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ATTRIBUTES OF BLENDED LEARNING ENVIRONMENTS DESIGNED TO FOSTER A SENSE OF BELONGING FOR HIGHER EDUCATION STUDENTS

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ABSTRACT

Aim/Purpose	This article seeks answers to the following: (1) What describes a 'sense of belonging', inclusiveness, and well-being for students? (2) Which aspects of blended learning, synchronous and asynchronous, promote students' 'sense of belonging'? and (3) What are the state-of-the-art best practices for creating inclusive curriculum design for blended learning?
Background	For university students, experiencing a strong 'sense of belonging' with their learning communities is a reliable predictor of academic adjustment and program success. The disruption to usual teaching modes caused by the COVID pandemic has diminished opportunities for social engagement among students and their teachers, intensifying the need to encourage students' belongingness as being ever more important.
Methodology	This article surveys the literature, pre- and post-COVID, using two complementary search techniques: (1) a systematic scoping review, a top-down strategy, and (2) snowballing, a bottom-up approach, seeking the answers to the three research questions above.
Contribution	The synthesis presented in the paper provides answers to these questions influenced, in part, by the Community of Inquiry framework and the Universal Design for Learning guidelines. Further, based on our findings from this investigation we offer a set of salient attributes of best practices in designing curriculum for blended learning environments, that is inclusive and fosters a sense of belonging for higher education students

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Findings	We discovered that belongingness is different for various cohorts. Further, many interventions to improve student wellbeing, and learning experiences on and offline, were built around social, teaching, and cognitive presences. Additionally, our investigation found that blended learning, regardless of the proportion of online versus offline instruction, was generally a positive influence on academic outcomes and student learning.
Recommendations for Practitioners	The set of attributes presented offers practical and helpful approaches to improve curriculum design to promote higher education students' sense of belonging.
Recommendations for Researchers	We highlight the lack of specificity in the literature regarding synchronous versus asynchronous learning pedagogy that promotes inclusiveness and a sense of belonging, and we detail our plans for future work will attempt to address this omission.
Impact on Society	As a result of the COVID pandemic, many higher education institutions made a sudden and rapid transition to online learning exclusively. As institutions start the move back to more traditional modes of learning, this paper highlights the considerations to be made in using blended learning environments.
Future Research	Our plans include seeking student and academic advice and feedback on approaches that foster a sense of belonging for higher education students.
Keywords	sense of belonging, blended learning, community of inquiry, higher education, universal design for learning

INTRODUCTION

The advent of the digital age has been evidenced by the steady incorporation of transformational technologies within our daily lives, and not least in its progress, has been its penetration into educational environments. These technologies have been pervasive and have impacted teaching pedagogies, learning environments, and aspects of access (Adel & Dayan, 2021; Bredenkamp, 2015; Cochrane & Narayan, 2018; Irvine et al., 2013). Further, whilst educators navigate the array of opportunities and challenges afforded by increased abilities to acquire and transmit digital information, the arrival of the COVID-19 pandemic has disrupted digital assimilations, and often hastened earlier than planned adoptions (Fabrey & Keith, 2021; Giray, 2021; Hehir et al., 2021; Mulrooney & Kelly, 2020).

Internationally, educational institutions' reactions to the COVID health crisis have been very varied, from some making no response to many universities adopting alternate delivery modes, particularly leveraging upon online curricula (Crawford et al., 2020; Farnell et al., 2021; Gupta et al., 2020). Nearly 1.6 billion students worldwide have been impacted by the sense of unease and uncertainty brought by the pandemic (United Nations, 2020), reporting that they feel "isolated, abandoned, depressed" (United Nations, 2021). Regardless of the institutional response, it is incumbent on academics to address their students' disconnection with their peers, subject content, and staff by creating a learning environment that particularly fosters inclusion, a 'sense of belonging', and wellbeing (Doolan et al., 2021; Farnell et al., 2021). Pre-pandemic, many institutions engaged actively in programs designed to promote their students' sense of connectedness as a strategy for improving learning outcomes, as learners with a strong sense of belonging are more persistent and satisfied with their studies, and these students achieve generally better academically (Delahunty et al., 2014; Peacock et al., 2020; Sax et al., 2018; Spencer et al., 2020; Thomas, 2012; Thomas et al., 2014). Given learners' disquiet and unease brought about by the pandemic, it is ever more important to promote students' sense of belonging in their changed learning environments.

