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Issues in learning management systems implementation: A comparison of research perspectives between Australia and China

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Abstract

Australian post-secondary institutions have embraced the incorporation of Learning Management Systems (LMSs) into traditional classroom-based instruction and distance learning models. Given that an increasing number of Chinese students are studying in Australia and that their experience of using LMSs in China may be very different from that in Australia, it is important to explore the issues in LMS implementation in the two countries. This literature review compares the use of LMSs in China and Australia with the aim of identifying some of the issues impacting their integration into the course offerings of post-secondary institutions in both countries. The review identifies seven main themes that influence the implementation of LMSs: LMS selection and non-financial factors; diversity of LMS deployment in Australia; the rise of MOOCs in China; the impact of culture on LMS usage; online learning and socialisation; learner and faculty expectations of online learning; and roadblocks to online learning. This review helps to identify and synthesise the issues that impact upon the ability of higher education institutions in Australia and China to integrate LMS technologies into their course offerings.

Keywords Learning management systems · LMS · Online learning · E-learning · Blended learning · Literature review

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1 Introduction

Traditional classroom methods of course delivery at post-secondary institutions have been significantly transformed by the integration of e-learning technologies into course offerings. Online learning tools have assisted in the adoption of a student-centred learning model where the teacher no longer has absolute control (Raji 2019), interactions between students are teachers are more prevalent (Zheng et al. 2020), and cooperative learning is encouraged (Chyr et al. 2017). Learning Management Systems (LMSs) are an integral part of the learning experience for students in many educational institutions in Australia and China (Liu et al. 2003; Weaver et al. 2008). A LMS can be defined as an online platform that offers support for traditional instructional activities such as information presentation, management of course materials and collection and evaluation of student assessments (Yueh and Hsu 2008) and must be capable of storing and delivering grades and feedback to learners (Turnbull et al. 2019). Providing ubiquity to learning content and virtually managing learning are also essential facets of any LMS (Sabharwal et al. 2018). Moodle is an example of a commonly used LMS platform for developing online academic courses (Badia et al. 2018).

Australia's overseas education market was valued at more than AUD 35 billion in 2018 (Australian Government Department of Education and Training 2019a). Education is seen as an essential vehicle to foster relationships with countries in the Asia-Pacific region – particularly with Australia's most important economic partner, China. In July 2019, there were more than 190,000 Chinese students enrolled in Australian educational institutions, representing more than 28% of all international students in Australia (Australian Government Department of Education and Training 2019b). LMSs are a vital platform to serve the needs of learners, educational institutions and academic administrators, who together comprise the diverse community of LMS users.

The success of an institution's courses depends in no small part, on the engagement of learners and educators with its LMS. There have been several attempts to study the phenomenon of Chinese students adapting to online learning in Australia over the last fifteen years. A study by Chen et al. (2008) found significant roadblocks to successful adaptation to Australia's online learning environment by Chinese learners. These included: a student-perceived reduction in input from teachers in an online learning environment; the lack of a learning community online; and little reinforcement of learning activities. Another Australian study found that digital technologies were not transforming university teaching and learning, and universities needed to work on the reliability and user-friendliness of LMSs (Henderson et al. 2017).

An adequate understanding of the issues impacting on LMS integration is critical to ensuring the ongoing success of every learning institution's programs and courses. Some of the reasons for pursuing the integration of LMSs into course delivery infrastructure include increases in teaching efficiency; enriched student learning; satisfying student expectations; competitive pressure from other institutions; responding to increased demand for courses; and culture shifts in teaching and learning at universities (Coates et al. 2005). If some of these desired outcomes are to have any chance of success, then implementation strategies that consider LMS implementation are essential. This is particularly relevant to Australia which has 2316 post-secondary institutions (The Good University's Guide 2019), most of which use some sort of LMS to support programs that are delivered to an expanding clientele of international students. Given

the increase in the number of Chinese students at post-secondary institutions in Australia, it is timely to examine recent research efforts into LMS deployment in Australia and China to identify the issues impacting on LMS implementation in post-secondary educational institutions in both countries. The lack of any prior studies that deal explicitly with comparisons of implementation issues of LMSs between Australia and China was also an important gap that prompted this study. The findings will be valuable for post-secondary institutions in both countries.

The rest of the paper is structured as follows. Section two outlines the research method adopted for this study. Findings and discussion follow in the subsequent section. Section four provides the implications for cross-border joint research. The conclusion outlines the limitations along with the avenues for future research.

2 Research method

The study was framed by addressing the research question: what are the key issues associated with the implementation of Learning Management Systems (LMSs) into the course offerings of post-secondary institutions in Australia and China?

The methodology adopted in this paper draws on the strengths of two main approaches to literature reviews: narrative and systematic. According to Rother (2007), a narrative review is a critical analysis of the literature of a chosen topic. Narrative reviews are broad in nature and usually do not describe in detail the methods employed to collect and analyse the literature selected for examination (Henry et al. 2018). By contrast, systematic reviews are characterised by explicit, transparent methods that can be reproduced by other researchers (Collins and Fauser 2005). The strengths of systematic reviews include the narrow focus of the research question, comprehensive search for evidence, and criterion-based selection of relevant evidence. This review adopts a narrative approach to answering the research questions and applies some of the rigours of systematic review methodologies to the selection and inclusion of the published articles referred to in this paper. Hence, the findings should be treated with cautions that usually apply to a narrative review.

