The impact of organisational support, technical support, and self-efficacy on faculty perceived benefits of using learning management system

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ABSTRACT
This paper examines how organisational support influences learning management system (LMS) self-efficacy, technical support, and faculty-perceived benefits. An empirical study based upon responses from 379 instructors at several universities is conducted. Structural equation modelling is applied to develop and assess the measurement model, and analyse the relationships among the factors in the structural model. The results support the hypotheses that organisational support plays a primary role in enhancing faculty’s LMS self-efficacy and technical support. In turn, improved LMS self-efficacy and technical support lead to faculty-perceived benefits from using LMS. Implications are that universities can increase the use of LMS and achieve more effective outcomes from faculty for web-based distance learning and web-assisted course curricula by structuring their organisations to better support faculty in both technical and self-efficacy areas.

1. Introduction
In the past two decades, Learning Management System (LMS) has become a major player in the area of distance education (Cigdem and Ozturk 2016; Islam 2015; Ros et al. 2014), and is critical for academic institutions (Al-Busaidi 2013). Much research has been advanced in the literature on web-based distance learning (DL) technology with the Internet as the platform (Limayem and Cheung 2011; Sanga 2016). LMSs such as Blackboard, Moodle, WebCT, and Desire2Learn become increasingly important for university faculty in online managing and delivering course instruction (Capece and Campisi 2013; Dahlstrom, Brooks, and Bichsel 2014). Hence, researchers are interested in understanding the role of the organisation in creating and maintaining well-defined units within their institutions that provide training and technical support for effective LMS skills transference to faculty (Chiaburu and Marinova 2005). Specifically, universities are tasked with providing a supportive web-based learning environment via the use of organisational support for the use of computer software packaged systems.

While the importance of organisational support for Information System (IS) is well recognised by practitioners in the field (Cheney, Mann, and Amoroso 1986; Herath and Rao 2009; Powell and Dent-Micalef 1997), few studies have empirically demonstrated the key role organisational support plays in effecting faculty-perceived benefits of LMS in the DL environment (Mouakket and Bettayed 2015). Based on the meta-analyses, Alshammari, Ali, and Rosli (2016) found that instructional design of LMS, self-efficacy, and technical support are the factors that may decrease or even prevent users’ utilisation of LMS, but no studies have examined these specific factors empirically and simultaneously. Almarashdeh (2016) also claims that even fewer studies have examined how the belief of the faculty in his/her competence in using LMS and technical support mediate the impact of organisational support on faculty-perceived benefits (Almarashdeh 2016). There is a gap in the literature relating organisational support, user self-efficacy, and technical support to faculty-perceived benefits.

This study fills this literature gap by examining a model of the relationships among organisational support, technical support, LMS self-efficacy and faculty-perceived benefits in the DL environment. Some specific research questions are: (1) How does organisational support influence LMS self-efficacy and technical support in the DL environment? (2) Do technical support and LMS
self-efficacy increase the benefits of LMS usage from the faculty perspective? We engage in an empirical study to address the research questions above.

2. Theory and hypotheses

2.1. Literature review

Four areas in the literature are reviewed in developing the research model: organisational support; self-efficacy in general and computer self-efficacy (CSE) in specific; technical support, and perceived benefits of using LMS. These key research areas are used to develop the constructs, research model, and hypotheses. The theoretical framework for construct development is discussed in the following paragraphs.

2.1.1 Organisational support

Researchers have determined that organisational support enhances psychological empowerment (Gupta 2007; Thomas and Velthouse 1990) and hence enhances self-efficacy (Spreitzer 1995) which is one aspect of psychological empowerment. The organisation as the interface for supporting and enhancing value of software applications to the end-users is beginning to replace the concept of the technology-driven user interface as the primary source for value in end-user computing (Trauth and Cole 1992). Thus, organisations should be structured to apply various mechanisms to remedy unsatisfactory software interfaces. Through on-the-job applied training and encouragement from the organisation, employees gain more confidence and capabilities (Higgins and Guliford 2014) and receive more technical support. This leads to greater benefits (Gist, Schwoerer, and Rosen 1989). Al-Busaidi and Al-Shihi (2010) claim that organisation support is important for faculty members to adopt and accept LMS in their online teaching. Ayub, Baker, and Ismail (2015) find school support is positively correlated with teachers’ attitudes on using information and communication technology in DL classes. In DL, ongoing support should be provided for faculty when they try to integrate LMS tools into an online teaching environment that implements new pedagogies (Chen 2011).

