Professional identity and the adoption of learning management systems

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Universities implement Learning Management Systems (LMSs) with the aspiration of improving educational practice. However, LMS adoption by academics within universities vary and frequently falls short of institutional aspirations. In this study, we propose an integrated and adopter–centred professional identity perspective of LMS adoption and empirically validate such a perspective at a New Zealand university where a LMS was implemented. We surveyed 204 academic staff and analysed questionnaire data using structural equation modelling. Results indicate that the adoption of the LMS was associated with professional identity. Variations in aspects of professional identity not only shaped the extent of LMS usage, but was also predictive of qualitatively different ways of using the LMS for teaching. Theoretical and practical implications are discussed based on the research findings.

Keywords: learning management system; academic staff; adoption; professional identity; higher education; structural equation modelling

Introduction

Higher education worldwide is subject to challenges that are affecting the way the sector operates. These challenges include the massification and internationalisation of higher education, the tightening of government funding, the need to develop student employability and the pressure to transform curricula and teaching (Tierney and Lanford 2016). In response to these challenges, universities increasingly engage with teaching and learning innovations (Smith 2012), among which learning management systems (LMSs) have been afforded a high profile (Klobas and McGill 2010).

LMSs provide the infrastructure that allows teachers to design and deliver content, supervise learning progress, communicate with learners and create learning experiences in an online environment (McGill and Klobas 2009). LMSs also serve as gateways, connecting teachers to other educational technologies (Sinclair and Aho

2018) and are fast becoming essential not only for distance education but also for traditional face-to-face teaching in blended learning settings (Schoonenboom 2014).

Universities have been taking up LMSs by mandatory implementation or by allowing departments to make their adoption decisions (Sinclair and Aho 2018). However, irrespective of their strategies, LMS adoption by academics within institutions varies and frequently falls short of institutional aspirations (Cigdem and Topcu 2015). Research consistently shows that academics view and use LMSs differently: Some use LMSs to engage in innovative pedagogies, but the majority use LMSs for material distribution and regard LMSs dispensable rather than as essential aides to effective teaching (Dahlstrom, Brooks, and Bichsel 2014; Schoonenboom 2014).

Studies on e-learning adoption demonstrate that potential adopters perceive the characteristics of technologies and react according to the perceived utility and ease of adoption (Al-Samarraie et al. 2017; Renda dos Santos and Okazaki 2016). These studies, however, do not explain why individual academics perceive and subsequently adopt LMS in different ways when they are essentially in the same organisational context, employed in similar capacities and facing the same LMS. Differences in individual adoption of e-learning innovations have been attributed to differences within adopters and commonly captured by labels such as 'innovators' and 'laggards' (Porter and Graham 2016). Categorising adopters in this way is problematic because it implies that an innovation is necessarily beneficial and that individuals who adopt an innovation faster and to a fuller extent are superior to those who take up an innovation at a slower pace or not at all. It disregards the different views, practices and circumstances of individual academics.

In this study, we advance our knowledge by exploring why individual academics adopt LMSs in different ways, and we propose a neutral, non-judgemental and adopter-centred perspective of LMS adoption based on the notion of professional identity. We empirically validate the professional identity perspective in a research-intensive university where a new LMS was mandated by the institution. Finally, we discuss the research findings and our contributions to the current scholarly conversation.

A professional identity perspective of LMS adoption

Professional identity refers to the self-definition of being and working as a member of a profession (Chreim, Williams, and Hinings 2007). Such a view implies a set of professional values and capabilities that distinguish one profession from other professions and recognises that professionals are afforded and execute a degree of autonomy in performing their roles (Kyratsis et al. 2017). Fundamental to a professional identity perspective in explaining behaviour is the notion that people engage in identity-congruent behaviour (Oyserman 2009). That is, if an innovation, such as a new LMS, aligns with the existing professional identity, adoption is likely to take place. If an innovation, such as a new LMS, clashes with the existing professional identity, then adoption will be less likely to occur. A professional identity perspective is adopter-centred; it contends that people do not passively respond to change but use their professional judgement to make sense of the change, drawing on their experiences and the set expectations of their profession (Skelton 2012). In the context explored in this study, it is the degree of alignment between professional identity and the implemented LMS that is proposed to shape the differential adoption by academics.