Figure 1 illustrates the search strategy used in this review. This review used the following online databases to retrieve articles relevant to the research question: A+ Education; Education Research Complete; ERIC; Teacher Reference Centre; and Mental Measurements Yearbook. These databases were selected based on their relevance to literature in the field of education. These databases were accessed through EBSCOhost, a digital referencing and archiving service. A search string using the keywords: ‘Learning Management System’, ‘LMS’, ‘E-Learning’, and ‘online learning’ was constructed with appropriate Boolean operators to search relevant English language literature on studies in Australia and China. These searches were applied to the abstract field of the database query engine. This helped to ensure that the central theme of each retrieved article aligned with the research question of this review. Given the rapid advances in LMS technology and use over the years, it was decided to limit the age of publications included in this review to a six-year period (2014–2020) to ensure that included papers had a contemporary focus. Only full-text results in English were included. A United States of America (USA) study by Sadykova (2014) was also included because of its focus on the case of a Chinese student studying online at an

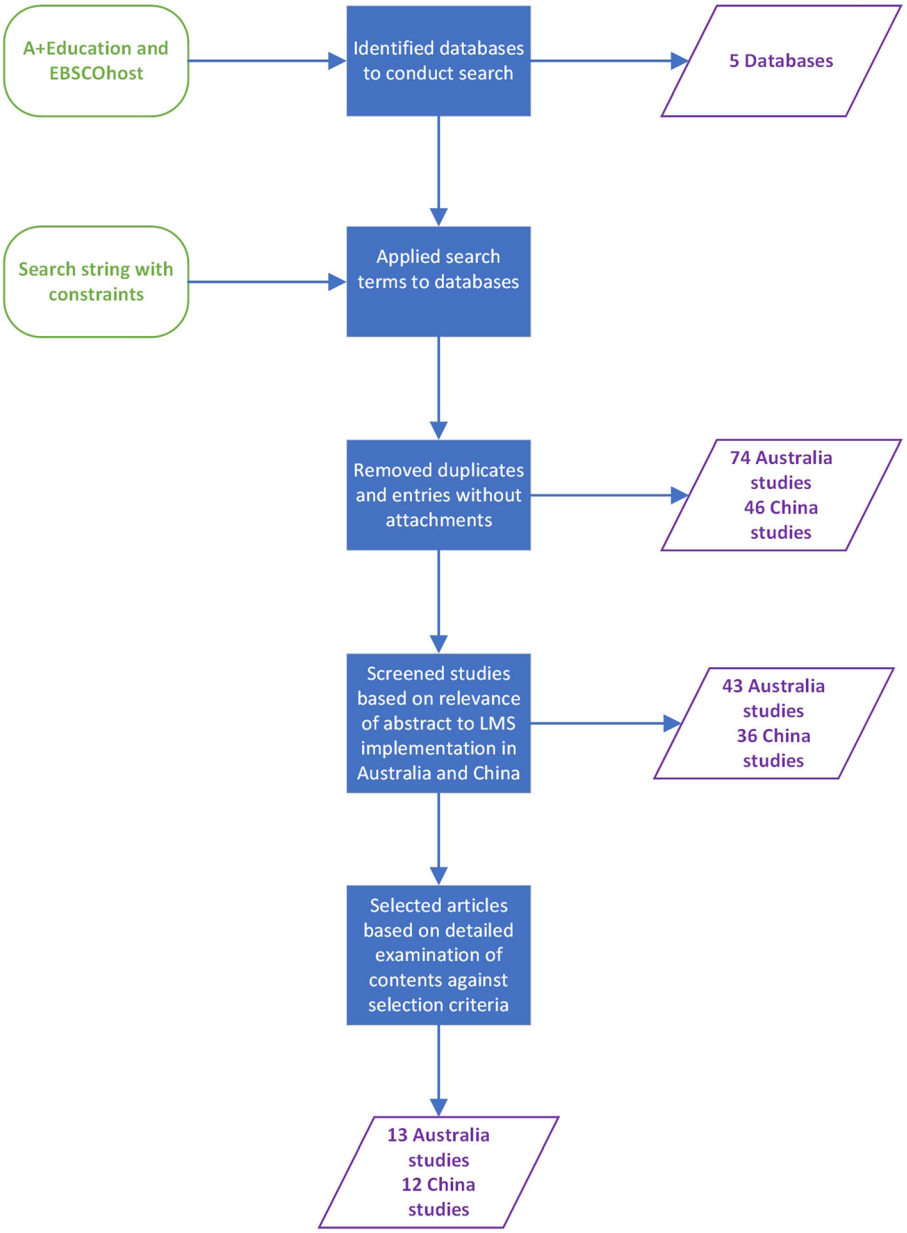

Fig. 1 Search Strategy

American institution. Based on the title and abstract information, publications were initially screened for inclusion depending on their relevance to the research question. After previewing each article, a shortlist of publications was compiled according to the following four inclusion criteria: the publication critiqued the use of LMSs from an

education or training perspective; the research methodology was identified and discussed; there was an adequate description of the context in which the research was carried out, and the data analysis was sufficiently rigorous.

The databases used in this review were outside the control of the authors in terms of the publications they have access to and their search algorithms. It is possible that two identical searches within a short period of each other could yield different results. The inclusion of more databases in this review could have mitigated this issue. Another limitation is the search restriction of English-only publications from prominent English language databases. Expanding the search to include Chinese language and mainland China databases could possibly have enriched this review. The search strategy employed in this review yielded 36 publications about LMS systems in China and 43 publications about LMS systems in Australia. There were also cases of full-text records being inaccessible due to connecting database authentication issues. These 79 publications were examined in detail for inclusion against each of the four inclusion criteria. Finally, a total of 12 China-focussed and 13 Australia-focussed publications were selected for further analysis. While there are some research papers that compared LMSs in other countries such as the USA, Japan and Malaysia, they were included in this review because of their substantive focus on China. Accordingly, such papers were labelled as China-focussed. Table 1 displays the summary information of included publications and their classification as China or Australia-focussed.