A sense of belonging is created when students feel included and connected to a group, class, subject, and institution (Armellini et al., 2021; Garrison, 2017; Larcombe et al., 2015; Metzger & Taggart, 2020; Peacock & Cowan, 2019; Wilson et al., 2018). Prior to the pandemic, considerable literature focused on gender, cultural, and student disabilities (Baik et al., 2019; Smucker, 2022). However, there has been less of a focus on how the curriculum could be more inclusive for students generally, through content delivery, assessment, and feedback. Institutional responses to the pandemic have seen an acceleration towards blended learning environments, being various synchronous and asynchronous mixes of online teaching and learning with face-to-face campus-based activities. The difficulty for educators is how to create a curriculum that best supports their students' sense of belonging, particularly being mindful that one size does not fit all. An inclusive curriculum takes into consideration the needs of differing student cohorts with various social, cultural, linguistic, educational, and physical/psychological needs who are often physically distant from their peers and/or the university campus. Therefore, the challenge in designing an inclusive curriculum is ensuring the provision of content, pedagogy, and assessment methods through access and opportunities for all students (Smucker, 2022) whilst capitalizing on the advantages of both face-to-face and online teaching (Law et al., 2019).

During the pandemic, our students were offered dual mode classes, being a mix of campus-based face-to-face teaching (f2f) with synchronous online participation by remote students; they participated in blended learning environments where online learning materials and activities were part of the subjects' requirements. Like others worldwide, our students reported in feedback that they felt isolated and disconnected from their peers, subject content, and staff. As educators, we asked ourselves "How can we build a 'sense of belonging' for higher education students through an inclusive curriculum design in a blended learning environment?". In searching for an answer, we decided to undertake a review of the educational literature for insights into instances, successful or otherwise, where attempts had been made to address students' sense of belonging, particularly where opportunities and support were being delivered online. We set about investigating the practice, pre-and post-COVID, seeking to identify the salient features of inclusive curriculum design that is student-centered, flexible, and supportive of student wellness, with a particular focus on blended forms of teaching and learning that capitalize on the affordances of digital technologies. Through the identification of successful practices in the literature, we hoped to arrive at a set of implementable guidelines for academics that help to address the challenges of designing a curriculum for blended learning environments that promotes inclusivity, accessibility, and wellbeing for their students. The following section describes the methodology adopted to conduct this investigation.

METHODOLOGY

As educators, our primary interest is in gaining deeper insights into how the curriculum could be more inclusive for students in the higher education classroom, particularly through pedagogical approaches. In this study, the term curriculum includes content delivery, assessment, feedback, online interaction, and technological platforms. As descriptors of blended learning abound, we include synchronous and its antonym 'asynchronous' learning situations. As the starting point, our research question of "how can we build a 'sense of belonging' for higher education students through an inclusive curriculum design in a blended learning environment?" needed to be decomposed further. The tripartite composition of the research question, being themed around 'a sense of belonging', inclusive curriculum design, and blended learning environments, was delineated into the following more specific questions for investigation. Within the higher education sector:

(1) What describes a 'sense of belonging', inclusiveness, and well-being for students?

(2) Which aspects of blended learning, synchronous and asynchronous, promote students' 'sense of belonging'? and

(3) What are the state-of-the-art best practices for creating inclusive curriculum design for blended learning?

These questions led to the research themes – a sense of belonging, blended learning, higher education, and curriculum – listed in Table 1, together with various synonyms and descriptors of student cohorts to guide our searches of the literature. An initial exploratory search of the themes using the ERIC ProQuest in September 2021 resulted in the following candidate papers for each category: sense of belonging = 27,128, blended learning = 18,556, curriculum = 174,398 and higher education = 467,092. To address our research question and optimize our search outcomes, we chose two very different, yet complementary, search strategies. The first strategy employed was a systematic scoping review, a top-down approach that filters through large data repositories to find exact matches to the selected inclusion criteria (Peters et al., 2015; Tricco et al., 2018). This method returns a restricted set of records, whereby each result must include a descriptor of each of the three research themes of Table 1, together with a relevant cohort label, returning the intersection of all four criteria. Being cautious about the restrictive nature of the systematic scoping review results, a second 'snowballing' method was selected to independently explore each of the three research questions and their various intersections with each other. Snowballing is a bottom-up, broad-brush approach, useful for unearthing insightful works that would be discarded by the narrowing search strategy of the systematic scoping review. Details on the two search methods follow.

Table 1. Keywords for database queries chosen to mirror the research question's themes

RESEARCH QUESTION THEMES			COHORT DESCRIPTORS
Sense of belonging	Blended learning	Curriculum	Higher education
sense of belonging belonging belongingness feeling to belong inclusiveness inclusion wellness	blended learning e-learning hybrid eLearning electronic learning synchronous asynchronous dual	curriculum curricula curriculum development curriculum relevance content delivery assessment feedback online interaction technological platforms pedagogical approach	higher education college university post-secondary postsecondary undergraduate postgraduate

Systematic Scoping Review Strategy

Systematic scoping reviews are prescribed for researchers interested in identifying characteristics amongst the available evidence, for clarification of definitions and concepts within a field, and for identifying gaps in the knowledge base (Munn et al., 2018; Peters et al., 2015). In such reviews, the decision-making is carried out by at least two researchers and the search strategy is intended to be explicit and transparent through the adoption of documented search terms and the use of standardized data extraction tools. This scoping review has been guided using the prescribed steps: Identification, Screening, Eligibility, and Inclusion, as detailed in Peters et al. (2015), being a revised version of the PRISMA approach that is used globally for more stringent, standardized systematic clinical reviews (PRISMA, 2020; Tricco et al., 2018).