A professional identity perspective, which assumes adoption is shaped by professionals' sense-making and their role-related identities, demands a nuanced understanding of adoption. Current studies regard LMS adoption as the use of features

and measure adoption as the intention to use (Cigdem and Topcu 2015), as the actual use (Lonn and Teasley 2009) or as the period of use (Renda dos Santos and Okazaki 2016). These measures are simplistic and feature-centric (Burton-Jones and Straub 2006; Barki, Titah, and Boffo 2007) and do not reflect how LMSs are used to support professional practice. We contextualise LMS in academics' pedagogical practice, viewing individual adoption not only as the range of LMS features being used, but also as qualitatively different ways in which LMSs are used to support teaching. In particular, researchers have shown that similar technologies can be used for quite distinct pedagogical purposes, with the use of technologies for information delivery by some teachers and for the facilitation of learning by others (Owens 2015; Tarling and Ng'ambi 2016). In the present study, we assess LMS adoption in three ways: as the number of features used, as a velicle for information delivery and as a means of facilitating learning. These three ways together provide a professional identity-based measurement of LMS adoption.

Hypotheses development

Because of its subjective nature, professional identity is complex and can be captured and interpreted in multiple ways. This creates difficulties in any attempts to measure professional identity. While we acknowledge there are multiple frameworks on teachers' professional identities and have addressed this issue in the Discussion section, we draw on Lamote and Engels's (2010) framework of teachers' professional identity in this study to explore how professional identity may be predictive of LMS adoption. The framework comprises four components, which are professional orientation, self-efficacy, commitment to teaching and task orientation. The paragraphs that follow describe the development of six hypotheses addressing the four components of the framework. Figure 1 provides an overview of the hypothesised model.

The first component of the framework, professional orientation, derives from Hoyle's (2012) notion of the 'extended professional'. This component captures the extent to which teachers are flexible and oriented towards educational innovations (Van Veen and Sleegers 2006). Such an orientation is shaped not only by individual differences but also by the professional context (Flores and Day 2006). In the present study, we draw on research on change management and education and propose three professional orientations to change and innovation that are related to LMS adoption. These professional orientations capture how an individual perceives a specific educational change as well as the individual and contextual factors that shape such perception.

LMS implementation brings new tools and procedures, which trigger changes in the teaching practice. Academics' adoption of LMSs, therefore, should be associated with how they perceive these changes. Studies on change management have shown that affective commitment to change, which describes an individual's feelings about a specific change event, is predictive of employees' behaviour response (Meyer et al. 2007). In this study, we adopt affective commitment to change to assess an academic's perception of specific changes brought by LMS implementation and propose that such perception is related to LMS adoption. We hypothesise as follows:

Hypothesis 1: Affective commitment to change introduced by LMS is positively related to (a) the number of LMS features used, (b) the use of LMS for information delivery, and (c) the use of LMS for facilitation of learning.

Affective commitment to change captures the perception of specific changes. This perception, as indicated by the professional identity perspective, is shaped partly by an individual's general orientation to change. In change management literature, change orientation, which refers to an individual's general attitude towards change in

the workplace, has been reported to be associated with how people perceive change events (Parker, Williams, and Turner 2006). Therefore, in the present study, we hypothesise as follows:

Hypothesis 2: Change orientation is positively related to affective commitment to change introduced by LMS.

The role of professional context in shaping professional orientation is captured by 'climate for initiative', which refers to 'the formal and informal organisational practices and procedures guiding and supporting a proactive, and persistent approach toward work' (Baer and Frese, 2003, 48). Climate for initiative was found to be positively associated with attitudes to specific innovations. In higher education research, universities are metaphorically described as academic tribes and territories (Becher and Trowler 2001), indicating the co-existence of multiple discipline-specific cultures, and studies have shown that these micro-cultures influence teachers' behaviour (Roxa and Martensson 2015). We, therefore, hypothesise as follows:

Hypothesis 3: Climate for initiative is positively related to affective commitment to change introduced by LMS.