3 Findings and discussion

From the analysis of Australian and Chinese literature from January 2014 to June 2020, seven themes were developed that consolidate the research outcomes of each study. This was accomplished by carefully comparing the results of each paper's findings to establish commonalities that could form logical groupings for further analysis. These seven themes are:

- LMS selection and non-financial factors
- Diversity of LMS deployment in Australia
- The rise of Massive Open Online Courses (MOOCs) in China
- The impact of culture on LMS usage
- Social aspects of online learning
- Learner and faculty impressions of online learning
- Potential roadblocks to online learning.

3.1 LMS selection and non-financial factors

In selecting a LMS, decision-makers in higher education institutions often rate cost as one of the most important criteria (Williams van Rooij 2012). Cost is a quantifiable variable readily understood by academic managers who need to justify the acquisition of teaching technology from a value-for-dollar bottom line. For proprietary systems, these costs could include software licensing and vendor servicing expenses. In contrast, cost estimates for the acquisition of open-source systems such as Sakai or Moodle

Table 1 Summary information for LMS publications

Author (Year)	Study Purpose	Australia/China Focus
Callan et al. (2015)	Delivering more flexible approaches to trade training using blended e-learning	Australia
Cao (2017)	How Massive Open Online Courses (MOOCs) are changing College English in China	China
Chen et al. (2020)	This mixed-methods study explored the use of Blackboard's synchronous system: "Blackboard Collaborate"	Australia
Dong et al. (2019)	An exploration of the social aspects of learning with a LMS using a multiple case study approach	China
Gómez-Rey et al. (2016)	The application of Hofstede's six-dimensional model of national culture to online learning	China
Khairudin and Hamid (2015)	Developing a model that will assist universities to select a LMS using non-financial measures	Australia
Kibelloh and Bao (2014)	An investigation into how online Master of Business Administration (MBA) programs in China are perceived by working mothers	China
Li et al. (2015)	Understanding student perceptions to the use of Learning Management Systems in traditional undergraduate courses in China	China
McConnell (2017)	An analysis of the views of teachers in China on the effectiveness of e-Learning	China
Mihelic and Griffin (2019)	An investigation of online learning within the Australian VET sector	Australia
Mirriahi et al. (2015)	A comparison of three case studies of the implementation of blended learning at the University of New South Wales	Australia
Moore and Greenland (2017)	An investigation into the impact of assessment policy on student attrition for online courses at Open Universities Australia (OUA)	Australia
Ng and Angstmann (2017)	Using enquiry-based online learning to promote physics literacy	Australia
Redmond et al. (2014)	An examination of the differences in online discussion participation between students of engineering and students of education	Australia
Reedy (2019)	A qualitative exploration of Aboriginal in online learning	Australia
Sadykova (2014)	The interaction of overseas students (especially from China) with domestic students in an online environment to acquire knowledge	China
Sheridan et al. (2014)	How students perceive the use of online assessments as a tool to engage in reflective practice in their work-related internships	Australia
Shih et al. (2017)	The use of e-learning technologies to mediate the social practice of learning among coursework students in Sydney, Australia	Australia
Sridharan et al. (2014)	Measuring the gap in the perception of pedagogies, technologies, learning resources and the management of	Australia

Table 1 (continued)

Author (Year)	Study Purpose	Australia/China Focus
	learning resources between e-learners and e-providers	
Wanner (2014)	Examining the differences in teacher and student expectations and interactions between online and face-to-face teaching	Australia
Xu et al. (2014)	How students manage their emotions in online learning environments in China	China
Yang and Wang (2014)	A comparison of the perceptions of privacy of students in China and Japan	China
Zhang et al. (2017)	An analysis of the factors influencing the intention of learners to adopt MOOC learning in China	China
Zhao and Mei (2016)	An investigation of the differences between American and Chinese student's motivation to succeed in online learning	China
Zhu and Qi (2018)	An investigation of the relationship between college students' social identity and online learning performance in Guangdong province	China

would require an assessment of the in-house IT support staff and faculty training expenses over the perceived useful life of the system (Williams van Rooij 2007). Calculating the Net Present Value of competing investment proposals is a necessary process in selecting any IT system. However, reliance on financial factors based on system functionality alone runs the risk of precluding alternatives that may have substantial but less financially quantifiable benefits.

Khairudin and Hamid (2015) investigated the use of non-financial factors to aid universities in the decision-making processes to select a LMS from competing alternatives in Australia and Malaysia. The research culminated in the development of a model that included twenty-eight financial and non-financial criteria divided into six different categories or perspectives. Examples of non-financial criteria included: enhancing lecturer's knowledge of state-of-the-art technology; support for content sharing and migration; security from unauthorised access; and usage of overall LMS functionalities. The study indicated that there was substantial support for using a multi-dimensional decision-making model among IT decision-makers at universities.

Many institutions evaluate LMS software from an accounting perspective and limit their analysis of competing alternatives to cost recovery calculations, or in the case of open-source software, full development costs. Given the impact the choice of a LMS will have on participating learners, the inclusion of non-financial factors in decision making would be prudent. More input from faculty and learner communities would also help promote the consideration of non-financial factors in LMS selection decisions.

3.2 Diversity of LMS deployment in Australia

LMSs are used to support learning in a variety of disciplines, academic levels, and learning situations. Online learning can be delivered as a complete stand-alone

offering, as part of in-class instruction (Singh 2003), or even to support industry work-placements (de Leng et al. 2009). The LMSs used to support online learning can even be designed to support synchronous interactions with learners. Four examples encapsulated in this theme highlight the diversity of LMS use in Australia.

3.2.1 Example one: Physics delivered online

Ng and Angstmann (2017) examined the online delivery of a course in physics called *Everyday Physics* to see if learners were more motivated to study this discipline in an online environment. Twenty-nine undergraduates in science and non-science disciplines completed Likert-style questionnaires designed to capture the opinions of students studying physics online. The results of the survey confirmed that both science and non-science students were generally positive about the pedagogical structure of the online physics course. However, the extent to which these results can be generalised to broader populations of students is questionable. It may well be that learners of other disciplines have different perceptions of online courses. As the global appetite for non-classroom centred methods of delivery increases, LMSs capable of self-contained distribution and management of course content and assessment are certain to increase in importance. The challenge for Australian institutions is to leverage LMS tools to adapt successful classroom-based instructional methodologies to an online environment with a global reach.

