

# Quality assurance interventions in blended learning design: A systematic review of the literature

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The COVID-19 pandemic has accelerated the shift in higher education towards blended and online learning, prompting a need for robust quality assurance interventions. Blended learning, a combination of face-to-face and online experiences, offers flexibility and individualised learning paths, but its quality varies across institutions. Quality assurance interventions play a crucial role in monitoring and enhancing the effectiveness of blended learning programs. This systematic literature review examined existing literature on quality assurance interventions in blended learning within higher education. The review highlights the importance of evaluating the impact of these interventions on student performance and the educational landscape. It also emphasises the need for evidence-based frameworks for benchmarking and assessment. The review identifies four key intervention approaches: professional development courses, communities of practice and mentoring, audit frameworks and learning design support. Each approach has its strengths and can contribute to improving the quality of blended learning. Future research should focus on multifaceted interventions that combine these approaches to enhance the skills of academics and elevate the standard of blended learning across institutions.

## *Implications for practice or policy:*

- This review can guide higher education institutions in implementing quality assurance activities to enhance their online and blended learning offerings.
- Evidence-based approaches that institutions can adopt include professional development courses, communities of practice and learning design support interventions.

*Keywords:* learning design, blended learning, quality assurance, higher education, academic, systematic review

## Introduction

The COVID-19 pandemic significantly expedited the shift in higher education from the traditional focus on face-to-face learning to an increase in blended and online learning options (Singh et al., 2021). Blended learning (BL), which can be defined as the thoughtful combination of face-to-face and online learning experiences, has the capacity to enhance educational offerings compared to traditional campus-based learning by facilitating flexible self-paced online learning activities that support on-campus education (Smith & Hill, 2019). Moreover, it offers the potential to individualise the learning path for each student, thereby enhancing out-of-class activities and opportunities for feedback (Castro, 2019).

However, the quality of blended and online learning modalities at different institutions needs to be measured. To do this, quality assurance interventions have been developed and play a pivotal role in safeguarding the integrity and effectiveness of BL programmes (Cappelli & Smithies, 2021; Marshall & Sankey, 2023). By implementing robust strategies and mechanisms, educational institutions can systematically monitor, evaluate and enhance the overall instructional design, content delivery and student engagement within BL environments.

As the adoption of BL continues to proliferate, it is imperative to assess the range of quality assurance interventions that have been implemented, their impact on student performance and their implications for the overall educational landscape. As a starting point, a systematic review of literature about these mechanisms is required, and that is the focus of this paper. This review provides a comprehensive analysis of the literature on quality assurance interventions in BL aimed at higher education academics to inform

best practice approaches for improving technology-enhanced learning (TEL) design and implementation in the higher education setting.

### **TEL in higher education**

Before the widespread adoption of TEL in higher education, academic skill sets were focused on face-to-face pedagogy with emphasis on the delivery of on-campus lectures, seminars and workshops (McQuiggan, 2012). It is important to note that many universities in Australia were already in the process of adopting blended or even online learning modalities before COVID-19; however, the pace of that adoption was increased by the necessities of the pandemic (Singh et al., 2021). The integration of TEL within the framework of BL has the potential to revolutionise contemporary education by fostering a dynamic and interactive instructional environment that seamlessly combines traditional face-to-face instruction with innovative online learning tools and resources, as well as other modalities, including hyflex (where class meetings and materials are made available so that students can access them online or in person, during or after class sessions) and here-or-there (a blended synchronous approach where students can participate together on campus (here) or from a remote location (there) in real time) (Beatty & Becker, 2019; Zydney et al., 2019).

### **Institutional support for academics using TEL**

As BL continues to emerge as a prominent educational approach, the imperative to upskill academic staff in new technology and pedagogical practices related to the deployment of that technology becomes increasingly vital to facilitate the effective integration of digital tools and platforms within diverse learning environments (Adamson & Sloan, 2021). However, adoption of new pedagogical practices, which might include migrations to new learning platforms, are complex endeavours, and maintaining a level of quality across the institution in question can prove challenging.