The second component of Lamote and Engels's (2010) framework is teachers' self-efficacy. Self-efficacy generally refers to an individual's future-oriented assessment of their capability in achieving certain outcomes (Bandura 1977). Within technology adoption studies in educational contexts, teachers' technological competence and efficacy have been shown to affect the adoption of classroom technologies (Anderson, Groulx, and Maninger 2011) and LMSs (Cigdem and Topcu 2015). Given that current LMSs are cloud-based platforms that interact with many internet applications, internet self-efficacy would seem to be of particular relevance. We, therefore, hypothesise as follows:

Hypothesis 4: Internet self-efficacy is positively related to (a) the number of LMS features used, (b) the use of LMS for information delivery, and (c) the use of LMS for facilitation of learning.

The third component of Lamote and Engels's (2010) framework is commitment to teaching. Commitment to teaching describes how a teacher feels psychologically connected to the teaching profession (Berger and Lê Van 2018). Despite being an important part of academics' professional identity (van Lankveld et al. 2017), commitment to teaching cannot be assumed in higher education contexts. The competing forces between research productivity and teaching effectiveness may not necessarily develop a sense of commitment to teaching (Nixon 1996). Skelton (2012) found that academics' commitment to the profession may lie primarily in research, in teaching, or in both. Dispersed commitments may shape how academics respond to teaching-related technologies and innovations. Academics with a professional identity shaped around a research profile may view teaching as distant from their core professional values and therefore not engage with the adoption of learning technologies (Brownell and Tanner 2012).

Commitment to teaching, nevertheless, does not specify the way the individual teaches in practice. Therefore, an academic who has a high level of commitment to teaching and to traditional lecturing may spend a significant amount of time designing and organising learning resources in LMS but not necessarily use more interactive features to create more online learning opportunities. To this end, we hypothesise as follows.

Hypothesis 5: *Commitment to teaching is positively related to (a) the number of LMS features used and (b) the use of LMS for information delivery.*

The last component of Lamote and Engels's (2010) framework is task orientation, which refers to the ways teachers achieve pedagogical outcomes (Lamote and Engels 2010). Research has shown that teachers with more student-focused approaches to teaching used educational technologies in more innovative ways that were beyond information delivery (Drent and Meelissen 2008). From the identity-congruence stance, academics who are used to teach in ways that facilitate students to engage with ideas and each other are more likely to use LMSs to create more interactive opportunities for students to learn in the online environment. We, therefore, hypothesise as follows:

Hypothesis 6: Student-focused approach to teaching is positively related to the use of LMS for facilitation of learning.

Method

Context and participants

The study took place at a New Zealand university. We collected questionnaire data between June and November 2017, during which time the university was replacing its existing learning platform with a new LMS and academics staff at the university were using or had used the new LMS to teach for the first time. The questionnaire was sent to 1669 academic staff via the LMS implementation newsletters, the university's social media, individual emails and paper-copies. In total, 204 usable responses were collected, analysed and reported in this study. The majority of participants were between 36 to 55 years old (55.4%), had been working at the university for between 5 and 20 years (51.5%), and held a fulltime permanent position with research responsibilities (66.7%). The gender proportion is distributed equally between male and female participants.

Measures

Length of questionnaire is negatively related to response rate (Deutskens et al. 2004), and having four items are considered adequate to measure a reflective construct (Kline 2015). We, therefore, adopted four items from each of the original scales that were used to measure the following six latent constructs: affective commitment to change introduced by LMS, change orientation, climate for initiative, internet self-efficacy, commitment to teaching, and student-focused approach to teaching. Items were selected based on their relevance to the present study and were modified to fit the research context.

Affective commitment to change introduced by LMS was measured using Herscovitch and Meyer (2002)'s scale of Affective Commitment to Change. An example item is 'I believe in the value of the change to [name of the LMS]'. Responses were recorded by a 7-point scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*).

Change orientation was measured using items adopted from Parker, Williams, and Turner (2006). An example item is 'Too often work practices are changed just for the sake of change'. Responses were recorded by a 5-point scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Responses were reverse coded so that a higher score indicates a more positive attitude towards change.

Climate for initiative was measured using items adopted from Baer and Frese (2003). An example item is: 'People around me actively address problems'. Responses were recorded by a 5-point scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*).

Internet self-efficacy was measured using items adopted from Markauskaite (2007). An example item is: 'I believe I have the capability to use planning and

decision-support applications'. Responses were recorded by a 5-point scale ranging from 1 (*Not at all confident*) to 5 (*Totally confident*).