3.2.2 Example two: LMSs and blended delivery in trade education

The trade and technical training sector is often overlooked by e-learning researchers. The study on blended e-learning in trade training by Callan et al. (2015) fills this gap in the literature. The study is based on semi-structured interviews with twenty-one professionals drawn from Vocational Education and Training (VET) colleges and employers across several states and territories, and twenty-one apprentices from the baking, building and construction, stonemasonry and plumbing industries. The interviews confirmed that e-learning was regarded as a critical factor in the delivery of effective trade-based training. A major benefit emerging from the interviews was that through the use of e-learning modules, employers could keep their apprentices on the job longer because essential underpinning knowledge could be completed at home (Callan et al. 2015, p. 304). However, the motivation for reporting such positive views from employers may be more related to profit considerations than learner wellbeing. Participants in the study generally reported a positive view towards adopting new future technologies as they emerged, such as the 3D delivery of content via e-learning systems.

The use of blended learning techniques in trade and technical training appears to be taking a foothold. Trades-related courses are challenging to deliver using online tools because of the practical nature of the concepts to be mastered (Mihelic and Griffin 2019). In the twenty-first century environment of IT-tool savvy workers, blended learning will become an increasingly important medium to deliver effective training (Crawford 2016). Educators in the Vocational, Educational and Training space need to adapt to this change.

3.2.3 Example three: Using a LMS to support workplace learning

Researchers, at the University of Wollongong engaged in the delivery of work-integrated learning (WIL) curriculum, conducted a study into the perspectives of students on the efficacy of LMSs to facilitate the completion of WIL assessments (Sheridan et al. 2014). These students were placed with employers as part of their enrolment. Overall, the study found that students had positive attitudes towards the online facilitation of WIL assessments. One of the more prevalent advantages cited in the survey was the flexibility online assessments gave students to complete required work in a place and time suited to their work placement situation. The researchers opine that this leads to more thoughtful and insightful assessment submissions than otherwise would have been the case in in-class situations. However, they only considered asynchronous communication methods in their study. Many online platforms incorporate synchronous tools, so the use of such systems may yield a different outcome.

Work placements are increasingly becoming an integral part of many university and college programs. Traditional classroom-based delivery usually requires students on work placement to submit reflective assessments outside of a work context. By employing online methods to manage work-related assessments, the learner's context in the workplace can be better integrated into assessment submissions because they are able to complete them on-the-job (McNamara and Brown 2009). Faculty are also able to provide more relevant feedback via online tools to the learner while they are still in the workplace.

3.2.4 Example 4: Using synchronous tools embedded in LMSs

Chen et al. (2020) set out to investigate the impact of synchronous communications tools on the learning experiences of Australian students. Blackboard Collaborate (BC) is a web conferencing tool contained within the Blackboard LMS that facilitates real-time interactions between course participants. When used in conjunction with other functions of the Blackboard LMS, it is a powerful tool to bring synchronous communication to the learning and assessment process. The study found that participants enjoyed seeing and hearing their teachers in real time but found the requirement to engage in activities that recorded their voice or image quite daunting. Perhaps this reluctance was due to an assumption that little or no effort was required to adapt synchronous communication tools to learner needs and expectations. Cong (2020) specify four interconnected factors that determine the successful adoption of tools within the framework of a LMS: defining a clear purpose, adequate support for staff, consistent scheduling of communications, and adequate training for students. As communication technology enhancements improve the prospects of more widespread use of synchronous tools in LMSs, it is important that institutions adequately prepare LMS stakeholders for a transition to real-time communications within LMS environments.

3.3 The rise of MOOCs in China

Online learning and traditional classroom-based delivery are often considered to be independent educational pathways in China. China is one of the largest adopters of

MOOCs, possibly second only to the United States (US) and with a large number of Internet users, China is aiming to use MOOCs to exploit opportunities to foster life-long learning and provide learning opportunities to adults who previously had little exposure to formal education (Zhang et al. 2015).

Cao (2017) conducted a literature review on the use of MOOCs in the delivery of English instruction in China. The review examined 129 publications on MOOC usage across China with a view to determining their impact on learning effectiveness. The study identified six prominent MOOC platforms in China that deliver English language courses, of which XuetangX (学堂X) was the most prominent. Cao (2017) concluded that MOOCs have influenced the design of English teaching programs in China and encouraged teachers to upgrade their skills and qualifications to better adapt to this mode of English language learning.

Cao's review of Chinese literature is limited in comprehensiveness by the search strategy employed to retrieve pertinent publications. "大学英语慕课" (Dà xué ying yǔ mù kè) translated into English as "College English MOOCs", is the only term used to retrieve the articles. Moreover, the search was constrained to a web-based search engine and no attempt was made to interrogate more robust databases of information. However, the fact that it is based on Chinese language sources does provide a uniquely Chinese perspective on LMS usage in China. It would also appear from the review that the integration of MOOCs into English language training in China has the endorsement of the Chinese government and is expanding in popularity. Further research into government policies on MOOC education in China may reveal insights into the future direction of this mode of education in China.