As detailed by Peters et al. (2015), the Identification stage requires exploration using keyword searches in the title, abstract and index terms of articles through querying international education databases. To construct the search queries, we used the Boolean operations of "OR" and "AND"; "OR" was used between all terms within each column of Table 1, while "AND" joined all columns into the query across Table 1. In the Screening phase, all results were sorted into those that were peer-reviewed, in English (translations accepted), involving post-secondary students, including graduates and postgraduates of any discipline, and published post-1990 (after the appearance of web

servers and browsers). We chose this relatively early publication date to capture any works relating to possible seminal articles or early insights into aspects of the curriculum for encouraging students' sense of belonging that was supported by online technologies. Results of searches outside of these criteria (shown in Table 1), along with duplicate records, were discarded. Next, in the Eligibility stage, the limits of the search are more strictly defined through a selection of appropriate databases for querying and deciding a set of a priori inclusion and exclusion criteria to guide keywords (Peters et al., 2015). Discussions between the authors fine-tuned the inclusion criteria, so that literature identified from all sources would necessarily have foci on: (1) the social aspect of belonging and disregarding research that solely concentrated on physical fitness or physical wellness; (2) differing learning environments where digital technologies were used and particular interest on comparison studies of on- and off-line practices; and (3) pedagogical practice and ignoring texts that solely related to institutional matters such as administration or recruitment or whole of institute approaches focused on administrative matters.

The leading, internationally recognized ERIC (Education Resource Information Center) database was chosen for its over 1.6 million records of educational literature and resources (ERIC, 2021). Hosted by the U.S. Department of Education, ERIC has two independent search interfaces, EBSCO and ProQuest, that were used separately in the data collection for this study. For the final Inclusion step, sources were rechecked for relevance and full texts were read to identify the purpose of each study and to categorize the study's design and the methods used.

Snowballing Strategy

'Snowballing' or 'chain-referral' sampling is a non-probabilistic, "step-by-step" technique (Biernacki & Waldorf, 1981; Wohlin, 2014). When undertaking snowballing, the foremost objective is to identify a representative sample of the relevant research, yet the chance of achieving a true set is strongly influenced by the decisions made at the beginning of the search. To optimize success, Wohlin (2014) recommends commencing snowballing with seminal works and highly cited materials before undertaking a set of backward and forward iterations.

For this strategy in our investigation, Google Scholar (see https://scholar.google.com/intl/en/scholar/about.html) searches around the key terms sense of belonging, inclusiveness, and blended learning searching for evidence relating to the curriculum including pedagogical approaches, assessments and feedback methods across delivery modes were undertaken to garnish sets of possible articles, whose contents were then examined for relevance and significance to the research questions. Pertinent articles were 'snowballed' by scrutinizing their reference lists for similar relevant research undertaking numerous backward iterations. Most importantly, snowballing allowed us to step forward in time by checking the citations of useful articles, in order that academic conversations, insights, and sometimes consensus around our research questions could be followed. Thus, a bank of research was collected around each theme and their intersections contributing to this paper. The literature identified through the two search strategies, systematic scoping review and snowballing, was collated and synthesized for reporting in the following section.

Results

For the systematic scoping review search, the EBSCO and ProQuest interfaces were queried independently with all search terms listed in Table 1. During identification, the preliminary searches of abstracts, titles, and article keywords in September 2021 returned 28 results, and 59 results respectively. A flowchart summary of the systematic scoping review process, and its four stages, is illustrated in Figure 1, culminating in 25 papers identified for inclusion in the study. For completeness, these results are listed in the Appendix where the context, learning setting, and involved participants for each article are supplied.

