									0.91				54.63
Influence of others (IO)	IO1	0.71	0.88	0.79							0.75			17.86
	IO2										0.86			29.05
	IO3										0.91			53.83
Use (USE)	USE1	0.86	0.95	0.92								0.93		72.64
	USE2											0.94		93.21
	USE3											0.92		75.99
Task perf-ormance (TP)	TP1	0.71	0.91	0.87									0.75	14.90
	TP2												0.88	33.16
	TP3												0.83	26.43
	TP4												0.92	71.93

Table 5: Construct correlations and square root of average variance extracted (AVE)

Const.	IQ	SQ	PU	US	PA	LA	IO	USE	TP
IQ	0.81 a								
SQ	0.66	0.85 a							
PU	0.65	0.59	0.89 a						
US	0.65	0.64	0.69	0.93 a					
PA	0.50	0.45	0.53	0.45	0.89 a				
LA	0.52	0.48	0.60	0.59	0.57	0.92 a			
IO	0.41	0.45	0.56	0.50	0.59	0.61	0.84 a		
USE	0.53	0.56	0.67	0.60	0.47	0.56	0.57	0.93 a	
TP	0.58	0.55	0.69	0.58	0.65	0.65	0.60	0.64	0.85 a

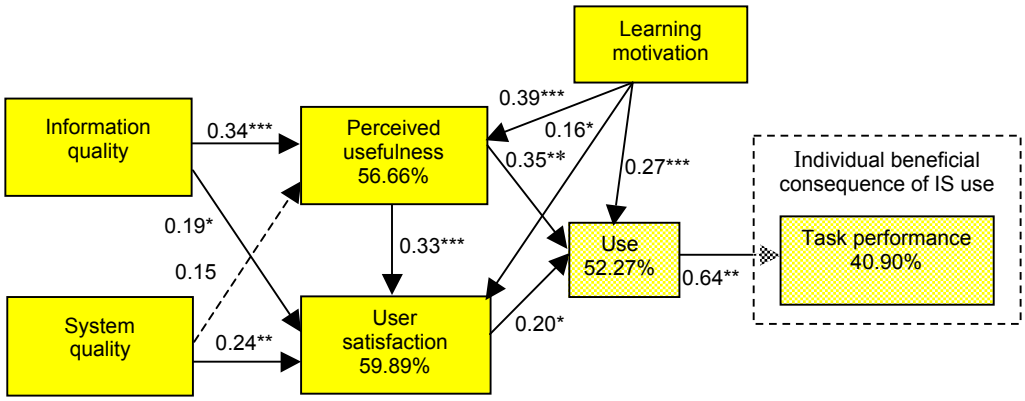
a: Indicates the square root of average variance extracted (AVE) of the construct.

Path analysis

With adequate convergent and discriminant validity, the hypotheses were then empirically tested. However, learning motivation was composed of the sub-constructs of professional advancement, learning achievement and the influence of others; it was thus measured by the repeating indicators from the first-order constructs (Diamantopoulos, Riefler & Roth, 2008; Wiley, 2005). The results of the *SmartPLS* analysis are shown in Figure 3. The results indicated that excluding H1c, all other hypotheses were supported.

The results showed that employees' use of e-learning systems had a significantly positive association with their self-evaluation task performance; thus, H3 was accepted. The results indicated that employees gained beneficial consequences from their use of the systems in performing tasks. Besides, perceived usefulness and user satisfaction were shown to have significant influence on system usage, and perceived usefulness had significant impact on user satisfaction. Therefore, H2a, H2b, and H2c were accepted. Furthermore, learning motivation was shown to have a significant influence on not only perceived usefulness and user satisfaction, but also system usage. Therefore, H4a, H4b, and H5 were accepted. Finally, perceived usefulness was shown to be influenced by information quality, but not by system quality, and user satisfaction was significantly influenced by both information and system qualities. Thus, H1a, H1b, and H1d were accepted, while H1c was rejected.

The results empirically validated the impact of other supposed net benefits to individuals, organisations, or society in the IS success model. They showed employees' learning motivation, reflecting their learning needs strengths in acting to meet the needs, increased their motivation for e-learning systems use, i.e. perceived usefulness and user satisfaction. Use of the systems enhanced their task performance, something sought by organisations. The validation indicated the alignment of e-learning systems with organisational goals, indicated by employees' task performance, and employees' individual learning needs, indicated by the strengths of their learning motivation.



* |t|>1.96, p<0.05; ** |t| >2.58, p<0.01; ***: |t|>3.29, p<0.001

Figure 3: The PLS results

However, to further understand the impact of the different learning motivation sub-constructs in employees' use of e-learning systems, a first-order PLS analysis of the sub-construct path model based on the proposed hypotheses was also made for additional justification. The sample size compared to the largest path number of the sub-construct path model still conformed to the suggestions of Chin (1997) and Majcherzak et al. (2005). Results of the further analysis are shown in Appendix B.