2.1.2. LMS self-efficacy

Many studies develop and discuss theories around self-efficacy in the social cognitive context (Compeau, Higgins, and Huff 1999; Wood and Bandura 1989). Self-efficacy is a belief in one’s ability or competence to perform a specific task (Gist 1987). The literature on CSE builds on the theory of self-efficacy through empirical studies (Compeau and Higgins 1995; Deng, Doll, and Truong 2004). Researchers observe that CSE is an individual’s capability to use computer software and hardware (Compeau and Higgins 1995). CSE is a critical variable for studies measuring improvements in acquired skills (Bates and Khasawneh 2007; Gravill and Compeau 2008).

CSE can be conceptualised at both the general and application-specific levels (Marakas, Yi, and Johnson 1998). General CSE refers to one’s estimate of efficacy across different computer applications (Wang, Xu, and Chan 2015). Application-specific CSE means an individual’s estimate of ability in completing application-specific computer-related jobs where outcome performance varies by the application. Previous researchers have found CSE positively affects perceived ease (Terzis and Economides 2011) and behavioural intention to use software (Hsia, Chang, and Tseng 2014) in e-learning. Jia, Bhatti, and Nahavandi’s (2014) research reveals that perceived virtual environment self-efficacy has a positive effect on task outcome. In this paper, LMS self-efficacy is the belief of an instructor in his/her ability to use LMS for teaching effectiveness and achieving instructional goals for distance education.

2.1.3. Technical support

Technical support such as the assistance from technicians can enhance employees’ use of the technology. Previous research has found the importance of the availability of assistance to individuals who require it (Compeau and Higgins 1995; Thompson, Higgins, and Howell 1991). Schultz and Slevin (1975) consider ‘support/resistance’ as one factor influencing utilisation of computer systems. Further, Sekakubo, Suleman, and Marsden (2011) identify insufficient technical and user support as one of the reasons of LMS failure. Yusof et al.’s (2008) study demonstrates the adoption of IS was disrupted due to the lack of technical support. Al-Busaidi and Al-Shihi (2010) argue that technical support in the forms of instructional design specialists, computer specialists, and trained assistants, is essential to instructors’ acceptance of LMS.

2.1.4. Perceived benefits

Perceived benefits mean the impacts that the computer software has on a person’s work (DeLone and McLean 2003; Torkzadeh and Doll 1999). One major purpose of using an LMS is to reach the intended learning outcomes of a course as well as to increase students’ engagement with DL (Gigdem and Ozturk 2016). This study views the benefits brought by LMS from the faculty perspective. It examines how LMS helps instructors save time (DeLone and McLean 2003), improve instruction quality (Chickering and Ehrmann 1996), and increase job productivity (Sharda et al. 2004).
2.2. Research model

The research model is described in Figure 1. The model provides a framework for examining the impact of organisational support on LMS self-efficacy and technical support along with the effect of LMS self-efficacy and technical support on faculty-perceived benefits.

Organisational support is defined as the extent to which institutions provide training programmes, policies, and encouragement for faculty use of LMS in DL or web-assisted course design and teaching. Technical support is defined as the extent that faculty can freely call upon the LMS instructional design and technical team in the proper use of functions and features of LMS (Trauth and Cole 1992).

While some institutions may not provide the support for technical and instructional design, other organisations provide workshops to help faculty users be familiar with basic functions of LMS. Instructors who use LMS for web-assisted or online class teaching rely heavily on technicians to help apply various tools. Here, the instructional designer is viewed as a resource of an institution. These designers are not only experts on LMS, they are also familiar with curriculum design. The training of instructional designers on both technology advancement and curriculum issues along with a sufficient number of technicians provided by an organisation can better serve faculty needs in solving technical problems in using LMS. Thus, we propose the following hypothesis:

H1: The higher the organizational support, the higher the technical support.

