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Using an adapted, task-level technology acceptance model to explain why instructors in higher education intend to use some learning management system tools more than others

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ABSTRACT

Instructors in higher education perform some instructional tasks much more often using a learning management system (LMS) tool than other tasks. In studies that aim to explain these differences, the Technology Acceptance Model (TAM) perspective is missing. In this study, an adapted, task-level TAM questionnaire was used to measure task importance, task performance, LMS usefulness, LMS ease of use, and intention to use an LMS for 18 different instructional tasks among 180 instructors at a Dutch research university. The results show that low intention to use an LMS can be explained by (1) low task importance or performance, and/or (2) low LMS usefulness, and/or (3) low LMS ease of use level. The LMS tools and tasks within each of the three groups were not related substantively. This raises a question regarding whether an instructor's LMS intention level can best be explained by the combination of a specific tool, a specific instructional task, and a specific user interface.

1. Introduction

This study aims to explain the differential use of tools within learning management systems (LMSs) by instructors in higher education, from the perspective of technology acceptance. The use of LMSs has become an integral part of higher education on a world wide level (Browne, Hewitt, Jenkins, & Walker, 2008; Ellis, Ginns, & Piggott, 2009; Limayem & Cheung, 2008; Mahdizadeh, Biemans, & Mulder, 2008; Sharpe, Benfield, & Francis, 2006; Walker, 2006). LMSs not only form the basis of distance education, but they are also used very frequently to support traditional face-to-face teaching at universities in a so-called *blended learning* setting (Torrisi-Steele & Drew, 2013), which will be the focus of this article.

LMSs offer various tools, each of which supports the performance of one or more specific *instructional tasks*, defined in this article as activities performed by instructors that relate to students' performance of learning activities. Some LMS tools are used for instructional tasks that are performed to enable or prepare student learning activities. For example, a tool for uploading course materials (tool) can be used to make PowerPoint slides from lectures available (instructional task) for study by students (student learning activity); likewise, a discussion forum (tool) can be used to enable students (instructional task) to hold a whole-group discussion (student learning activity). Other tools are used for instructional tasks that are performed to guide or scaffold student learning activities. For example, online file sharing (tool) can be used to provide feedback (instructional task) on assignments handed in by students (student learning activity).

In this article, the use of an LMS tool for performing a specific instructional task is referred to as a *tool/task combination* and is given its own label. For example, if a digital test software package (tool) is used to create and make available self-assessments (instructional task) to be completed by students (student learning activity) then a tool/task combination *self-assessment/test software* exists, which is assigned the label *Self-test* (see Table 1 for a list of labels).

In higher education, instructional tasks differ in the extent to which LMS tools are used to perform them. A consistent finding is that LMSs are used most frequently for the distribution of learning materials, less frequently for communication between instructor and students, and even less frequently for online assessment or collaborative learning (Blin & Munro, 2008; Browne et al., 2008; Garrote & Pettersson, 2007; Larsen, Sørebø, & Sørebø, 2009; Mahdizadeh et al., 2008; Woods, Baker, & Hopper, 2004). This pattern has not changed fundamentally in the last few years (Garrote Jurado & Pettersson, 2011). As such, a question arises regarding where these differences stem from.

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Table 1
Eighteen instructional tasks for which instructors in higher education might use an LMS tool.

ID	Label	Formulation
1	Meeting	Hold group meetings (lectures and seminars) *through video-conferencing software—e.g., Adobe Connect*
2	Guest speaker	External experts give a guest lecture at my own invitation *through video-conferencing software—e.g., Adobe Connect*
3	Probing	Probe students' knowledge during group meetings *using a digital tool—e.g., SMS-vote or Shakespeak*
4	Student questions	Answer questions from students at irregular times between meeting *by e-mail or in an online environment—e.g., Blackboard*
5	Office	Hold fixed office hours for students *through chat or Skype*
6	References	Make references for further reading and other textual information sources available *in an online environment—e.g., Blackboard*
7	Self-test	Design and make available materials/*a digital test* with which students can perform formative self-assessments *using assessment software—e.g., QuestionMark Perception*
8	Exam	Administer an examination to students that contains multiple-choice questions, among others/*Administer a digital examination to students using laptops in a specifically equipped examination room*
9	Instructor feedback	Provide *digital* feedback on *digital* assignments completed by students and return this to them *by e-mail or in an online environment—e.g., Blackboard*
10	Portfolio	Examine and comment on students' acquired knowledge and skills based on evidence put together by the students (portfolio)/*In a digital portfolio system, examine and comment on a portfolio, put together by a student, consisting of evidence of acquired knowledge or skills—e.g., SharePoint or Sakai*
		I organize an environment in which students (if necessary, supervised and/or guided by me):
11	Student discussion	-hold a whole-group discussion on the subject matter *in an online environment—e.g., discussion forums in Blackboard*
12	Collaborative writing	-write a paper together in small groups, *using a wiki or other software for collaborative writing—e.g., the SharePoint wiki, Wikispaces, Google Cloud Connect, or Google docs*
13	Peer feedback	-comment on and/or judge each other's papers *through software for peer review—e.g., Turnitin*
14	Blog	-during the course, tell or write about their experiences with the course *in an online discussion forum or a blog—e.g., in Blogger*
15	PowerPoint	*After a meeting, make available my own presentation (e.g., PowerPoint slides) in an online environment—e.g., Blackboard*
16	YouTube	*Make available (possibly within a PowerPoint presentation) references to video presentations with further information—e.g., videos on YouTube*
17	Web lecture	*Record my own lectures and make these available (web lectures)*
18	Instruction	*Record my own instructional videos (e.g., about difficult topics) and make these available*