Most of the results in Appendix B were consistent with Figure 3 results. Nevertheless, the different learning motivation orientations/sub-constructs presented different impacts. First of all, the learning achievement sub-construct was shown to have significant impact on perceived usefulness and user satisfaction, but not on system usage. Secondly, the sub-construct of the influence of others showed its significant impact on perceived usefulness and system usage, but not on user satisfaction. Nevertheless, the professional advancement sub-construct did not show any significant impact on system usage, perceived usefulness or user satisfaction.

The results indicated that employees who used e-learning systems did not use the systems for their current advancement of jobs. On the contrary, they used the systems because of the influence of others. Besides, their intrinsic learning achievement also affected their system use, whereby the impact was mediated through their perceived usefulness and user satisfaction of the systems.

Discussion

Most current studies focus on the technical issues of e-learning development, which is confronted with complex set of factors. It was not clear the alignment of employees' learning needs and organisational goals in e-learning training. Based on the IS success model, this study clarifies the impact of learning motivation upon e-learning systems use for employee productivity. The results indicated the importance of learning motivation in employees' self-directed, autonomous e-learning training.

Capture both the technological and human dimensions for e-learning system use
E-learning systems were designed for learning/training, and training transfer will not occur if users were not motivated to use the systems. The results showed the significant positive association of employees' perception of technological quality, information quality and system quality, with their perceived motivation for e-learning systems use, perceived usefulness and user satisfaction that motivated them. This reflected the importance of both the technological and human dimensions for employees' use of e-learning systems.

Revalidate the association of employees' e-learning systems use with job-related performance
In the changed learning/training environment, employees' acceptance or use of e-learning systems was important to organisations which have adopted e-learning systems for human capital management. The results showed that employees' use of e-learning systems improved their task performance, indicating that employees gained beneficial consequences through e-learning and transferred what they gained through the training to their tasks.

Learning motivation for e-learning system use
Finally, the results empirically clarified employees' learning motivation increased perceived usefulness and user satisfaction for e-learning, and also increased their use of the systems. The analysis further specified employees' learning motivations for e-

learning training. Although professional advancement did not show its impact, the influence of other persons and intrinsic learning achievements both directly or indirectly helped employees' acceptance and use of e-learning. This will help in the designinf of e-learning for employees' self-directed learning in workplaces.

Conclusion

Learning motivation indicated employees' readiness, capacity and willingness to take charge of their learning to meet their needs and goals (Holec, 1981; Dam, 1995). For learning occurrences, providing for general principles in an suitable context to meet the learners' inner psychological structure helped them to apply what they learned to new problems (Gredler, 1992; Bandura, 1977; Griffin & Griffin, 1996; Roblyer, 2004). E-learning systems provided only a potential stimulus to kindle learners' acquisition of knowledge. With high learning motivation, employees took responsibility for learning, and meaningful learning occurred and improved learning outcomes from e-learning training (Dam, 1995).

The results indicated the alignment of e-learning systems with organisational goals, in the form of employees' task performance and employees' individual learning needs, by relying on strengths in their learning motivation. This validation will help facilitate the design of e-learning for employees' self-directed learning in workplaces (Cross, 1982; Houle, 1979; Rubenson, 1991). The results also validated the impact of other supposed net benefits to individuals, organisations, or society in the IS success model. Practically, the results will help organisations' human capital management through the investment of e- learning systems for employee training, and theoretically, the clarification facilitates the further advancement of the IS success model.

Limitations and suggestions

The validation of the impact of learning motivation upon employees' use of e-learning systems cannot not be established on the basis of a single empirical study. Hence, we need to be cautious when generalising from the findings. For example, samples from different contexts or diverse working conditions could be studied to revalidate the perceptual connection. In addition, the impact of other important factors regarding e-learning, such as group support or organisational culture, facilitating conditions (e.g. reward), and different demographic characteristics, also could to be clarified in the context of workplace e-learning.