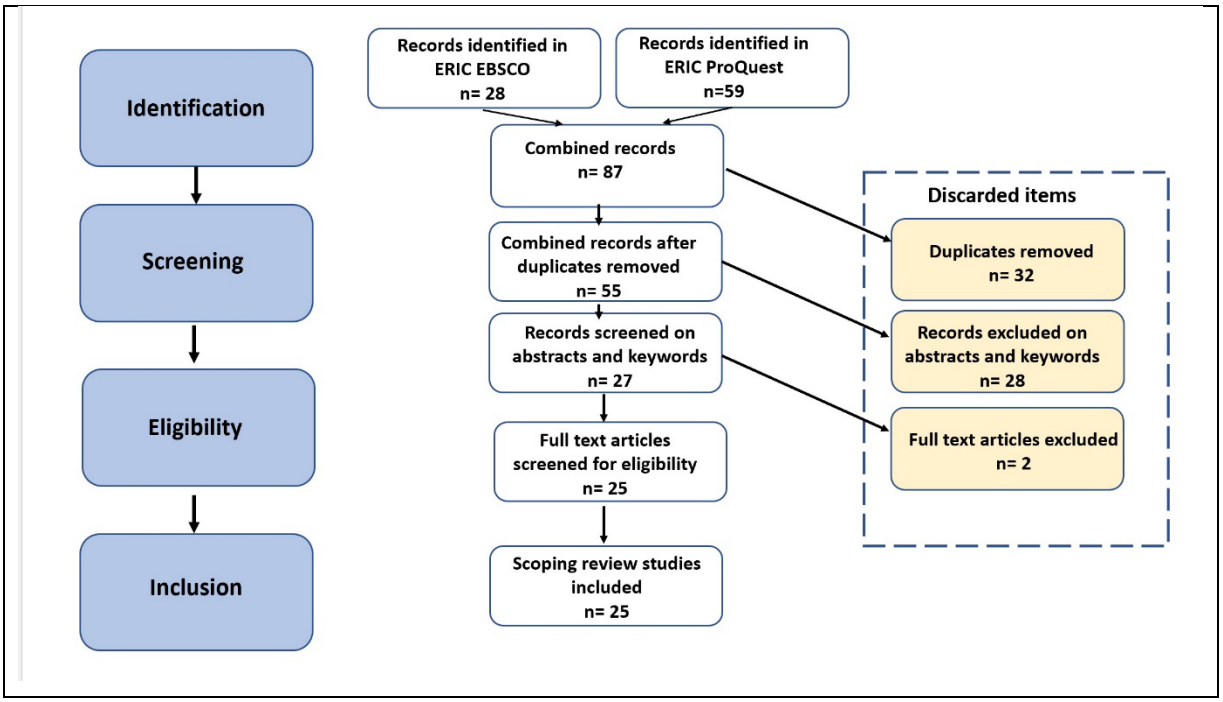

Figure 1. Flowchart for search decision process of keyword searches (Table 1) using EBSCO and ProQuest databases

By its nature, prescriptive scoping reviews funnel down to a small set of articles that may or may not illuminate the research being investigated. In our case, although 25 articles were discovered using our search terms in Table 1, there were few insights provided in addressing our research questions.

To gain a broader understanding, we decided, through snowballing, a separate search of higher education papers on each of our three research themes: a sense of belonging, blended learning, and inclusive curricula. As a result, the significant seed papers that guided our searches were identified for each theme. Four articles initiated our search around 'Sense of belonging' – CAST (2021), Garrison (2017), Malone et al. (2012), and Peacock and Cowan (2019) (see reference list with the prefix 'a'). Similarly, we found four papers – Cunningham (2014), Hastie et al. (2010), Nortvig et al. (2018), and Raes et al. (2020) – that were seeds for snowballing the 'blended learning' theme (see reference list with prefix 'b'). Our third snowballing exercise around 'curriculum' commenced with two articles – Bower et al. (2015), and Zydney et al. (2019) (see reference list with prefix 'c').

Subsequently, a pool of 117 documents was collected from the snowballing strategy and these studies were amalgamated with the 25 studies identified by the systematic scoping review (listed in the Appendix). All texts were explored for answers to each of the research questions, with the combined insights from both searches presented here under the themes: sense of belonging, blended learning, and inclusive curriculum.

Sense of Belonging

In addressing the first question, "What describes a 'sense of belonging', inclusiveness, and wellbeing for students?", we found that identity construction is an ongoing process defined through the formation of interpersonal attachments with their classmates and institutional communities, on- and off-line (Baik et al., 2019; Delahunty et al., 2014; Diep et al., 2017; Sax et al., 2018; Spencer et al., 2020; Thomas, 2012). As such, many higher education providers now adopt a 'whole of institute' approach to bolster students' confidence and sense of connectedness with the aim to enhance student-learning outcomes (Hughes & Spanner, 2019; Molyneaux et al., 2017; Scobie & Picard, 2018; Wilson et al., 2018). Although such strategies are not the focus of this investigation, they pivot on the point

that "academics and the curriculum are the only guaranteed points of contact between students and the university" (Hughes & Spanner, 2019, p. 26) and the two factors that most strongly impact student engagement are their learning experiences and social networks (Armellini et al., 2021; Cole et al., 2021; Wilson et al., 2018).

Given the importance of social connectedness and a 'sense of belonging' for student learning, the search around this theme sought definitions of belongingness, looking for its measures and evidence of its impacts, particularly in online and blended learning environments. As pointed out by Metzger and Taggart (2020, p. 231) summarizing Malone et al. (2012), "Belongingness is a psychological construct characterized by value, fit, and meaningful engagement in person-to-person, small group, and larger social contexts". Attempts to measure a person's achieved belongingness, rather than their need to belong, have been made by Malone et al. (2012) using the 12-item survey General Belongingness Scale (GBS). The GBS uses six items to assess the level of acceptance and inclusion within a group and six items (reverse-scored) to indicate rejection and exclusion. The GBS has been broadly adopted in differing work, social and educational settings (e.g., Metzger & Taggart, 2020; Yildiz, 2017). More specifically, student belongingness is defined by Spencer et al. (2020, p. 199) as "the extent to which students feel accepted, respected, included, and supported by others in an academic setting".