LMS self-efficacy is defined as the extent to which faculty members believe they have confidence in their capabilities in using LMS to accomplish their work tasks. Employees tend to form a global belief that the greater the organisational commitment to them, the greater their work effort will be appreciated and rewarded (Eisenberger et al. 1986). The organisation (i.e. the university) can better structure itself to help faculty gain confidence and competence in the use of LMS through workshop skill training and favourable policy encouraging the utilisation of LMS. Previous study (Stone and Henry 2003) has found that training plays an important role in CSE. Further, Capece and Campisi (2013) demonstrate that users believe DL training programmes enhance their motivations and skills to use the system. Thus, we propose the following hypothesis:

H2: The higher the organizational support, the higher LMS self-efficacy.

Faculty-perceived benefits are defined as the extent to which faculty perceive that the LMS can improve their own teaching and productivity and achieve instructional goals. Most instructors are not technology savvy (Buzzard et al. 2011). To achieve different instructional goals and enhance online class teaching effectiveness manage an online class effectively, instructors generally expect technological assistance for initiation and application of unfamiliar or intricate tools of LMS (Pena 2015), or directly adopt the online course template designed by the technicians. For example, faculty usually turn to instructional designers when they set up randomised quizzes for multiple students, appropriately produce post video clips to help students comprehend complex course contents such as equation-based problem-solving, or apply rubrics for class evaluation. We, therefore, propose the following hypothesis:

H3: The higher the technical support, the higher faculty perceived benefits.

Sezgin and Erdogan’s (2015) research outlines a positive relationship between teacher-perceived self-efficacy and success. Gravill and Compeau (2008) find that self-efficacy positively affects learning outcomes and performance in the computer software domain. In DL environment, previous studies show that CSE is a consistent predictor of outcomes (Eom 2011; Garavan et al. 2010; Hsia, Chang, and Tseng 2014). When instructors believe that they have mastered the skills necessary for using software, they tend to enact more features of LMS, manage an online class more effectively, and achieve specific benefits. We infer that increased LMS self-efficacy will enable the user to find more benefits. Thus, the following hypothesis is proposed:

H4: The higher the LMS self-efficacy, the higher faculty perceived benefits.

3. Methodology and results

The aim of this study is to examine how organisational support influences LMS self-efficacy, technical support and the impact on faculty-perceived benefits in the use of LMS. An empirical study is conducted to measure the variables and test the hypotheses.

3.1. Instrument development

The measurement model in this paper is derived from the literature review. A question pool was first generated.
After expert interviews designed to remove unwanted items, a pilot study was followed by a large-scale study after modification and elimination of items (MacCallum, Roznowski, and Necowitz 1992) that were determined to not address our research questions. Table 1 provides the constructs broken down by items adapted and operationalised for the measurement instrument based upon theory (Hughes, Price, and Marrs 1986).

Organisational support for the LMS was measured by four items drawn from Compeau and Higgins (1995) and Igbaria and Livari (1995). Technical support measures were derived from the literature regarding the influence of organisational support on technical support through training (Compeau and Higgins 1995; Deng, Doll, and Truong 2004; Doll and Deng 2010; Thompson, Higgins, and Howell 1991). The 3-item LMS self-efficacy measure in Table 1 was derived from Spreitzer’s (1995) instrument for measuring competence as it relates to capturing the spirit of self-efficacy according to Deng, Doll, and Truong (2004) and Doll and Deng (2010). Perceived benefits measures were taken from a combination of studies, including Smaill (2005) study on web-based learning and assessment, Gong, Xu, and Yu’s (2004) technology acceptance model for web-based learning, Arbaugh’s (2001) study on the effects of online courses, and Hara and Kling’s (2000) study on student distress in web-based learning.

A multi-item 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree) was used for measuring organisational support, technical support, and faculty-perceived benefits. An adapted 5-point Likert scale (1 = to no extent, 2 = to little extent, 3 = to moderate extent, 4 = to great extent, and 5 = to very great extent) was used in measuring LMS self-efficacy.