Transitioning courses from face-to-face delivery (F2F) to an online context is also an ongoing phenomenon in China. This was studied by Li et al. (2015) who adapted the course *Internet and Distance Education* a two-credit offering at Zhejiang University, to delivery via a LMS called Sakai. The research participants were asked to complete a variety of assessments within the Sakai LMS, including a requirement to interact with other students in information-sharing activities. Both quantitative and qualitative methods were used to analyse student opinions of their learning experience. The conclusions drawn from the analysis were that student perceptions of e-learning as a quality medium was at a high level, and that instructor involvement in the learning process was considered essential to learning success. This peer-reviewed research involved input from a US-based academic, which adds a non-Chinese perspective to this local Chinese study. This is important to mitigate any accusations of bias that may be attributed to a perceived homogeneous research environment in China. The finding that the participants in the study viewed instructor guidance as crucial to success in an online environment has implications for LMS design. LMSs are often criticised for impeding real-time interaction between instructors and students, so LMS features that facilitate more synchronous communication would most likely be welcomed by the learner community.

Learner characteristics, the degree of control learners have on the learning process, and differences in LMS platform characteristics can all have an impact on the desire of learners to study online. In a China-focussed study, Zhang et al. (2017) explored learner perceptions of MOOC efficacy to discern if any significant factors were influencing an individual's decision to pursue online learning opportunities. The study suggested that perceptions of usefulness and ease of use were positively related to MOOC adoption

intention; perceptions of user control were in turn positively related to perceived usefulness and ease of use, and personal innovativeness in information technology positively influenced perceived usefulness and perceived ease of use. The study implied that LMS platform developers need to be cognizant of individual learner characteristics – particularly where there are language and cultural issues involved. However, as the authors note, the study is limited in scope and sample size and could be enhanced by including more local and overseas sources. This would help strengthen the case for generalising the study's findings.

3.4 The impact of culture on LMS usage

Cultural influences can be significant in shaping the perceptions of online learning. Gómez-Rey et al. (2016) set out to determine the variables most likely to play a crucial part in those perceptions. They used the Hofstede 6D[1] model of national culture as the theoretical underpinnings of their study. Their analysis of two survey results from students in four countries: Spain, the US, Mexico and China yield two critical findings. Firstly, four of Hofstede's six dimensions were considered significant in terms of their relevance to learner characteristics. These were Power Distance, Individualism, Pragmatic and Indulgence. Secondly, although the perceptions of online learning were noticeably different between students in the four countries at the beginning of the study, when measured at the end of the study, they were more or less uniform. This suggests that group dynamics may influence changes to individual perceptions over time. For online course designers creating a curriculum for an international audience, the main insight from the research is that online pedagogies need to be flexible enough to accommodate differences in the cultural backgrounds of learners – especially at the beginning of a course. What is not considered explicitly in the study is the impact of the culture of teachers on LMS usage by students. This dimension could impact on LMS use as educators from different cultural backgrounds may perceive the role of LMSs in education differently.

Differences in the culture and values of learners can also affect group work dynamics in an online environment. In a study exploring Indigenous Australian perceptions of online learning, Reedy (2019) discovered that indigenous learners were reluctant to post online comments in fear of revealing their cultural identity and being judged in a negative light. Learners participating in online group work often have to temper their reactions to other participants because of the asynchronous nature of communication in this environment. More effective online communication can be facilitated by encouraging more personal interactions between learners to bring down communication barriers (Heinze and Procter 2006). The issue of emotional self-management by learners in online courses has been examined by several studies, but few have explicitly focussed on Chinese learners. Xu et al. (2014) attempted to correct this deficiency by instigating a study of 307 undergraduate students in 40 study groups in China, enrolled in an online course in multimedia applications. The study examined

[1] The Hofstede model of national culture consists of six dimensions that define how values in the workplace are influenced by culture. These dimensions are Power Distance (PDI), Individualism versus Collectivism (IDV), Masculinity versus Femininity (MAS), Uncertainty Avoidance Index (UAI), Pragmatic versus Normative (PRA) and indulgence versus restraint (IND) (Tajaddini and Gholipour 2017, p. 110)

student strategies to manage emotions in an online group setting and concluded that emotional management was positively related to feedback from instructors. Reference is also made in the study to the Confucian heritage culture (CHC) as a possible reason for differences between emotion managing strategies in China and other countries (Xu et al. 2014, p. 798). The very characteristics of the Chinese learner's CHC could be inhibiting honest or complete responses. However, the issue of providing useful feedback to Chinese learners does have important implications for instructors in online environments. Chinese students engaged in online group work may need more targeted pastoral care to help them adjust to online learning demands.

For international students, the ability to collaborate online with others in a group setting could be a critical factor for learning success. Sadykova (2014) examined a selected sample of international students studying in an online environment in the US. The case study of 12 international students included two students from Nepal, five students from mainland China, and one student each from India, Nigeria and South Korea. The feature of the research relevant to this review is that it focussed in part on the case of one of the five students from China who agreed to participate in the face-to-face interview stage of the study. The information gleaned from interviews of the student and the online instructor revealed that peer support from American classmates assisted her to adapt to the demands of online learning. Sadykova (2014) concludes that this student's previous education experience (all in China and all face-to-face) did not equip her with the psychological skills to succeed in an online learning environment. Sadykova reasons that the mentoring role adopted by her American classmates was an effective substitute for the pastoral care provided by a face-to-face instructor and was instrumental in providing the necessary encouragement and support for this Chinese student to succeed in her online studies. This highlights the value of pursuing practices that integrate international students into the mainstream online community. This is particularly important for online courses that require a high degree of student-to-student collaboration. Such collaboration may work best when international students are paired with domestic students for the duration of a course.

3.5 Social aspects of online learning

A study of social practice in e-learning by Shih et al. (2017) examined how e-learning technologies mediate the social practice of learning at the University of New South Wales. The study employed the use of focus groups to record the views and attitudes of students from six university faculties on online learning. Focus groups are a particularly effective means of gathering shared views on issues that would be difficult to collate from one-on-one interviews. The results of the study indicated that students highly valued functions that promote interactivity in e-learning systems. In addition, the time-saving features of learning technologies were also highly valued. In some respects, e-learning technologies supplement the benefits of engagement with social network sites that can have a positive impact on student wellbeing (Samad et al. 2019).