Commitment to teaching was measured using items adopted from Ramsden and Moses (1992). An example item is: 'Teaching is an activity that gives me a great deal of satisfaction'. Responses were recorded by a 5-point scale ranging from 1 (*Only rarely true*) to 5 (*Almost always true*).

Student-focused approach to teaching was measured using items from the Approaches to Teaching Inventory (Trigwell and Prosser 2004). An example item is 'In my interactions with students, I try to develop a conversation with them about the topics we are studying'. Responses were recorded by a 5-point scale ranging from 1 (*Only rarely true*) to 5 (*Almost always true*).

LMS Adoption was measured by a checklist of 12 questions, each asking how the participant used a certain LMS feature. An example question is: '*How did you use the Discussion feature?*' Responses for this question are (a) *I did not use online discussion tools, including the Discussion*; (b) *I used the Discussion or equivalent tools to help clarify instructions, tasks, or assignments*; and (c) *I used the Discussion or equivalent tools to help students expand their knowledge*. Drawing on participants' responses, we calculated three dimensions of adoption, which were: the number of LMS features used; using LMS for information delivery, and using LMS for facilitation of learning.

Seven demographic variables: 'gender', 'age group', 'academic faculty', 'tenure', 'employment type', 'course type', and 'course stage' were measured as control variables.

Data analysis

Structural equation modelling (SEM) with full information maximum likelihood estimation was used to test hypotheses. Three commonly reported goodness-of-fit indices: the Standardised Root Mean Square Residual (SRMR≤.08, Hu & Bentler, 1999) , the Root-Mean-Square Error of Approximation (RMSEA≤.05, Browne & Cudeck, 1993), and the Comparative Fit Index (CFI≥.95, Bentler, 1990), were used to assess model fit.

Data analysis involved three steps. First, data preparation including missing value analysis was conducted following Kline's (2015) recommendation. Second, confirmatory factor analysis (CFA) was performed to establish the full multi-factor measurement model. Third, hypotheses were tested in the structural model, and path coefficients were estimated.

Results

Descriptive statistics, reliability and validity

Table 1 displays the means, standard deviations, correlations and reliability coefficients (Cronbach's alpha) of the variables measured in the study. The latent variables showed acceptable reliability (α >.70). The full six-factor measurement model was specified and tested using CFA. The model fitted the data well: χ^2 (237) = 276.23, RMSEA= .03, SRMR=.05, and CFI=.98. As indicated in Table 2, all items loaded on their respective latent variable and had significant standardised factor loadings higher than .40 (Kline 2015).

Hypotheses-testing

The hypothesised model fitted the data well: $\chi 2$ (429) = 515.32, RMSEA= .03, SRMR=.05, and CFI=.97. Figure 2 shows the results of hypotheses-testing (control

variables are not shown for clarity purposes) and Table 3 shows all of the standardised path coefficients in the model.

Of the seven control variables, age was negatively correlated with affective commitment to change brought by LMS (β=.17, ρ<.05), the number of features used (β=.18, ρ<.05), the use of LMS for information delivery (β=.25, ρ<.01) and the use of LMS for facilitation of learning (β=.15, ρ<.05). Course type (online or on campus) was positively associated with affective commitment to change brought by LMS (β=.13, ρ<.05) and the use of LMS for facilitation of learning (β=.14, ρ<.05). Course stage was positively related to affective commitment to change brought by LMS (β=.21, ρ<.01).

The results supported the hypothesised model. Affective commitment to change introduced by LMS (Hypothesis 1) was positively associated with the total number of features used (β=.32, ρ<.001), the use of LMS for information delivery (β=.24, ρ<.001), and the use of LMS for facilitation of learning (β=.27, ρ<.001). Change orientation (Hypothesis 2) was positively associated with affective commitment to change brought by LMS (β=.34, ρ<.001). Climate for initiative (Hypothesis 3) was positively associated with affective commitment to change brought by LMS (β=.23, ρ<.01). Internet self-efficacy (Hypothesis 4) was positively associated with the total number of features used (β=.17, ρ<.05), the use of LMS for information delivery (β=.17, ρ<.05), and the use of LMS for facilitation of learning (β=.21, ρ<.01). Commitment to teaching (Hypothesis 5) was positively associated with the total number of features used (β=.20, ρ<.05) and the use of LMS for information delivery (β=.16, ρ<.05). Student-focused approach to teaching (Hypothesis 6) was positively associated with the use of LMS for facilitation of learning (β=.20, ρ<.05).