### 3.2. Data collection

A survey was administered to four medium-size universities in the Midwestern region of the United States that have agreed to participate in this research. A total of 428 faculties who used LMS for instructional use (e.g. web-assisted course instruction, DL, or both) completed the online questionnaire. These responses were pared down (Gerbing and Anderson 1985) to 379 respondents for our final sample size as we were only interested in faculty members who use LMS for course instruction (e.g. role is ‘instructor’ or ‘faculty’). The frequency of faculty respondents by titles is listed in Table 2. The percentage of female and male respondents was 57% and 43% respectively; among the respondents, 15% used LMS for DL courses only, 63% used LMS for web-assisted course, while 22% used the system for both types of courses.

### 3.3. Analysis of the measurement model

The data analysis first assessed the measurement model and then, if the test of measurement model was adequate, the authors examined the structural model (Anderson and Gerbing 1988), with the tool of structural equation modelling (i.e. LISREL).

Table 3 organises the information about the measurement model into three groups: construct names, descriptive statistics, and reliability and validity test. The descriptive statistics include a construct’s mean, standard deviation, skewness, and kurtosis. The mean values of the four variables are from 3.83 to 3.98 and their standard deviations from 0.77 to 0.85. The skewness values fall between −2 and +2 and the kurtosis values between −5 and +5. These statistics together suggest that all four variables are normally distributed (Ghiselli, Campbell, and Gerbing 1988).

### Table 1. Constructs and their measurement items.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
</tr>
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<tbody>
<tr>
<td>Organisational support (OSU)</td>
<td>OSU1. I am supported and encouraged by my organisation to use the CMS in my job</td>
</tr>
<tr>
<td></td>
<td>OSU2. The training provided by my organisation helped me get familiar with this software</td>
</tr>
<tr>
<td></td>
<td>OSU3. My organisation is really keen to see that we are happy with using the CMS</td>
</tr>
<tr>
<td>Technical support (TSU)</td>
<td>TSU1. exchange information with others who know how to better use the software functions</td>
</tr>
<tr>
<td></td>
<td>TSU2. talk to other people who are more knowledgeable</td>
</tr>
<tr>
<td></td>
<td>TSU3. discuss with others who know how to make better use of the software features</td>
</tr>
<tr>
<td>Learning management system</td>
<td>SEF1. I am confident about my ability to use the software to complete my work</td>
</tr>
<tr>
<td>self-efficacy (SEF)</td>
<td>SEF2. I believe in my capability of using the software to complete my work</td>
</tr>
<tr>
<td></td>
<td>SEF3. I have mastered the skills necessary for using this software in my job</td>
</tr>
<tr>
<td>Faculty-perceived benefits (PBE)</td>
<td>PBE1. In general, this software enhances my teaching effectiveness</td>
</tr>
<tr>
<td></td>
<td>PBE2. This software enables me to handle a large class effectively</td>
</tr>
<tr>
<td></td>
<td>PBE3. This software improves my students’ learning</td>
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</tbody>
</table>

### Table 2. Breakdown by respondents’ title.

<table>
<thead>
<tr>
<th>Title</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor</td>
<td>66</td>
<td>17.4</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>70</td>
<td>18.5</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>96</td>
<td>25.3</td>
</tr>
<tr>
<td>Lecturer/Instructor</td>
<td>114</td>
<td>30.1</td>
</tr>
<tr>
<td>Other (such as adjunct or visiting professors or lecturers, graduate teaching assistants)</td>
<td>33</td>
<td>8.7</td>
</tr>
<tr>
<td>Total</td>
<td>379</td>
<td>100.0</td>
</tr>
</tbody>
</table>
and Zedeck 1981) and ready for the next step of assessment.

The reliability and validity test in Table 3 reports the values of Cronbach (1951) alpha ($\alpha$), average variance extracted (AVE), and Pearson correlations (Corr). An $\alpha$ value of 0.70 or higher suggests that the measurement scale performs consistently when it is tested repeatedly and, thus, is viewed as reliable (Nunnally 1978). The $\alpha$ values of all four variables are 0.76 or higher, indicating that their measurement scales have adequate reliability.