The issue of social presence is of particular importance to LMS deployment because of the perceived lack of social interaction in this environment (Tu and McIsaac 2002). In Zhu and Qi (2018)'s study of social identity and online learning, it was argued that some Chinese students could benefit from counselling and participation in volunteer activities to compensate for an inability to develop satisfying social interactions in an

online environment. LMS developers are often accused of not giving social presence due consideration in LMS design specifications, while course facilitators often assume that classroom-based pedagogies can be transferred seamlessly to an online setting. The fact is that many learners pursue higher education for reasons outside the knowledge and certifications that can be attained. Social interaction with peers, friendships, and even lasting relationships are the norm for many students in traditional classroom-based instruction. Dong et al. (2019) studied the impact of LMSs on student socialisation. The authors concluded from their analysis that educators must also seek new ways to deploy LMS features to support enhanced learner socialisation online.

LMSs contain discussion boards and other communication tools that could aid social interaction online. To what extent do learners engage with each other through discussion forums, and what is the nature of that engagement? Redmond et al. (2014) attempted to answer that question by studying the discussion posts of engineering and education students pursuing online education at a regional Australian university. Discussion forums containing posts from 159 engineering students and 104 education students were analysed and classified into five groups: social, interactive, cognitive: surface processing, cognitive: deep processing and metacognitive. The results indicated that the nature of the discipline (engineering or education) did impact on the student's display of levels of thinking and the number of posts made. The education students posted more often and had longer posts, while the engineering students demonstrated higher levels of thinking. There was a noticeable social element to many posts in both disciplines.

However, the study indicates that the volume and quality of learner activity in online discussion forums may be dependent on the course of enrolment of the learners and the subject matter being studied. It may, therefore, be beneficial for online educators to integrate additional communication tools into their courses which would be appealing to students who have an aversion to posting in discussion forums. Synchronous tools such as live chat apps and video conferencing are good candidates for inclusion in a LMS's suite of communication tools. Such tools may also increase learner participation and motivation to succeed in online learning (Chugh 2010).

3.6 Learner and faculty impressions of online learning

Comparisons between face-to-face (F2F) and online delivery of courses can often yield insights into how online delivery can be better managed to meet learner needs and expectations. A study on faculty views on the effectiveness of e-Learning in China by McConnell (2017) revealed that it was not favoured in quality terms as a serious contender to traditional classroom-based instruction. The study found that most teachers were concerned about the capacity for Chinese students to embrace self-study approaches to learning because of cultural preferences towards teacher-driven instruction and an aversion in Chinese society to encourage learner autonomy. Wanner (2014) analysed the responses of student feedback from F2F and online learners. Wanner (2014) suggested that there are four considerations for a successful transition to online delivery of courses: careful analysis of one's motivation, teaching pedagogies and skills to teach online; make clear to students the expectations and online environmental skills early in the course; do not attempt to transform a F2F course alone without institutional assistance, and use synchronous and asynchronous activities in the design

of online delivery. Wanner's study is limited by a small sample size and a focus on a single course of study. By his own admission, the paper is "a critical reflection as a University teacher of taking a long established and highly successful on campus (face-to-face) course for the first time into the online environment as a completely online course" (Wanner 2014, p. 37). However, it does raise the issue that developing online courses is not just a simple matter of dumping F2F course content into a LMS and expecting it to be successful.

Another point of comparison to consider is the degree of alignment or misalignment between the views of online education providers and the e-learning community. Sridharan et al. (2014) conducted a study investigating the differences in perceptions and preferences between e-learning providers and e-learners, of four dimensions of online learning: pedagogies, technologies, the content of learning resources, and the management of learning resources. Interviews were conducted with twenty-seven representatives from five universities and two from Open Universities Australia (OUA). The results were compared with an online survey of 210 e-learners. The study concluded that major differences exist in stakeholder perspectives in two domains of online learning: pedagogies and student resource management. This implies that e-learning may not be delivered in a way that satisfies learner demand. This study is a wake-up call for LMS providers and educational institutions to become better acquainted with their customer base before designing and implementing e-learning systems. The customer base should include all stakeholders who interact with LMSs regardless of their role.

An exploration of what motivates students in different countries to pursue online learning can also be helpful in developing an understanding of learner perceptions of online learning. A comparative study in the USA and China by Zhao and Mei (2016) explored several dimensions of the motivation by students to complete online courses. The survey results were analysed by examining the demographic characteristics of each student against a range of motivation types. The motivation types considered were: course relevance, course interest, affection and emotion, reinforcement, and self-efficacy. The main conclusion drawn from the study was that overall motivation towards online learning was significantly higher in the USA than in China. This was particularly true within three motivation types: course relevance, reinforcement, and self-efficacy. The generalisation of this study's findings beyond the two institutions targeted is questionable. Institution-specific factors such as university policy, faculty characteristics, and adopted technologies may impact upon the motivation to pursue online studies. In addition, there is also likely to be some bias in the survey tools as they were developed for a North American audience and may have limited validity in China. However, the research does indicate that motivation towards online learning in China may be influenced by factors not considered in a Western context.

3.7 Potential roadblocks to online learning

The success of LMSs in enabling online learning is often constrained by both conditions created within a LMS environment, and external factors affecting learners and faculty who use these systems. An overview of the four most prominent examples of *roadblocks* to LMS enabled online learning are: privacy in LMS systems, women and

access to higher education, online learner attrition, and faculty skill deficits in online delivery.