Discussion

We set out to examine the vexed question of why individuals occupying similar roles in the same organisation vary in the extent to which they adopt innovative technologies, in this case an LMS, which are designed to enhance effectiveness. Our results confirm that by assessing adopters' professional identities, we are able to predict not only the extent but the nature of use. This is a substantial contribution to understanding, bringing together under one coherent theoretical umbrella the disparate findings offered by multiple researchers. Previous studies on LMS adoption are grounded in Technology Acceptance Models (Davis 1989) and Innovation Diffusion Theories (Rogers 1995), in which adoption is viewed as dependent primarily on perceptions of technological characteristics. Although studies have proven the tenability of these theories and models (Sørebø et al. 2009; Lee, Hsieh, and Hsu 2011), the role of individual academics in the adoption process has been marginalised. Individuals have been simplified as entities that perceive technological characteristics and react, or as sets of skills and attitudes. The present study, by contrast, gives the centrality of adoption back to academics, recognising them as professionals who develop attitudes towards LMSs based on previous experience, make judgements drawing on professional practices and regulate their behaviours in accordance with the context in which they work. As such, the study echoes the call for the attention to people and their humanity in innovation adoption and technology acceptance research (Thompson 2012; Pereira 2002).

Such a professional identity perspective also offers a neutral stance to individual adoption: adoption is explained by the degree of congruence between aspects of the professional identity and the implemented LMS. Here, what matters is the professional needs, beliefs and practices (Ottenbreit-Leftwich et al. 2010), rather than the perceptions of technological characteristics.

The approach unpacks the complex and multi-dimensional nature of individual adoption. It extends our current understanding of adoption, which is simply represented as frequency of use (Park, Lee, and Cheong 2007), period of use (Renda dos Santos and Okazaki 2016) or intention to use (Lee, Hsieh, and Hsu 2011). The three dimensions of LMS adoption measured in the present study revealed qualitatively different ways academics integrated the LMS into their teaching practice. Together they show that LMS adoption is not an all or nothing event but is nuanced being shaped by adopters' professional identities and connected to adopters' professional practice.

With regard to the aspects of professional identity that derive from Lamote and Engels's (2010) framework, change-orientation, climate for initiative and affective commitment to change were associated with LMS adoption. Together, the three change-related professional identity orientations suggest that it is the feelings about the changes brought about by the introduction of a new technology rather than the technology itself that shape individual adoption. This finding highlights the importance of change management in the LMS adoption process (Benson and Palaskas 2006), which has not been captured by quantitative studies that draw on technology acceptance models and theories.

The finding that internet self-efficacy was associated with LMS adoption is similar to Buchanan's (2013) study. With most LMSs are moving towards cloud-based solutions, the research indicates that internet skills are important in shaping academics' adoption. Such a finding suggests that in order to facilitate LMS adoption training and interventions should attend to the development of a range of skills and capabilities in using internet applications rather than being confined to introduce features that are specific to the implemented LMS.

The study confirmed the role of commitment to teaching in LMS adoption. Previous scholarly conversations acknowledged that the lack of commitment to teaching hindered individual adoption (Brownell and Tanner 2012), but there was no quantitative evidence, to the best of our knowledge, that supported this claim. The present study verified this claim. The finding indicates that to facilitate LMS adoption by academics, institutions may need to raise the profile of teaching and enhance staff commitment to teaching.

The study found a significant positive relationship between the student-focused approach to teaching and the use of LMS for facilitation of learning. Previous studies in school contexts have indicated a positive relationship between the student-focused approach to teaching and the innovative use of information and communication technologies (Drent and Meelissen 2008). This study contributes empirical evidence that favours such a positive relationship in the higher education context. The finding supports the notion that to improve or transform educational practice through the introduction of LMSs, universities may need to go beyond implementing LMSs as technological artefacts but provide professional development opportunities and incentives that shift academics' understanding of teaching.

Lamote and Engels (2010) provide a four component framework of teachers' professional identity. The results confirmed the predictive validity of each component. Academics take up of the new LMS was predicted by their degree of extended profession, their efficacy, their commitment to teaching, and their approaches to teaching. Lamote and Engels's (2010) framework is not the only model of teachers' professional identity, others similarly identify commitment, capability, self-efficacy, professional contexts, relationships, emotion, motivation and job satisfaction as parts of teachers' professional identity (Hong 2010; Canrinus et al. 2012). Future research may

explore a professional identity perspective of the adoption of educational innovations based on alternative models.