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Appendix A: Construct measures

Constructs		Measurements	
Information quality		IQ1	The e-learning system provides sufficient and complete information.
		IQ2	The e-learning system provides clear and definite information.
		IQ3	The information provided by the e-learning system meets my needs.
		IQ4	The information provided by the e-learning system helps to solve my problems.
		IQ5	The content of the e-learning system is good.
System quality		SQ1	The e-learning system provides interfaces of easy operation.
		SQ2	The buttons for operation of the e-learning system are clearly and easily understood.
		SQ3	The e-learning system responses instantly.
		SQ4	The functions of the e-learning system work well and are seldom out of use.
Perceived usefulness		PU1	Using the e-learning system enhances my work efficiency.
		PU2	Using the e-learning system increases my competing competence.
		PU3	Using the e-learning system enhances my work productivity.
User satisfaction		US1	The sufficient information of the e-learning system that meets my work needs is satisfying.
		US2	The efficiency of the e-learning system is satisfying.
Learning motivation for e-learning systems	Profession advancement (PA)	PA1	To increase work capabilities.
		PA2	Due to work needs.
		PA3	Because of changes in the job.
	Learning achievement (LA)	LA1	Satisfied with the substantial feeling due to learning.
		LA2	Interested in the training content.
		LA3	Learning makes me feel sense of achievement.
	Influence of others (IO)	IO1	Because of the influence other people who undertake the learning.
		IO2	For the reason that people tell me the benefits of learning.
		IO3	To catch up with others.
Use (USE)		U1	I frequently use the e-learning system.
		U2	I use lots of functions of the e-learning system.
		U3	I depend on the e-learning system.

Perceived beneficial consequences of IS use: Task performance	TP1	I accomplish tasks according to standard operation procedures.
	TP2	After use of the e-learning systems, my work efficiency is better than my other colleagues.
	TP3	I know how to plan and schedule the rate of progress of the tasks that I am responsible for.
	TP4	After use of the e-learning system, my average work efficiency enhances.

Appendix B: Cross loadings

Items	IQ	SQ	PU	US	PA	LA	IO	USE	TP
IQ1	**0.82**	0.51	0.46	0.48	0.43	0.39	0.33	0.36	0.44
IQ2	**0.84**	0.51	0.42	0.47	0.30	0.39	0.24	0.33	0.38
IQ3	**0.84**	0.56	0.54	0.51	0.46	0.38	0.27	0.41	0.44
IQ4	**0.84**	0.55	0.62	0.57	0.42	0.41	0.33	0.43	0.44
IQ5	**0.72**	0.53	0.56	0.56	0.40	0.53	0.47	0.58	0.63
SQ1	0.58	**0.87**	0.44	0.53	0.39	0.35	0.37	0.45	0.42
SQ2	0.59	**0.85**	0.50	0.56	0.41	0.41	0.40	0.49	0.49
SQ3	0.54	**0.85**	0.53	0.57	0.38	0.43	0.36	0.49	0.48
SQ4	0.52	**0.83**	0.51	0.52	0.36	0.41	0.40	0.47	0.49
PU1	0.54	0.56	**0.88**	0.62	0.45	0.52	0.44	0.58	0.61
PU2	0.58	0.48	**0.87**	0.61	0.45	0.56	0.55	0.58	0.56
PU3	0.63	0.54	**0.93**	0.64	0.53	0.55	0.51	0.63	0.66
US1	0.64	0.58	0.66	**0.93**	0.43	0.56	0.50	0.58	0.58
US2	0.55	0.62	0.62	**0.92**	0.40	0.53	0.43	0.53	0.50
PA1	0.53	0.40	0.50	0.43	**0.89**	0.56	0.49	0.41	0.57
PA2	0.41	0.39	0.48	0.40	**0.89**	0.52	0.54	0.39	0.60
PA3	0.39	0.41	0.43	0.37	**0.88**	0.44	0.55	0.47	0.57
LA1	0.51	0.44	0.57	0.54	0.55	**0.93**	0.58	0.52	0.62
LA2	0.44	0.43	0.52	0.52	0.45	**0.92**	0.52	0.52	0.55
LA3	0.49	0.45	0.58	0.56	0.58	**0.91**	0.59	0.50	0.61
IO1	0.35	0.32	0.45	0.34	0.68	0.53	**0.75**	0.45	0.60
IO2	0.27	0.38	0.39	0.43	0.36	0.48	**0.86**	0.42	0.39
IO3	0.40	0.43	0.54	0.49	0.46	0.54	**0.91**	0.55	0.52
USE1	0.49	0.55	0.62	0.57	0.44	0.53	0.52	**0.93**	0.59
USE2	0.48	0.51	0.60	0.55	0.44	0.51	0.50	**0.94**	0.57
USE3	0.50	0.51	0.64	0.56	0.44	0.51	0.57	**0.92**	0.62
TP1	0.39	0.36	0.44	0.41	0.46	0.40	0.35	0.39	**0.75**
TP2	0.50	0.54	0.64	0.58	0.58	0.57	0.62	0.65	**0.88**
TP3	0.51	0.49	0.52	0.39	0.52	0.56	0.43	0.45	**0.83**
TP4	0.56	0.46	0.66	0.55	0.62	0.63	0.56	0.60	**0.92**

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