In a recent systematic review, McCarthy and Palmer (2023) highlighted the complexity of implementing BL and stressed the necessity for institutions to evaluate adoption. The evaluation process should be comprehensive, focusing on assessing the outcomes and impact of TEL, rather than solely concentrating on learner satisfaction with the provided education. Key areas identified for evaluation include the curriculum, the environment and the community (the educators and the learners) (Cappelli & Smithies, 2021). Cappelli and Smithies emphasised the importance of universities adopting an evidence-based framework for benchmarking and assessment of TEL. Marshall and Sankey (2023) identified five (of 12) TEL benchmarking frameworks that specifically highlight online learning standards suitable for BL environments. These frameworks are the ASCILITE (2020) Technology Enhanced Learning Accreditation Standards, the Quality Matters framework, the Online Learning Consortium (2024) scorecard suite, the New Zealand e-learning guidelines and the e-learning maturity model. Other evaluation frameworks that can be used to assess BL implementation include the Guskey (2015) framework, Kirkpatrick's evaluation framework (Kirkpatrick & Kirkpatrick, 2016) and the academic professional development evaluation framework (Chalmers & Gardiner, 2015). A crucial aspect of many of these frameworks relates to the professional development (PD) and training provided to staff.

The benchmarking toolkit for technology enhanced learning developed by the Commonwealth of Learning outlines important benchmarks for higher education institutions focused on quality improvement in TEL (Sankey & Mishra, 2019). The intention of the toolkit is "to help institutions see their technology-enabled learning (TEL) practice in the light of what is considered good practice, and then compare their analysis with others" (p. 3). To do so, the toolkit identifies 10 domains against which institutions can compare their TEL practice: policy, strategic plan, information technology support, technology applications, content development, documentation, organisational culture, leadership, human resource training and TEL champions. Benchmark 9 (human resource training) emphasises the importance of staff development, and this is of relevance to this systematic review.

The role of PD for staff has been a key feature of studies of TEL implementations. According to Zhao and Song (2021), higher education academics require institutional support and training in technological

content and pedagogy for the successful implementation of BL. Similarly, Fathema and Akanda (2020) found that universities should provide comprehensive training in learning management system (LMS) usage for academics, while also focusing on discipline-specific training and PD related to LMS utilisation.

Examples of institutional support activities that can enhance academics' technological content and pedagogical knowledge include skills workshops, formal courses, participation in communities of practice and coaching and mentoring programs integrated within the work environment (Garone et al., 2022). Technology design support tools can also be used by academics to support the creation of online learning experiences (Bennett et al., 2015).

Although there is a plethora of research about different institutional support activities, and a developing research base related to models, frameworks and toolkits that might be implemented to gauge the effectiveness of those activities, now is an opportune time to review the different quality assurance interventions. As more and more universities seek to engage with wider student audiences via the use of blended and online learning modalities, there is a need to utilise institutional resources in the most efficient way. Understanding the different approaches and tools used to evaluate TEL implementation is an important first step in that understanding, and it is this that this systematic review of literature sought to do.

## **Methods**

The preferred reporting items for systematic reviews and meta-analysis (PRISMA) was utilised to guide this systematic literature review.

### **Literature search**

A systematic literature search was undertaken using the Web of Science, Scopus and ERIC databases to identify existing research. The key search terms for this activity were “blended learning higher education” OR “blended learning framework” OR “blended learning design” AND “higher education” AND “quality assurance” OR “quality improvement” OR development” OR “benchmarking” OR “evaluation” in the title, abstract or keywords. The search was conducted in September of 2023 to enable a complete search of the literature published to date. Reference lists from articles were also reviewed to identify additional resources that did not appear in the literature search but had been regularly referenced by the final group of selected articles.

Retrieved records were imported to the Covidence systematic review platform. Following the removal of duplicates, articles were screened for eligibility by title and abstract. Articles identified as possibly relevant underwent full text review. Screening was completed by one of us (HB) with the input of the other two of us (KW and KH) sought where article inclusion or exclusion was not clear.

The references included in the search involved an intervention that targeted higher education academics and was aimed at improving online or BL design. Articles that did not describe a quality assurance intervention, were not aimed at the higher education setting, were not targeted at academics and were not available as full-text peer-reviewed original articles were excluded.

### **Data extraction and analysis**

Data from the eligible studies was extracted by HB and recorded utilising a standardised data extraction form. Information extracted included higher education setting, quality assurance intervention details, sample size, participant demographics and outcomes. Considering the heterogeneity of studies, a qualitative approach was undertaken for analysis. Studies were classified according to the nature of the learning design intervention utilised.