Theoretically, professional identity is an ongoing experience of participation and reification (Wenger 1998). The present study explored how pre-existing professional identity shaped the interpretation and the adoption of LMS. The development and reconstruction of professional identity has not been examined here. Other research has shown how the old sense of self detaches from identities, leading to new identities (Conroy and O'Leary-Kelly 2014; Ibarra 1999), including in contexts where business organisations adopt new technologies (Utesheva, Simpson, and Cecez-Kecmanovic 2016) and universities implement new educational technologies (McNaughton and Billot 2016). Future research may fully examine the reciprocal relationship between professional identity and the adoption of educational technologies in a single research design.

The practical implications of this study could be considerable and worthy of further investigation. Given that professional identity shapes adoption behaviours, refocusing change management, communication and training interventions to explicitly address congruence and pedagogical approaches is likely to enhance adoption. Explaining and enhancing rather than assuming efficacy could result in easier adoption. Addressing climate and targeting influential professionals may shift the teaching practice in the process of individual adoption.

Limitations

The study is cross-sectional therefore claims for causal relationships should be made with caution. Future research would benefit from a longitudinal study that enables the examination of causality. Second, the study relied on self-reported data which may be subject to common method bias (Podsakoff et al. 2003). To minimise self-reported bias,

the study used a checklist to measure what and how LMS features were used by academics. The variance explained by the model is similar to studies that measured the actual usage rather than subjective intentions (Igbaria et al. 1997; Park, Lee, and Cheong 2007). To minimise potential selection bias, we collected data online and through paper-copies, which reduced the risk of not being able to reach potential participants via a single means. However, the respondents of this study may still be different from the non-respondents. We anticipate, from the professional identity perspective, that those who view teaching and learning important would be likely to invest the effort in filling in a questionnaire that is about an LMS. Third, the study took place at a single university in New Zealand, which means the generalisation of our findings is unknown. We argue that as the study concerns individual adoption, the fact that participants came from one university would assist in displaying nuances in professional identities and their associations with individual LMS adoption.

Conclusion

This study offers an adopter-centred, neutral and non-judgemental perspective of LMS adoption, drawing on the notion of professional identity. The results confirmed that academics' pre-existing professional identity was associated with their responses to LMS implementation and revealed that LMS adoption was a professional identity issue. To gain a better understanding of the role of professional identity in LMS adoption, future research may further explore how professional identity shapes the process of learning to use LMSs and how professional identity itself may be reconstructed during the adoption process.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Table 1. Means, Standard Deviations, Reliability Coefficients and Correlations between Variables

Constructs	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.Gender	--	--															
2.Age group	--	--	-.034														
3.Faculty	--	--	.036	.042													
4.Tenure	--	--	-.081	.612**	.070												
5.Employment type	--	--	.080	-.217**	-.093	-.329**											
6.Course type	--	--	.026	.059	.067	-.017	.033										
7.Course stage	--	--	.220**	.220**	.126	.073	-.201**	.066									
8.Change orientation	2.69	0.53	.232**	-.039	.116	-.223*	.027	.167*	.113	(.69)							
9.Climate for initiative	2.03	0.54	.166*	-.042	.042	-.140*	.253**	.042	-.088	.118	(.81)						
10.Affective commitment to change	4.70	1.51	.094	-.091	.032	-.118	.119	.198**	.167*	.376**	.256**	(.94)					
11.Internet self-efficacy	3.48	1.09	.048	-.304**	.171*	-.193**	.098	.198**	-.156*	.124*	.168**	.103	(.88)				
12.Commitment to teaching	3.85	0.60	.336**	-.054	.040	.083	-.030	-.054	.007	.276**	.133	.107	.212**	(.77)			
Student-focused approach	2.47	0.38	.302**	.005	-.101	.044	.050	.021	.144	.247**	.099	.129	.118	.719**	(.69)		
13.Number of features used	6.86	2.21	.116	-.208**	.013	-.075	-.013	.114	.031	.194**	.115**	.368**	.278**	.286**	.214**		
14.Use LMS for information delivery	6.29	2.78	.055	-.230**	.006	-.033	-.039	.083	-.052	.126*	.078	.265**	.268**	.242**	.163**	.780**	
15.Use LMS for facilitation of learning	1.81	1.63	.173*	-.152*	-.032	-.048	.027	.223**	.100	.196**	.115	.357**	.291**	.249**	.304**	.669**	.501**

Note: N=204. SD= Standard Deviation; Diagonal elements are Cronbach's Alpha; *ρ<.05; **ρ<.01.