Yorke (2016) devised a 16-item Belongingness Engagement and Self-Confidence Survey (BESS) to gauge a student's sense of belongingness with their institution, their perceptions of academic engagement, and their overall self-confidence. The BESS instrument was trialed at 13 UK universities across three disciplines with large differences in the activities undertaken at each site and student population compositions. The involved institutions found the BESS application to be generally helpful for its separate scores for belongingness, engagement, and self-confidence, especially when BESS was applied pre- and post-local interventions. Yorke (2016, p. 163) examined all data across these 13 universities to investigate the impact on belongingness, engagement, and self-confidence of six characteristics within the data: male, first in the family, under 20 years of age, white British, UK domicile, and low adverse circumstances. Several patterns relating to the three scales emerged: a sense of belonging was impacted by ethnicity and circumstantial disadvantage; engagement was influenced by gender and age; and self-confidence was affected by gender, age, disability, and position in family or family experiences in higher education.

Elsewhere, similar patterns are mirrored in the literature (e.g., Sax et al., 2018). Efforts to create inclusive classrooms have often been fraught with difficulty given the diversity among learners, including minority groups of color, gender, sexuality, first-in-family, mature-age, poorer socioeconomic backgrounds, disability, regional, and remote learners (Delahunty et al., 2014; Delaney & Brown, 2018; Dinmore, 2014; Ibáñez-Carrasco et al., 2020; Lin & Nguyen, 2021; Osei-Kofi et al., 2004; Pearson et al., 2019; Sathy & Hogan, 2019). For different ethnic groups, various authors report that students' 'sense of belonging' and feelings of inclusion wax and wane over time impacting their learning (Adel & Dayan, 2021; Cureton & Gravestock, 2019; D. R. Johnson et al., 2007; Lin & Nguyen, 2021; Rainey et al., 2019). Furthermore, students with physical or mental impairments often find tertiary study quite challenging as it can have a negative impact on their wellbeing, causing anxiety and stress (Orygen, 2017; Pearson et al., 2019). Thus, the importance of inclusion for all students has been widely recognized and the study of strategies to encourage students' confidence has been incorporated into teacher training programs in Brazil (Aparecida do Nascimento dos Santos et al., 2016; Quevedo, 2011), Chile (Fermín-González, 2019), Finland (Seikkula-Leino et al., 2012), Taiwan (Yeh, 2010), and USA (Graziano & Bryans-Bongey, 2018).

Amongst the approaches employed to bolster students' 'sense of belonging' and wellbeing investigated by our searches are strategies influenced by Garrison's (2011, 2017) well-known Community of Inquiry framework, presented in Figure 2, where a student's educational experience occurs at the confluences of their social presence with teaching and cognitive presences. Garrison (2017, pp. 23-24) defines each presence. *Social presence* is the ability of participants to identify with a group, communicate purposefully in a trusting environment, and develop personal and affective relationships

progressively by way of projecting their individual personalities. *Cognitive presence* speaks to intent, process, and learning outcomes and the extent to which learners can construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry. *Teaching presence* is the design and facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes.

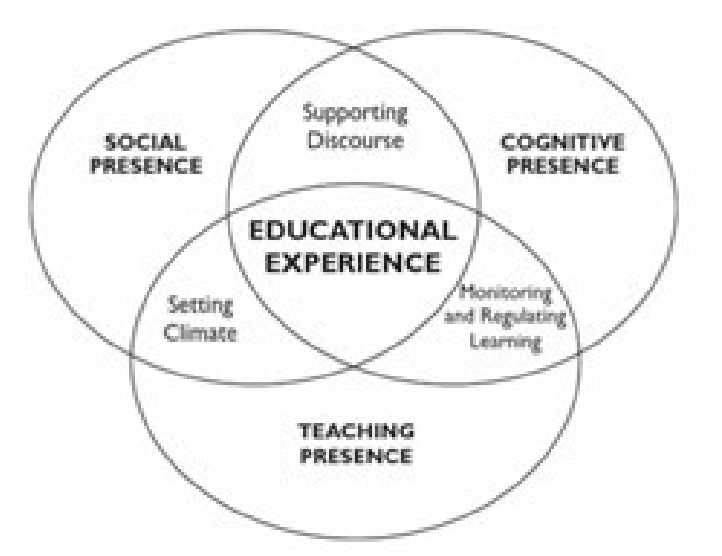

Figure 2. The Community of Inquiry framework with descriptions of presences as defined by Garrison (2017, pp. 23-24)