## Results

Database searches resulted in 2757 studies imported for screening; after removal of duplicates, 1612 articles remained for screening of title and abstract. A total of 93 full-text articles were assessed for eligibility, with 64 excluded as they were not a quality assurance intervention, two excluded as they were not conducted in the higher education setting and three excluded as they were not aimed at academic staff. A further nine articles were excluded as they were conference abstracts with no full-text article available. This resulted in 15 studies being included for analysis. The adapted PRISMA diagram is presented as Figure 1.

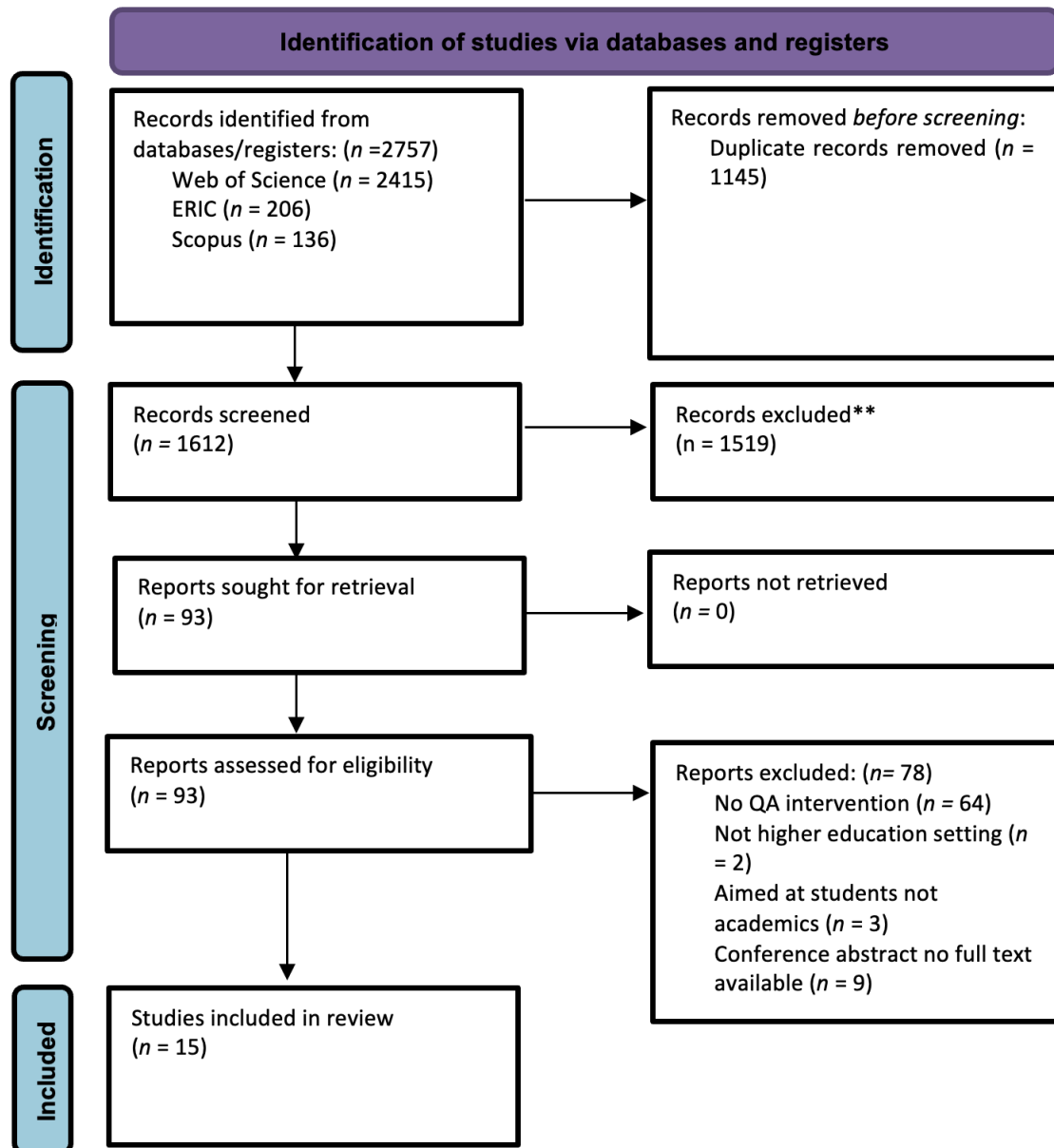


Figure 1. PRISMA flow diagram

## Study characteristics

The 15 included studies came from 12 countries with two studies from the United States of America, England and China and one study from Saudia Arabia, Scotland, Belarus, Vietnam, Spain, Indonesia, Switzerland, Japan and Hong Kong. Articles varied from single site case reports to studies investigating large-scale multi-institution interventions.