Table 2. Structural coefficients for the six-factor measurement model

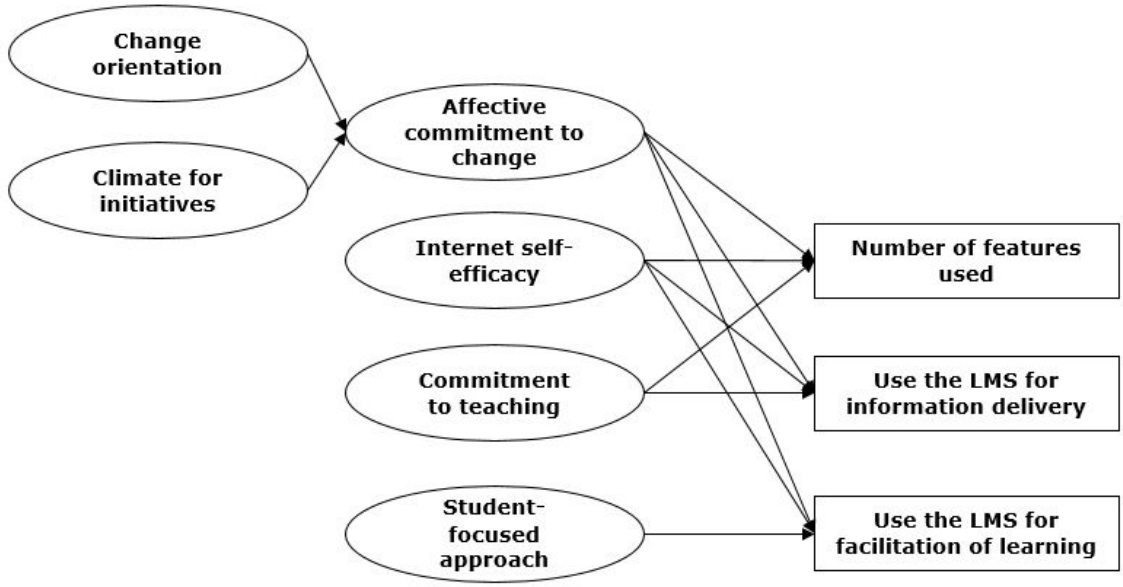
Items	CO	CI	AC	IS	CT	SF
CO1	**.562**	.060	.210	.075	.170	.137
CO2	**.503**	.053	.188	.067	.152	.123
CO3	**.743**	.079	.278	.100	.225	.181
CO4	**.590**	.063	.221	.079	.179	.144
CI1	.077	**.729**	.187	.126	.085	.082
CI2	.094	**.888**	.228	.153	.103	.100
CI3	.085	**.805**	.206	.139	.094	.091
CI4	.055	**.521**	.133	.090	.061	.059
AC1	.358	.246	**.959**	.039	.039	.063
AC2	.364	.250	**.975**	.040	.040	.064
AC3	.283	.194	**.756**	.031	.031	.049
AC4	.331	.227	**.887**	.036	.036	.058
IC1	.103	.132	.031	**.767**	.159	.085
IC2	.105	.135	.032	**.782**	.163	.087
IC3	.115	.148	.035	**.862**	.179	.095
IC4	.111	.143	.034	**.831**	.173	.092
CT1	.192	.074	.026	.131	**.632**	.431
CT2	.215	.083	.029	.147	**.709**	.483
CT3	.222	.085	.030	.152	**.733**	.500
CT4	.205	.079	.027	.141	**.677**	.462
SF1	.143	.066	.038	.065	.401	**.589**
SF2	.180	.083	.048	.082	.502	**.737**
SF3	.115	.053	.031	.052	.323	**.473**
SF4	.146	.067	.039	.066	.409	**.600**