For more than 20 years, the Community of Inquiry framework has informed the action-research of many when planning their interventions to improve student outcomes (Castellanos-Reyes, 2020) and as noted in a co-citation analysis by Park and Shea (2020), Garrison's peer-reviewed articles and books ranked the highest in online, distance and blended learning between 2008 to 2017. By incorporating meaningful intersections between the social and cognitive aspects of teaching presences, the Community of Inquiry framework is often used to explain the empirical practice, particularly for online or blended learning, where actors may be in different physical locations (Spring & Graham, 2017). Several such instances were found during searches for this review (Bower et al., 2015; Cunningham, 2014; Delmas, 2017; Heilporn et al., 2021; Law et al., 2019; Stewart et al., 2011; Swan et al., 2012; Swickard, 2021). Also documented in the literature have been institutional responses to the COVID-19 pandemic by moving to online and distance learning, to mitigate its impact on nearly 220 million higher education students worldwide (Doolan et al., 2021; Farnell et al., 2021). These efforts bring into sharper focus the need to support students in their learning, especially in offline and blended learning environments (Giray, 2021; Hehir et al., 2021; Lin & Nguyen, 2021; Milman, 2020; Mishra et al., 2021; Mulrooney & Kelly, 2020).

Blended Learning

In seeking answers to the second research question "Which aspects of blended learning, synchronous and asynchronous, promote students' 'sense of belonging'?", we searched firstly for accepted and meaningful definitions of blended synchronous learning. One of the broadest definitions is that of Spring and Graham (2017) as a "combination of face-to-face and computer-mediated instruction" for use in their thematic search for patterns thereby avoiding possible limitations imposed by other definitions with more specific requirements, like that of Allen et al. (2007), where the proportion of online content delivery is prescribed as between 30% to 79%. Additionally, Müller and Mildenberger (2021) posit that "blended learning is often used interchangeably with terms such as hybrid, mixed-mode or flexible learning", while complexity is added through the use of the term synchronous

learning, as opposed to asynchronous learning, which can be decomposed further into live or virtual modes (Chaeruman et al., 2018). To belabor this point, Hastie et al. (2010, p. 11) give 16 permutations of student versus teacher in cyber versus physical classrooms to classify nine different blended synchronous learning modes, before discussing the advantages and disadvantages of each. Based on these definitions, it becomes clear that there is a frustrating variety in how different authors understand and define blended learning, even more so, for blended synchronous learning. We note that much of the literature speaks of blended learning modes without a clear delineation between synchronous and asynchronous activities. For some clarity, we adopt the definition of blended synchronous learning that captures its essence and usage in the literature by Bower et al. (2015, p. 1), being: "Learning and teaching where remote students participate in face-to-face classes by means of rich-media synchronous technologies such as video conferencing, web conferencing, or virtual worlds".

As organizational savings in time and money are among the recognized benefits of synchronous blended/hybrid learning adoption (OECD, 2005; Raes et al., 2020), the relative proportions of face-to-face (f2f) versus e-learning are of interest to researchers, particularly concerning the impacts on student outcomes, engagement, and wellbeing (Bader & Kottstorfer, 2013; Delahunty et al., 2014; Müller & Mildenberger, 2021). Several comparative studies between f2f, blended and totally online (distance) learning have been made to gauge these effects (Bader & Kottstorfer, 2013; Bower et al., 2015; Cossaboon, 2020; Nieuwoudt, 2020; Rhoads, 2020). For students' academic achievements, Mu et al. (2014) undertook a retrospective study of occupational therapy doctoral students from differing modes to find no discernible differences in the results of examinations, clinical tests, and certifications. Likewise, Nieuwoudt (2020), investigating the academic performance of students attending virtual classes, either synchronously or asynchronously, found that total time spent in class was a strong positive predictor, rather than the mode. In contrast, Tripathi et al. (2017) found academic performances of pharmacology students were best in their pure e-learning model, yet when asked students favored the blended version of f2f with online learning.

For a broader view, Bernard et al. (2014, p. 88) report a meta-analysis of achievement outcomes across studies which supports blended learning over pure classroom instruction by about "one-third of a standard deviation ($g^+ = 0.334$, $k = 117$, $p < .001$)", finding the improvement associated with the use of technology for cognitive support rather than for presentation purposes and "the presence of one or more interaction treatments (e.g., student–student/–teacher/–content interaction)". While noting inconsistencies amongst comparison studies of online, blended, and f2f formats, Nortvig et al. (2018, p. 48) summarize that there are "no inherent features of any of the three teaching formats produce either better or poorer learning outcomes for students", stating that reported improvements most likely result from the opportunities afforded by computers to learn independently supported by student-centered asynchronous collaborative learning activities. This is further underlined by the meta-analysis findings of Müller and Mildenberger (2021) who used the blended learning definition of Allen et al. (2007), where the proportion of online delivery content is between 30% and 79%. From their analysis of 21 studies, with 2,505 participants in blended learning versus control of 3,004 undergraduates in traditional courses, they report no discernible effects of reductions in f2f classroom time, noting "of greater importance are how teachers – irrespective of the method of delivery – make their success criteria clear and offer challenge and feedback, coupled with the quality of the interaction among students and between students and teacher" (p. 11).