3.7.1 Privacy in LMS systems

Privacy for learners is a grey area in the realm of education (Polonetsky and Tene 2014). On the one hand, educators require information on learner activities to be able to provide meaningful feedback to students. On the other hand, certain biographical information about learners such as national origins, work history, and marital status are usually considered private to the individual. Most LMSs are capable of capturing the personal details of learners. In some situations, it is even possible to mandate the collection of learner information through a LMS as a requirement to finalise enrolment. Are most learners comfortable with providing this data? Yang and Wang (2014) examined the issue of privacy in e-learning in a comparative study. Their longitudinal study surveyed the attitudes towards privacy of 800 Japanese and Chinese students engaged in some form of e-learning from 2009 to 2012. The study found that learners in both countries generally had positive attitudes towards the provision of personal information to teachers using e-learning systems although there were some reservations about providing certain identifying information such as photos and personal addresses. One interesting conclusion was that "Chinese students were found to be less forgiving than Japanese students in terms of online monitoring and online-learning security" (Yang and Wang 2014, p. 213). This was attributed to a lack of exposure to online learning from Chinese students during their high school years.

While the study does not specifically focus on security mechanisms in LMS systems, it does raise some interesting questions about privacy issues within LMS learning environments. For example, does the national and cultural origins of learners impact upon the capacity to collect, via LMS systems, the personal information deemed necessary to participate in a course successfully? Alternatively, are LMS privacy features sufficiently robust to accommodate learner control of personal information gathered as part of the learning process? Higher education institutions embracing the new world of global online education will have to address questions like these if they wish to accommodate an increasingly diverse clientele.

3.7.2 Women and access to higher education

Unfortunately, gender bias against women is prevalent in China sometimes preventing them from fully participating in higher education (Gaskell et al. 2004). Kibelloh and Bao (2014) conducted a case study looking at working mothers in China who had enrolled in an online MBA degree. The study sought to document some of the experiences of women enrolled in online MBA courses and their perceptions of the usefulness and ease of use of the e-learning environment. On the issue of experiences in the MBA program, a central emerging theme was that participation in the program minimised their social roles because study time had to be shared with family responsibilities. With regard to perceptions of usefulness, online learning was considered favourably because of the flexible nature of the delivery and open access times. Finally,

the participants expressed a degree of comfort with using the e-learning interface. This last finding was attributed to the participants' prior experience using computer systems. The study highlighted some of the problems Chinese women have accessing higher education, and the potential of online solutions to mitigate access inequities in this group of learners. However, as the authors note, the use of the snowballing sampling method to select participants reduced the likelihood that the participant sample is representative of the broader population. It is, therefore, difficult to generalise the findings beyond the constraints of the study.

3.7.3 Online learner attrition

Concern has been raised in some quarters in Australia, about online student attrition caused by conflicting employment commitments. Moore and Greenland (2017) examined attrition in Australian universities that teach the Open Universities Australia (OUA) tertiary programmes and they found it could be attributed to work-related demands. The research had two components. First, 226 telephone interviews were conducted with students who had dropped out of their online studies, to find out the main reasons for their decision to leave. Next, the research analysed the policies of ten OUA universities in an attempt to discover if any institutional factors were contributing to student attrition in online courses. The study concluded that employment was the largest contributing factor out of eleven categories presented in the interview questions. The findings of phase two of the study indicated that all ten OUA universities had policies that dealt with extenuation circumstances when dealing with requests for assignment extensions. However, only half of the universities had policies that explicitly mentioned employment commitments as grounds for granting assignment extensions. An investigation into how these policies were formulated would provide some insight into the extent universities are connected with the potential employers of their graduates.

The research highlights the need for institutions engaged in online delivery to be cognizant of the fact that although LMSs provide a greater degree of flexibility for learners to align their study time with personal commitments, this does not necessarily mean that employment responsibilities will never interfere with assessment deadlines. There is also an onus of responsibility on employers, who are a significant beneficiary of employee self-improvement efforts, to better accommodate online learning with work schedules and commitments.

3.7.4 Faculty skill deficits in online delivery

In Australia, where blended learning is becoming commonplace, faculty training is seen as an important requirement to successfully transitioning classroom-based courses to online delivery. A case study by Mirriahi et al. (2015), described three programs offered by the University of New South Wales to deliver training to faculty on integrating course content into online platforms. The study first looked at a foundation course in university teaching (FULT) which aims to facilitate the development of an e-portfolio by each participant through online and in-class instruction. Next, the study reviewed the university's post-graduate course redesign offering (GCULT), which is also offered in a blended learning mode. Finally, the research examined the university's MOOC-based course called Learning to Teach Online (LTTO), which is open to

participants outside the university's teaching faculty. The researcher's positive reviews of the effectiveness of all three courses, lead to the paper's conclusion that technology acceptance among teaching faculty can be fostered through the provision of distinctly different pathways that learners can follow according to their needs and preferences. The study also concludes that further work in developing programs to support faculty involvement in blended learning is needed. This view is also supported by Al Meajel and Sharadgah (2017) who investigated the use of the Blackboard LMS for teaching in Saudi Arabia and found that training and institutional support were barriers to LMS implementation by faculty.

This study highlights the need to provide support for faculty entrenched in the traditional model of classroom-based instruction. For blended delivery to be effective, investment in faculty skills-development in online course delivery is crucial. Workshops, forums, and conferences on the subject of blended learning facilitates the sharing of ideas between instructors (Scoppio and Luyt 2017). This interaction is critical to fostering an understanding of online learning characteristics, and mitigating common problems encountered in integrating e-learning systems into classroom-based models.

4 Implications for joint research

The distribution of themes displayed in Fig. 2 indicates that research into LMS implementation in Australia and China can be uniquely country-based or can transcend national boundaries.