Table 1 outlines the details of the included studies describing the quality assurance intervention details, sample size, participant demographics and outcomes.

Figure 2 summarises the quality assurance interventions described in the included studies with four key intervention types identified, namely PD interventions, audit frameworks, communities of practice and learning design support interventions.

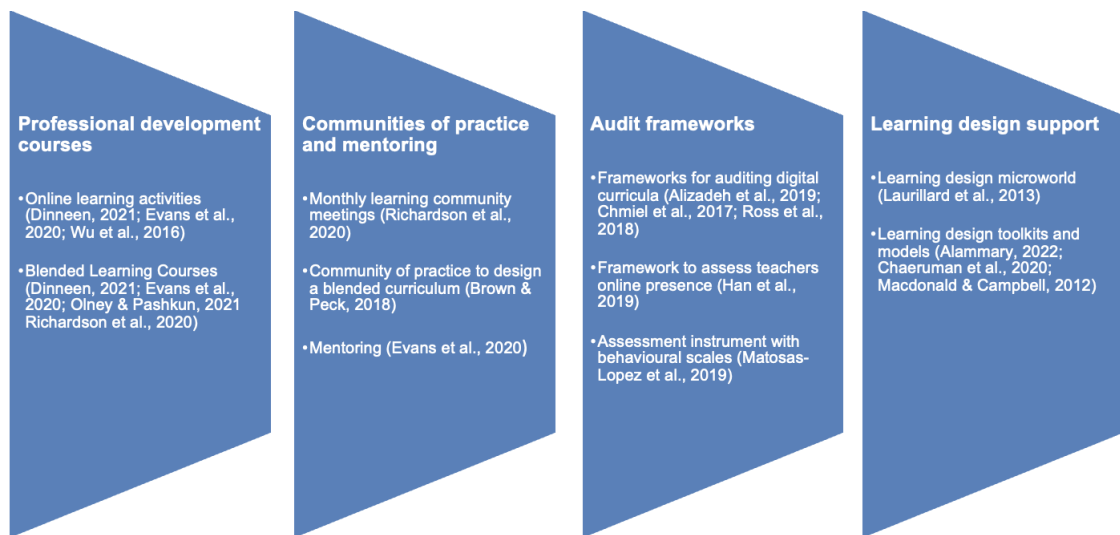


Figure 2. Learning design quality assurance interventions for higher education academics

Table 1  
Included studies

Article	Country	Intervention description and sample size	Methods and results
Alammary, 2022	Saudi Arabia	Learning design support BlendIt a toolkit to support BL course design. 12 academic participants.	Mixed methods evaluation Performance testing was used to test the response time of BlendIt after an academic had inputted appropriate data into the toolkit. All the test cases recorded a response time of less than 1 millisecond. This is much less than the maximum response time that was recommended by previous studies. An evaluation survey was used to evaluate BlendIt's usability, its usefulness, and the quality of its produced design recommendations. Analysis of the evaluation survey results indicated the design recommendations produced by BlendIt were seen as reasonable and able to offer insight into how to approach the design of BL courses.
Alizadeh et al., 2019	Japan	Audit framework Evaluation of a BL subject using the higher education course design rubric (5th ed.). 86 student participants.	Mixed methods evaluation The findings of the evaluation survey demonstrated students' overall satisfaction with the course, and their responses to the open-ended questions provided further insight into the educational and technical difficulties they encountered. The Quality Matters peer review also yielded a score of 70 out of 99, resulting in failure to meet the essential standards. However, comments from the peer reviewer guided the refinements and improvement of the course design, and the course currently meets all the requirements of the higher education course design rubric (5th ed.) upon amendment.
Brown & Peck, 2018	Vietnam	Community of practice This paper reports on an inquiry into the efficacy of a community of practice approach trialled at a higher education institution to contribute to the design of a renewed, blended curriculum. 28 participants, 8 course coordinators and 20 academic staff from 5 disciplines participated.	Qualitative evaluation Analysis of data from semi-structured interviews after 10 months of community of practice meetings indicated that participation in the community of practice had a positive impact on academics' sense of community and their knowledgeability in relation to new teaching approaches.
Chaeruman et al., 2020	Indonesia	Learning design support This study aimed to develop a model that could provide a guideline for lecturers in creating	Mixed methods evaluation Formative mixed methods research methodology used to develop an instructional design model.