When surveyed, students resoundingly prefer blended learning over traditional instructional learning (Bader & Kottstorfer, 2013; Milroy et al., 2013; Rhoads, 2020; Tripathi et al., 2017) with a 'sense of belonging' to a learning community associated with greater student satisfaction, social adjustment to university and program persistence (Brodie & Osowska, 2021; Delmas, 2017; Falloon, 2012; G. M. Johnson, 2015; Teo, 2010; Wilson et al., 2018). As pointed out by Raes et al. (2020), different delivery modes better support different learner characteristics, empowering students with some sense of control over their own learning. Various authors have investigated predictors of students' course satisfaction as influenced by several psychosocial influences, being personal confidence, self-efficacy, time

management, and organizational skills, social presence and support within peer and learning communities, and the impacts of work, family, and caring responsibilities (Delahunty et al., 2014; Farrell & Brunton, 2020; G. M. Johnson, 2015; Milroy et al., 2013; Peterson et al., 2018). At a large Australian university, 2,776 students across differing disciplines and instruction modes were asked the open-ended question, "What can be done to improve student wellbeing?" (Baik et al., 2019). The theme of many responses (n=161) related to "the importance of fostering a more inclusive and caring sense of community among the student body" and the need for teachers to facilitate and foster teacher-student interactions and peer interactions (n=167). Likewise, Brazilian students were asked for suggestions to improve their blended learning offerings, and "emotional support among students and from the teacher" was seen as an important motivation for students' participation and learning (Quevedo, 2011, p. 198).

As important as a 'sense of belonging' is for learning, Bower et al. (2015, p. 2) remind us that in blended synchronous learning environments, "social and emotional connectedness cannot be taken for granted but rather needs to be actively encouraged and fostered by teachers". To this end, several authors note that a 'sense of belonging' needs to be orchestrated for students participating online (Delahunty et al., 2014; Farrell & Brunton, 2020; N. Johnson et al., 2010) with this being particularly important for students from non-traditional backgrounds (Ibáñez-Carrasco et al., 2020; Thomas et al., 2014). To promote social interactions and belongingness, staff need to investigate and recognize strategies, like implementing communication protocols, providing multiple means for interaction, embedding collaboration into assessment, and providing different feedback methods (text, audio/video) (Delahunty et al., 2014; Farrell & Brunton, 2020; Kandemir & Kiliç Çakmak, 2021; Swickard, 2021; Thomas et al., 2014; Weiser et al., 2018).

While educators move to blended learning environments to improve student belongingness and engagement, efforts can be impeded by technical problems with equipment, poor skill sets of academics, and student unfamiliarity with platform interfaces (Cole et al., 2021; Delahunty et al., 2014; Falloon, 2012; N. Johnson et al., 2010; Lakhal et al., 2020; Ørngreen et al., 2015; Teo, 2010). For the instructor, this adds to the cognitive load of trying to juggle equivalence in interactions for on-and-offline cohorts whilst coping with connection issues and providing technical guidance (Bower et al., 2015; Nortvig, 2013; Raes et al., 2020). Several authors have emphasized the need for instructors to be trained and have real-time technical support, possibly from a teaching assistant or skilled colleague (Dinmore, 2019; Krutka et al., 2019; Lakhal et al., 2020; Spencer et al., 2020; Sun & Chen, 2016; Swickard, 2021). Equally, students can be frustrated with connection and timing issues, and therefore need adequate training with the IT tools and platforms being used (Cunningham, 2014; Lakhal et al., 2020; Spencer et al., 2020; Zydney et al., 2019). Finally, Brodie and Osowska (2021, p. 8) highlight another concern for students, noting "widely used automated messages either in the form of generic emails and university news seem to work against a sense of belonging among online students, making them, rather, feel disenfranchised (Read et al., 2003)."

Inclusive Curriculum

Commencing our investigation for the third research question "What are the state-of-the-art best practices for creating inclusive curriculum design for blended learning?", we searched across all learning settings for inclusive curriculum descriptions and for well-founded approaches to build students' sense of belonging which have gained broad acceptance. As such, the Universal Design for Learning (UDL) guidelines have been in use since 1984 and are widely applied (e.g., Ministry of Education, New Zealand, 2021; University of New South Wales, Australia, 2021; in the United States, Moore et al., 2018). UDL has been advocated for wider use in higher education (Coy, 2016; Dinmore, 2014), yet Fornauf and Erickson (2020, p. 192) caution in their literature review, that UDL implementation in higher education is impeded by "instructional methods and environments".

Originally a strategy to improve access to learning for disabled students, UDL guidelines "offer a set of concrete suggestions that can be applied to any discipline or domain to ensure that all learners can

access and participate in meaningful, challenging learning opportunities" (CAST, 2021). The UDL framework was crafted using insights from neurological studies as to (a) how students engage, (b) the differing ways in which students can action and express their learning, and (c) how students relate to the ways learning materials are presented. Using these understandings and as seen in Table 2, the UDL guidelines are a set of practical strategies designed to improve equitable access to information for all students, build knowledge and internalize to empower learners through the provision of multiple means of engagement, materials representation, and action and expression. Amongst the guidelines are suggestions like offering alternatives for visual information, using multiple media for communication and optimizing access to tools and assistive technologies. Although the origins of the UDL guidelines predate the digital era, they incorporate suggestions and strategies listed in the previous section for improving students' sense of belongingness in blended learning environments.