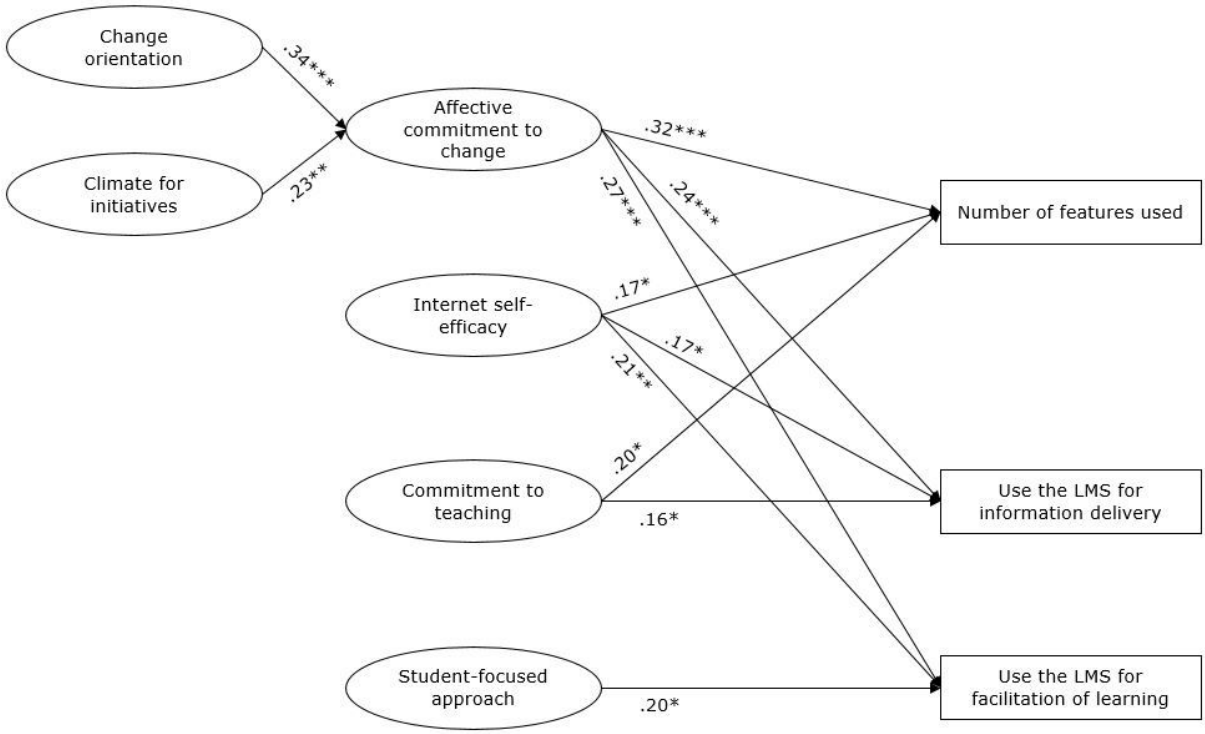
Note: N=204. CO=change orientation; CI=climate for initiative; AC= affective commitment to change; IC=Internet self-efficacy; CT=commitment to teaching; SF=student–focused approach. Bolded factor loadings are pattern coefficients of respective latent variable and are significant at $\rho<.001$.

Table 3. Path coefficients for the hypothesised model

	Affective commitment to change	**Number of features used**	**Use LMS for information delivery**	**Use LMS for facilitation of learning**
Gender	−.075	.013	−.010	.069
Age	−.168*	−.178*	−.247**	−.154*
Faculty	−.041	−.045	−.041	−.080
Tenure	.107	.065	.137	.105
Employment type	.091	−.081	−.099	−.040
Course type	.131*	.043	.038	.135*
Course Stage	.209**	.021	−.038	.063
Change orientation	.341***			
Climate for initiative	.227**			
Affective commitment to change		.319***	.238***	.272***
Internet self-efficacy		.172*	.165*	.210**
Commitment to teaching		.198*	.161*	
Student-focused teaching				.201*
R^2	.253	.262	.207	.287

Note: all of the path coefficients are standardised. *ρ<.05;**ρ<.01; ***ρ<.001.





Note: Control variables were included. All path coefficients are standardised; *ρ<.05;**ρ<.01; ***ρ<.001.

Figure 1. Hypothesised model

Figure 2. Results of hypotheses-testing