Article	Country	Intervention description and sample size	Methods and results
		a good course using a BL approach. 242 participants, 4 instructional system design experts, 3 e-learning experts, 235 lecturers were involved.	Close-ended and open-ended questionnaires used to gather formative feedback on proposed model. Three field tests of the proposed model were conducted. (Workshop to educate academics about proposed model, academics then designed courses, courses assessed using assessment rubric.) The rubric assessment result in a series of field tests also showed that the ability of lecturers to design a high-quality course using online learning in higher education was increased. First field test course scores (252 courses): 0% excellent, 18.6% good, 52.2% fair, 29.2% poor. Second field test course scores (253 courses): 33.6% excellent, 48.2% good, 28.2% fair, 0% poor. Third field test course scores (250 courses): 60.5% excellent, 33.6% good, 5.9% fair, 0% poor.
Chmiel et al., 2017	Switzerland	Audit framework Development of a comprehensive evaluation framework involving all actors (students, academics and institutions) in a higher education BL programme. 59 participants, 6 academics and 53 students were involved in the evaluation.	Mixed methods evaluation Student results: Student survey response rate: 21 of 24 (87.5%) students of the first run and 17 of 28 (60%) students of the second run answered the online survey. Mean age was 35.7 years (SD = 7.8), ranging from 26 to 51 years, with 74% of female students. Reflecting the wide distribution of age, the year of bachelor grading ranged from 1986 to 2011. Survey items were grouped to create the following indices (followed by the Cronbach's $\alpha$ reliability test result): usability (0.836), coordination and complementarities of presence and distance phases (0.706), BL influence on student autonomy and the learning process (0.736), flexibility of time, space and learning pace (0.852) and global satisfaction that summarises the satisfaction for the single courses (0.653). Academic results: Organisation & technical aspects. Depending on the course content, faculty reported that transformation of the existing courses into a BL format was time-consuming, for some courses equivalent to designing a new course. Adjustments made after the first run for preparation of the second BL semester were much less demanding in time and effort. Faculty was very positive regarding Moodle. Support and training were evaluated positively. Some faculty still struggled with Moodle manipulation. Online instruction was sometimes not precise enough, making adjustments necessary. Institution results: Two main challenges were identified during the first two recurrences of the BL semester: first, the need for a clear definition of hybrid courses inside the institution as well as better communication around the hybrid format towards students and other

Article	Country	Intervention description and sample size	Methods and results
			stakeholders such as the student's employers; second, there was a need for better coordination of all parties involved in the planning and scheduling of the BL courses. Resources for BL implementation support and faculty incentives are not yet consolidated. Awareness of the need for an institutional strategy has been raised.
Dinneen, 2021	USA	PD course A 2.5-day online programme that guided faculty through a range of experiences with teaching topics and tools. Experiential online faculty development. 250 academic participants in online program, 113 who participated in the evaluation.	Mixed methods evaluation Brief survey during the programme Consultation requests End of programme survey Faculty reported that they had been helped with both technology and learning teaching techniques for engaging students. Of the 250 faculty who completed the programme, more than 45% responded to the survey. When asked if they would recommend FLEX Camp to a colleague, 98% of respondents answered "yes". Most useful takeaways from the camp: tools (31%), student engagement techniques (25%), confidence boosted (16%), how to find help (16%), use of planning templates (9%) assignment design (9%). What did you learn about yourself as a learner? - value of student perspective (25%), improved confidence (14%), need to learn more about online teaching (12%), learning through experience (10%), need to make assignments more transparent (9%), reassurance through community (9%).
Evans et al., 2020	Hong Kong	PD course & mentoring PD course on BL delivered via BL over 16 weeks, approximately 1 semester, with a mix of face-to-face sessions, online activities, independent study and personal mentoring. 10 academic participants.	Quantitative evaluation After BL course training. the average number of clicks per Blackboard course increased, teachers went from an average of 14 clicks to 980 for the same subject; students went from an average of 5 to 230 clicks per subject. The number of online tools used in Blackboard increased, with the number of teachers using 5 or more tools increasing from 17% to 73%. There was a significant increase in the different types of online tools used after the training. Before the intervention, teachers mainly engaged with content and announcements; after the training there was an increase in the use of discussion boards, e-mails, wikis, blogs, group activities and tests.
Han et al., 2019	China	Audit framework A framework to assess teachers' online presence in BL adoption. 7272 academic participants relating to 15128 BL learning	Mixed methods evaluation Framework had three dimensions: intensity, regularity and interactivity; it was effective in assessing academic participation in BL. Universities in earlier stages of their BL (e.g., Universities A, B and C) exhibited lower percentages of mature and active adopters and a larger portion of course design and