Note. The description of the task performance of each instructional task *per se* (independent of the means of task performance) is in normal font. Additional information specific to use of the LMS tool is italicized. The last four instructional tasks do not have a non-digital counterpart. English translations of the formulation of Task 1–14 appeared earlier in Schoonenboom (2012).

LMS use by instructors in higher education has been viewed from several perspectives. One perspective focuses on the use of the LMS as a whole. Using this perspective, various factors have been identified that support or hinder LMS use. Most of these factors apply more generally to the use of information systems (of which an LMS is an example). These include factors external to the instructor, such as professional support, technical support, funding, preparation time, institutional infrastructure, and involvement of senior staff (Davis & Fill, 2007; Ocak, 2011). They also include intrapersonal factors such as usefulness of the LMS and instructors' efficacy (Torrisi-Steele & Drew, 2013). In the past 25 years, research within the tradition of the technology acceptance model (TAM) has shown consistently that the intention to use various information systems is influenced by their perceived usefulness and their perceived ease of use (Davis, 1986, 1989; Venkatesh & Davis, 2000; Yousafzai, Foxall, & Pallister, 2007).

A second perspective focuses on differential use of LMSs among instructors in higher education, and its relation to differences in instructors' epistemological views. Research based on this perspective has identified different instructor profiles that include the use of an LMS to support (1) information transfer only; (2) including application and clarification of concepts in addition; (3) including exchange and development of ideas in addition; and (4) including exploration and sharing, collaborative knowledge-creation, and development of process awareness and skills in addition (Lameras, Levy, Paraskakis, & Webber, 2012; comparable profiles can be found in Ellis, Steed, & Applebee, 2006; González, 2010; Roberts, 2003).

Very little research has been conducted on the question regarding why some instructors in higher education use LMSs much more extensively than others do (Torrisi-Steele & Drew, 2013). A few studies have suggested a relationship between instructors' views on and use of blended learning and the epistemological view underlying their approach to teaching. With respect to the latter, two groups of instructors can be distinguished: those who focus on information transfer and those who focus on student learning (González, 2012; Owens, 2012). The first group views blended learning as a means of transmitting information and sets up their LMS accordingly. The second group views blended learning as supportive of student needs, and they focus their blended learning design on complex knowledge-building practices and skills (Bliuc, Casey, Bachfischer, Goodyear, & Ellis, 2012). Note, however, that according to another study, this latter group's actual LMS use is much less student-centered than are their beliefs of what they should do (Owens, 2012).

However, this does not answer the more practical question of why some instructors use an LMS more often to perform certain instructional tasks than other tasks. Although TAM and its extensions have been applied regularly to LMS acceptance by students (e.g., Lin & Chen, 2013) and instructors (e.g., Chen & Tseng, 2012; Motaghian, Hassanzadeh, & Moghadam, 2013), hardly any attempts have been made to explain differential LMS usage among instructional tasks using TAM. This is remarkable. After all, if LMS use at the level of the whole system can be explained by the LMS's usefulness and ease of use, then it is to be expected that the use of the LMS for performing a specific instructional task might be influenced by the perceived usefulness and ease of use of the LMS in performing that specific instructional task.

This by no means implies that TAM research does not consider the tasks for which people use information systems. The idea that technology should fit the tasks that users perform has existed for a long time, and is part of extended TAM models. Many TAM studies have shown that a perceived "fit" between the technology and the tasks to be performed has a positive effect on the intention to start using the system (Kuo & Lee, 2011), the intention to continue its use (Lin & Wang, 2012), and intention in relation to attitude and utilization (Yu & Yu, 2010). This applies to the role of the task-technology fit in e-learning as well (Gebauer & Ginsburg, 2009; McGill & Klobas, 2009).

In these studies, the task-technology fit of an LMS is considered at the level of the system as a whole. Respondents are presented with statements such as "I feel that my academic goals and needs are met by applying the e-learning system" (Lin & Wang, 2012, p. 97); "The data