A construct’s validity includes convergent validity and discriminant validity. Convergent validity is usually evaluated by (1) AVE and/or (2) how well the measurement items load on their corresponding construct. This study presents the results of both evaluations. Fornell and Larcker (1981) contend that an AVE value of 0.50 or higher suggests convergent validity. This value indicates that the latent variable of the measurement items captures the same variance as or more variance than those captured by measurement errors. The AVE values of all four variables exceed 0.50, suggesting adequate convergent validity. Bagozzi and Yi (1988) recommend that a value of 0.60 or higher of standardised item-factor loadings for all measurement items suggest convergent validity of a construct. All standardised item-factor loadings ($\lambda$s), as reported in Figure 2, are greater than 0.60, providing added evidence of convergent validity for the measurement items.

Table 3. Descriptive statistics, reliability, and discriminant validity test ($N = 379$).

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean</th>
<th>Std. dev.</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>$\alpha$</th>
<th>AVE</th>
<th>Corr</th>
<th>Corr</th>
<th>Corr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Organisational support</td>
<td>3.83</td>
<td>0.85</td>
<td>−0.70</td>
<td>0.71</td>
<td>0.76</td>
<td>0.54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Technical support</td>
<td>3.83</td>
<td>0.85</td>
<td>−0.94</td>
<td>1.40</td>
<td>0.94</td>
<td>0.84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. LMS self-efficacy</td>
<td>3.98</td>
<td>0.77</td>
<td>−0.82</td>
<td>1.57</td>
<td>0.88</td>
<td>0.74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Faculty-perceived benefits</td>
<td>3.78</td>
<td>0.81</td>
<td>−0.83</td>
<td>1.40</td>
<td>0.82</td>
<td>0.65</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Notes: AVE values of the variables are placed in the diagonal cells. ** indicate that the Pearson Correlation is significant at the .01 level (2-tailed).

Figure 2. The measurement model (Standardised solution).
Discriminant validity is a measure of the extent that a latent variable is independent of other variables (Bagozzi and Philips 1982). To demonstrate discriminant validity, the AVE score of the latent variable should exceed the squares of the Pearson correlations between the latent variable and all other variables (Fornell and Larcker 1981). An examination of all AVE scores and the Pearson correlations offers evidence that the four variables have adequate discriminant validity.

The values of chi-square ($\chi^2$), degree of freedom (df), root mean square error of approximation (RMSEA), non-normed fit index (NNFI), and comparative fit index (CFI) are adopted to assess how well the model fits the data. A good model-data fit should have a score of 2.0 or less for the $\chi^2$ per df (Joreskog and Sorbom 1989), 0.050 or less for RMSEA (Steiger and Lind 1980), and 0.90 or more for NNFI and CFI (Bentler 1990; Bentler and Bonnet 1980). Per these criteria, the measurement model depicted in Figure 2 demonstrates an adequate model-data fit.

### 3.4. Structural model analysis

The LISREL structural model in Figure 3 is examined to test the hypotheses $H_1$ through $H_4$. With the same set of criteria described in the section above, the structural model suggests an adequate model-data fit as well.

For the sample of 379 university faculty members, results reported in Figure 3 show that there is statistical significance between an exogenous variable organisational support and an endogenous variable technical support ($\gamma = 0.62$, $t = 11.22$, $p < 0.01$), supporting hypothesis $H_1$ (The higher the organisational support, the higher the technical support). The variance explained in technical support by the research model is 39% ($\zeta = 0.61$). There is also statistical significance between organisational support and LMS self-efficacy ($\gamma = 0.39$, $t = 6.76$, $p < .01$), suggesting that hypothesis $H_2$ (The higher the organisational support, the higher the LMS self-efficacy) is supported. The variance explained in LMS self-efficacy by the research model is 15% ($\zeta = 0.85$).