Article	Country	Intervention description and sample size	Methods and results
		courses from 6 universities in China.	building in teachers' online activities. Universities in more advanced BL stages (e.g., Universities D, E and F) showed higher percentages of mature and active adopters and more interactive course facilitation emerging from their teachers' online activities.. Three key findings emerged: (a) the framework effectively assessed the degrees and features of teachers' online participation in BL implementation; (b) these results advanced the researchers understanding of BL adoption stages; and (c) the proposed framework proved to be technically adequate in assessing teachers' online participation in BL at an institutional level.
Laurillard et al., 2013	England	Learning design support & PD course Creation of a learning design support environment called The Learning Designer, a microworld to enable users to learn about learning design by interacting in the microworld. 10 participants, 6 academics and 4 learning designers.	Qualitative evaluation Qualitative interviews with academics and learning designers and in relation to the microworld. The results of the interviews were incorporated in the development of the tool which aimed to: (a) foster both individual and social processes and outcomes (b) promote the active engagement of the student as learner (c) ensure the needs assessment is congruent with learning. There was positive feedback from academics on both the general approach and specific features of the learning design support environment.
Macdonald & Campbell, 2012	Scotland	Learning design support & PD course Development of a PD resource (tool) for synchronous online teaching. This was a peer learning activity to enable tutors to explore different online teaching resources and development of learning activities together. 9 academic participants.	Case study report Qualitative data was gathered from academics' reflections on the tool. Demonstrators appreciated the systematic approach to learning activity development supported by the tool. Peer-to-peer learning was identified as a strength. Tool was successful in facilitating uptake of online learning activity development.
Matosas-López et al., 2019	Spain	Audit framework Construction of an assessment instrument with behavioural scales to evaluate university teachers in BL modalities, following the Behavioural	Behavioural Anchored Rating Scales methodology The instrument created allows the assessment of teachers in BL modalities with regard to 10 teaching categories. Each category is represented by a behavioural scale, each of which has five anchoring points established. Core behavioural aspects combinations were generated through the dichotomous rating carried out during the construction process. Out of a possible maximum of 160 core

Article	Country	Intervention description and sample size	Methods and results
		Anchored Rating Scales methodology. 483 participants, 477 students and 6 academics from 11 degree courses participated in the project.	behavioural aspects combinations, this rating process supplied a total of 146 combinations. The number of cases per category varied from 13 to 16 core behavioural aspects combinations. The behavioural scales in the final instrument highlight the importance of certain particularly significant teaching-related aspects of BL models, namely teacher-student communication, learning resources, course design and the teacher's technical competencies.
Olney & Piashkun, 2021	Belarus	PD course Learning Design and Course Creation Workshop from the Open University, United Kingdom. 22 academic participants from 6 Belarusian higher education institutions attended the course.	Mixed methods evaluation Team-based reflective and experiential teacher PD (TPD) was found to be effective in preparing academics for designing and creating blended and online courses. Responding to the online survey immediately after the TPD respondents indicated very high satisfaction with the workshop. All of the areas were overwhelmingly rated as excellent. When asked to comment on aspects of the TPD they liked best, 6 focused on the practical nature of the workshop, 6 mentioned the opportunity to work in teams and 5 referenced the attitude and competence of the facilitators. 3 respondents thought more time would be an improvement. In qualitative focus group interviews the participants also expressed a high level of satisfaction with the TPD.
Richardson et al., 2020	USA	PD course & community of practice Year-long faculty learning community eLearning Innovation Initiative; Phase 1: 1-week face-to-face PD workshop; Phase 2: monthly face-to-face faculty learning communities. 36 academics participants in the course and community of practice.	Mixed methods evaluation Quantitative results were explored and informed by qualitative data. 31 out of 36 (86%) of faculty members participated in the research by completing the survey, 13 participated in interviews. 4 early adopters, 5 moderate adopters and 4 late adopters. Although most participants (10 out of 13) found the PD and flexible learning course personally advantageous, only two instructors (moderate adopters) stated that the weeklong PD was not beneficial. Instructors who did benefit noted advantages related to social factors, convenience and personal satisfaction. Early adopters benefited from a wider exposure to tools and required a less formal hands-on approach.
Ross et al., 2018	England	Audit framework Generalisable framework for auditing digital learning provision in higher education curricula.	Case study evaluation Evaluative case study using an embedded single-case design. The digital learning resources audit tool was initially conceptualised, developed and then trialled.