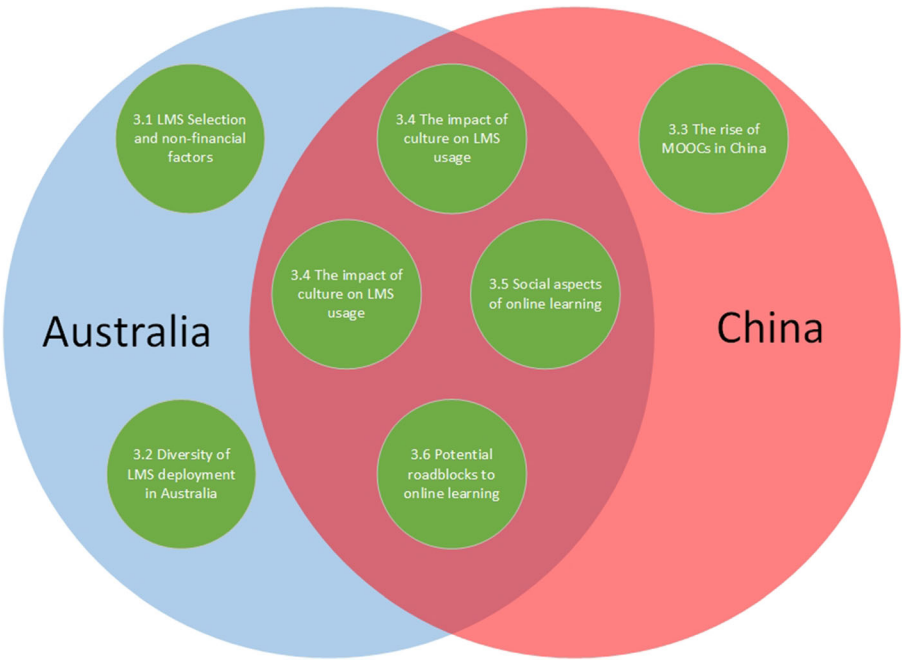

Fig. 2 Distribution of themes between Australia and China

This clearly depends on the aims and constraints of the research. For example, theme 3.2 (diversity of LMS deployment in Australia) consists of studies that targeted specific Australian contexts of LMS use (online delivery of physics courses, blended learning in trade education, synchronous tools in Blackboard, online learning in VET education, and LMS support for workplace learning). Similarly, theme 3.3 (the rise of MOOCs in China) consists of three studies that explore the evolution of MOOCs within a distinctive Chinese framework.

The four themes that contained papers in both Australia and China consisted of studies that were common concerns for researchers in both countries. Culture is explored as a significant influencer on LMS use in theme 3.4 (the impact of culture on LMS usage). This has interesting implications for LMS developers and educators who seek to deploy online systems across international boundaries. It is interesting to note that in theme 3.5 (social aspects of online learning), both the China and Australia studies addressed the importance of social connectedness in learning. It would appear that China-based researchers are becoming more interested in exploring human interactions in online learning despite a Confucian attitude towards study that shuns socialising in a learning environment (Guo 2004). In theme 3.6 (learner and faculty impressions of online learning), both the Australian and Chinese studies explored issues related to these stakeholder's experiences of online learning. Community acceptance of online learning is a common concern in both Australia and China which have a vested interest in transitioning to online learning delivery environments (Turnbull et al. 2020). The other theme relevant to both countries was 3.7 (potential roadblocks to online learning). Online learner attrition and faculty skill deficits were addressed by the two Australia-focussed papers, while the two China-focussed studies explored privacy issues and women in education. Clearly, roadblocks to LMS deployment are significant problems worthy of exploration in both countries.

The identification of common research efforts between countries is important for two reasons. First, it assists in the rationalisation of research effort to ensure that unnecessary duplication is minimised. In a research environment where output is increasingly measured in dollar terms, institutions and individuals are often required to choose between competing alternatives on the basis of their economic value (Galdas 2017). Second, it enhances cooperation between researchers across nations, enabling the exchange of ideas and expertise that leads to more robust research methodologies and outcomes (Georghiou 1998; Russell 1995). Higher education institutions, governments, and the research community should strive to develop protocols that include robust measures to investigate research efforts in other countries as part of the development of all research proposals.

5 Conclusion

Learning Management Systems are well integrated into the educational practices of most post-secondary institutions in Australia. Chinese students are the largest group of international students enrolled in Australian post-secondary institutions. They often face challenges adapting to the way LMSs are used to deliver course content and assessments. An understanding of how LMSs influence learner behaviour and usage can assist educators to develop more effective

strategies to leverage this technology to improve the learning outcomes of Australia's diverse student population. The differences between the implementation of LMSs in Australia and China and their impact on learner communities in both countries were the focus of this literature review. Seven broad themes emerged from the study that contributed to a better understanding of these differences. These were: using non-financial criteria to select LMS systems, Australian LMS diversity, MOOCs in China, culture and LMS use, social aspects of online learning, learner and faculty impressions of online learning, and potential roadblocks to online learning.

The findings of this study will be useful for educators, institutional administrators, and LMS designers who collectively define the online learning landscape within which students are expected to operate. For example, teaching faculty who design LMS course content that involves group work may want to consider incorporating exercises that facilitate more interpersonal interaction between culturally diverse learners. This could help foster a unified understanding of course expectations. Institutional administrators may find it useful when making decisions on LMS purchases to include factors other than function and cost before making selection decisions. For example, the cultural diversity of learners and their degree of familiarity with the technology could help define the functional requirements of proposed LMSs. Finally, LMS designers should take heed of the connected world that students live in, and the inherent inadequacy of asynchronous tools to satisfy learner expectations for real-time support. Strategies to integrate a diverse range of social media tools such as WhatsApp for Australian students and WeChat for learners from China would facilitate better learner-facilitator interaction in LMS supported courses delivered both in Australia and China.

This study is not without its limitations. The restriction to English language publications over a six-year period meant that relevant papers that could add value to the research aims might have been omitted. Another limitation of this paper is that it focusses on LMS use in China and Australia only. The extent to which the results can be generalised to other countries is therefore limited, as an examination of the literature in other national contexts may yield different results. Additional studies comparing LMS use in other countries would enrich the findings of this review and offer more insights into the challenges and opportunities of delivering LMS-enabled courses to an increasingly diverse student cohort.

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