Figure 3 also suggests that there is statistical significance between an endogenous variable technical support and another endogenous variable faculty-perceived benefits ($\beta = 0.27$, $t = 5.96$, $p < .01$), providing support to hypothesis $H_3$ (The higher the technical support, the higher faculty-perceived benefits). There is statistical significance between LMS self-efficacy and faculty-perceived benefits ($\beta = 0.50$, $t = 10.64$, $p < .01$), supporting hypothesis $H_4$ (The higher the LMS self-efficacy, the higher faculty-perceived benefits). The variance explained in perceived benefits by the research model is 39% ($\zeta = 0.61$).

### 4. Conclusions and discussions

Bates and Khasawneh (2007) call for further studies on the relationship between self-efficacy and online learning outcomes because they think the relationship between them is more complex than had typically been recognised. This study has a strong but specific focus on analysing the self-reported experience of faculty in utilising LMS for distance education. It examines that organisational support can help achieve the perceived benefits of IS (Petter, DeLone, and McLean 2013). It further extends this discussion to consider whether organisational support influences technical support (Yusof et al. 2008) and LMS self-efficacy (Ayub, Baker, and Ismail 2015) in order to increase the benefits of using LMS in a DL environment (Jia, Bhatti, and Nahavandi 2014). The research makes theoretical contributions using a large-scale empirical study through proposing a model and its findings that demonstrate the importance of organisational support in improving faculty’s online education. The findings demonstrate that LMS technology and organisational support can impact the faculty-perceived benefits of using LMS through technical support and LMS self-efficacy (Mitchell et al. 2012).

It has been a challenge to support teachers of successfully integrating educational technologies into the teaching practices supporting in-service teachers in the successful integration of educational technologies into their teaching practices has been a challenge (Chen 2011). The results of this research suggest that organisational support defined in this case as training and the encouragement of software usage has a bigger impact on technical support than LMS self-efficacy. In college education, faculty members usually assume the responsibility for curriculum design and leave the technical part to technicians. The level of technical support is mainly determined by organisational inputs such as budget and structure. We infer instructional designers and technicians also benefit more from advanced training programmes. The results also imply that faculty members...

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**Figure 3.** The structural model for testing the hypotheses (Standardised solution).
perceive more benefits from LMS self-efficacy compared to technical support (Lwoga and Komba 2015). When instructors feel more confident in system use, they will actively try to initiate and apply more of the tools provided by LMS to manage larger class size and enhance teaching effectiveness achieve higher instructional goals in DL education (Hsia, Chang, and Tseng 2014; Sezgin and Erdogan 2015). These tools include File Management, Dates Management, Discussions, Chat, Groups, Assignments, and Quizzes.

This study has practical implications. In 2015, Bousbahi and Alrazgan suggest that, by providing resources and fostering a supportive environment through the provision of time release to faculty members to manage their workload, leaders can reduce load anxiety and increase motivation and may consequently influence LMS use in the IT Department. This study further claims that organisations should focus more on technical support that helps faculty users overcome the learning curve and solves technical issues on LMS usage (Yusof et al. 2008). For example, depending upon different course subject, institutions may provide different online course templates for faculty to choose. Since some instructors tend to seek online course design assistance from their colleagues, administrations may encourage such support by rewarding those instructors who assist other faculty members in the use of distance education technology. Such reward could be to take this into consideration for faculty evaluation or promotion process. Universities can also influence faculty’s perception of the value of LMS for instructional and other-related purposes by providing faculty with customised workshops linking specific LMS functions and features to instructional goals in DL or web-assisted course teaching (Jia, Bhatti, and Nahavandi 2014). A practical suggestion is institutions should choose appropriate software to better provide technical support while to lower down the cost in the long term. More user-centred software can also increase user competence and belief in their abilities to apply LMS for their instructional needs, and thus realise greater benefits of using LMS.

This research examines LMS self-efficacy, organisational support, technical support and perceived benefits mainly from faculty perspective. How universities provide support to enhance students’ self-efficacy of using LMS, and thus lead to higher student learning outcomes would be an important implication for further academic research.

**Disclosure statement**

No potential conflict of interest was reported by the authors.

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