Article	Country	Intervention description and sample size	Methods and results
		2435 participants, 2275 students and 160 teaching staff. 183 undergraduate modules from 4 schools within a university faculty were assessed.	<p>A positive correlation was found between the volume of the digital resource provision and anticipated interactivity and engagement (Spearman correlation <math>r = 0.77</math> <math>p &lt; 0.0001</math>).</p> <p>Digital resources were ranked depending on their level of interactivity.</p> <p>There was significant variation in digital learning resources between the four faculty schools: the volumes (ANOVA: <math>F = 6.35</math>, <math>p &lt; 0.001</math>), interactivity (ANOVA: <math>F = 4.11</math>, <math>p = 0.008</math>) and scores (ANOVA: <math>F = 4.18</math>, <math>p = 0.007</math>).</p> <p>This contrasted with degree programmes within schools which did not show significant variation in their average digital learning score values (ANOVA: <math>I = 0.58</math>, <math>I = 0.86</math>).</p>
Wu et al., 2016	China	PD course Evaluation of an information communication technology (ICT) module targeting higher education academics. 162 academics participated in the module, with 155 completing the evaluation questionnaires.	<p>Mixed methods evaluation</p> <p>Data collected from online surveys both immediately after an ICT module and 6 months later. The results showed that participants intended to integrate ICT in teaching and had an above-average level of technological pedagogical and content knowledge (TPACK).</p> <p>Participants and their department heads also confirmed distinctive teaching performance of these new teachers and better learning behaviour of their students. The study revealed that demographic variables of new HE teachers may also affect their perception of ICT and TPACK.</p>

## **Findings and discussion**

This literature review is one of the first to provide a comprehensive description of quality assurance interventions in BL aimed at academics working in higher education settings. The results of the review can be used by higher education institutions to incorporate evidence-based quality assurance activities to improve the standard of their online and BL offerings.

### **PD courses**

The six interventions describing academic PD activities varied greatly in scope from a single online educational module (Wu et al., 2016) to an intensive year-long intervention involving an initial weeklong face-to-face workshop with monthly face-to-face learning community meetings (Richardson et al., 2020).

Zhao and Song (2021) found that improving both technological content knowledge and online learning design pedagogy were both important aspects of PD for supporting BL. In relation to technological content knowledge, all PD interventions involved training on specific technological tools and five were delivered using an online or blended approach enabling demonstration and scaffolding of technological aspects of the delivery mode. Aspects of online pedagogy covered included fostering online presence, assignment design and inclusive teaching (Dinneen, 2021), teaching with online activities (Evans et al., 2020) and designing an online course (Olney & Piashkun, 2021; Wu et al., 2016). Richardson and Hollis (2020) described an educational intervention focused mainly on the introduction of a variety of online learning tools, and the pedagogical content delivered was not described in detail.

All the PD interventions included in the review were deemed successful, but the course evaluations varied in depth and methods. Three of the PD interventions did not use a recognised evaluation framework to assess effectiveness. The evaluation conducted by Dinneen (2021) was the most limited, consisting of just a participant survey. Richardson et al. (2020) used both a participant survey and interviews with academics, and Evans et al. (2020) evaluated subject content created by academics and their online behaviours before and after the PD course. Of the two PD course interventions that used recognised evaluation frameworks, Wu et al. (2016) used Kirkpatrick's evaluation model and Olney and Piashkun (2021) used the academic professional development evaluation framework. PD course interventions are an excellent way to improve academic technical skills and understanding of relevant TEL pedagogy, and those designing these interventions should ensure a recognised evaluation framework is used to enable comprehensive demonstration of impact.

### **Communities of practice and mentoring**

Specht et al. (2020) have highlighted the potential of communities of practice in the higher education setting to foster innovation, facilitate social learning and provide the structure needed to generate support and encourage team spirit. Brown and Peck (2018) found that a community of practice approach assists academics in adopting innovation and leveraging social learning when developing a blended curriculum across multiple disciplines and subjects. Several other of the included articles from the review also demonstrated important aspects of the community of practice model with mentoring and learning community meetings supporting PD courses (Evans et al., 2020; Richardson et al., 2020); When designing a quality assurance intervention for BL, providing ongoing support for academics via a community of practice or peer mentoring is likely to foster a cycle of continuous improvement and innovation.

### **Audit frameworks**

Marshall and Sankey (2023) outlined 12 frameworks for standards and benchmarking in higher education, with five identified as particularly relevant for blended and online learning offerings. Of the five quality assurance interventions using audit and benchmarking tools resulting from the review, only Alizadeh et al. (2019) used a recognised benchmarking framework (the Quality Matters framework). All other interventions used their own benchmarking tools.

Three of the interventions used audits for benchmarking and assessment rather than to support development. Chmiel et al. (2017) comprehensively gathered data from faculty, students and the LMS for external assessment of multiple aspects of BL implementation but found this to be resource-intensive and potentially impractical for widespread adoption. In contrast, Ross et al. (2018) demonstrated that application of an audit framework to multiple disciplines and subjects is achievable, with 183 undergraduate modules assessed for digital learning adoption. Han et al. (2019) similarly demonstrated widespread applicability as it was instituted across six Chinese universities evaluating 15,128 BL courses, but the evaluation was targeted towards a specific aspect of online learning implementation (online teacher presence) rather than a comprehensive assessment of BL adoption.

The approach by Matosas-Lopez et al. (2019) focused more on facilitating academic self-improvement with formative feedback from the behavioural assessment framework being applied to target course improvement efforts. Alizadeh et al. (2019) similarly used the feedback from the initial Quality Matters internal and external assessment to guide future course iterations and improve implementation.

A potential future direction for research could include developing processes for applying recognised audit frameworks across multiple institutions and courses to identify areas of BL implementation requiring improvement and then using this for targeted PD and academic support.

### **Learning design support interventions**

Bennett et al. (2015) described aspects of learning design tools that provide support for academics, including alignment with perceived learning needs of students and learning objectives of the course content, allowance for flexibility of design and consideration of discipline-specific requirements bridging the gap between rigid templates and unstructured design.

The learning design toolkit (BlendIt) developed by Alammary (2022) reviewed student needs and learning objectives with a focus on determining the correct proportion of online and on-campus education in a BL design and selecting the most appropriate delivery methods to achieve the learning objectives. Chaeruman et al. (2020) used an iterative design process with repeated formative feedback and evaluation from learning designers and academics to develop and refine a learning design model that would assist academics when developing BL content. The model included formulating learning outcomes, mapping and organising content, dividing content into synchronous and asynchronous learning activities and determining the appropriate learning pathway. Both toolkits were assessed as providing valuable support in developing BL designs.

Two of the learning design support interventions combined both a design support tool and a PD activity. Macdonald and Campbell (2012) developed a resource (tool) to support synchronous online teaching. This tool was presented in a peer learning activity which allowed academics to explore different online teaching resources and develop learning activities together combining both a learning design tool and the benefits of social learning and peer support. Laurillard et al. (2013) described a learning design support environment (microworld) that allowed academics to explore and develop skills in TEL while scaffolding critical aspects of good pedagogy. Combining learning design support interventions with PD and peer support is likely to increase their impact and effectiveness.

### **Conclusion**

This literature review has identified four key approaches for improving the quality of blended and online learning design in the higher education context. Future research could focus on multi-faceted interventions that combine these approaches to upskill academics and lift the quality of BL across higher education institutions.

## Author contributions

**Author 1:** Conceptualisation, Investigation, Data curation, Writing – original draft, Writing – review and editing; **Author 2:** Formal analysis, Writing – review and editing; **Author 3:** Writing – review and editing;

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