Table 2. Universal Design for Learning guidelines offering concrete suggestions and strategies for all learners (CAST, 2018)

Universal Design for Learning Guidelines version 2.2 Note: Each dot point suggestion can be expanded into further instructional detail in the source document retrieved from http://udlguidelines.cast.org			
	Provide multiple means of engagement	**Provide multiple means of representation**	**Provide multiple means of action and expression**
Access	**Recruit interest** • optimize individual choice & autonomy • optimize relevance, value & authenticity • minimize threats & distractions	**Perception** • offer ways of customizing the display of information • offer alternatives for auditory information • offer alternatives for visual information	**Physical action** • vary the methods for response & navigation • optimize access to tools & assistive technologies
Build	**Sustain effort & persistence** • heighten salience of goals & objectives • vary demands & resources to optimize challenge • foster collaboration & community • increase mastery-oriented feedback	**Language & Symbols** • clarify vocabulary & symbols • clarify syntax & structure • support decoding of text, mathematical notation & symbols • promote understanding across languages • illustrate through multiple media	**Expression & communication** • use multiple media for communication • use multiple tools for construction & composition • build fluencies with graduated levels of support for practice & performance
Internalize	**Self-regulation** • promote expectations & beliefs that optimize motivation • facilitate personal coping skills & strategies • develop self-assessment & reflection	**Comprehension** • activate or supply background knowledge • highlight patterns, critical features, big ideas & relationships • guide information processing & visualization • maximize transfer & generalization	**Executive functions** • guide appropriate goal setting • support planning & strategy development • facilitate managing information & resources • enhance capacity for monitoring progress
Goal	**Expert learners who are**		
	Purposeful & Motivated	**Resourceful & Knowledgeable**	**Strategic & Goal-Directed**

Furthermore, in discerning best practices for inclusive curriculum design in blended learning environments, our literature searches returned many reports of empirical attempts to build students' 'sense of belonging' that were influenced by Garrison's (2011, 2017) Community of Inquiry framework's interactions of teaching presence with student's social and cognitive presences (Cunningham,

2014; Delmas, 2017; Kilis & Yildirim, 2019; Law et al., 2019; Peacock & Cowan, 2019; Watson et al., 2016). Guidance from these practices is examined next through the lens of each presence.

Teaching presence

This presence is further categorized by Garrison (2017) into design and organization, facilitating discourse, and direct instruction. Heilporn et al. (2021) note that good design and organization, through the provision of a well-structured and well-paced course that fully exploits synchronous and asynchronous modes of blended learning, can go a long way to ensuring an inclusive curriculum. Many pedagogical issues can be tackled through adequate preparation of materials (Heilporn et al., 2021; Lopez, 2019), and as Goldwasser and Hubbard (2019, p. 5) highlight "from a policy perspective, the only cost of inclusive classroom pedagogies to individual faculty members are the time costs required to reflect critically on one's pedagogical tools, curricular decisions, and self-awareness/preparedness."

Another aspect of teaching presence is facilitating discourse. In the preparation stages, careful planning and the conscious choice of technology is imperative as technical features will support, and possibly constrain, access to content, communications, and sharing (Farooq & Matteson, 2016; Hehir et al., 2021; Kandemir & Kiliç Çakmak, 2021; Lopez, 2019; Zydney et al., 2019). Consideration also needs to be given to links and interactions between students, teachers, and the content with the scaffolding of online and offline activities ensuring that deliberate connections are made so that interactions with each support and build upon the other (Heilporn et al., 2021; Lin & Nguyen, 2021; Nortvig et al., 2018; Orange et al., 2012).

Various authors provide advice for the direct instruction aspect of teaching presence noting the importance of establishing a strong educator presence as the teacher acts as a role model (Armellini et al., 2021; Hehir et al., 2021; Metzger & Taggart, 2020; Nortvig et al., 2018; Watson et al., 2016; Weiser et al., 2018), stating that instructions regarding roles of the teaching team and students should be clearly explained to create a safe, inclusive learning environment online and offline (Goldwasser & Hubbard, 2019; Heilporn et al., 2021; Kandemir & Kiliç Çakmak, 2021). According to Delahunty et al. (2014), these decisions can strongly impact students' sense of belonging and their engagement, so consideration needs to be given to whether interactions should be voluntary or mandatory, and when and how to give instruction and guidance in skill development, and how to give timely and appropriate feedback. Finer-grained advice from Goldwasser and Hubbard (2019) suggests relating course content to the real world and incorporating life lessons into classes, along with advocating small discussion groups, while Thomas et al. (2014) reported success with video-conferencing lectures.

Social presence

Supporting students' social relations in meaningful learning communities designed to foster coherence between online and offline activities is essential in building blended learning courses (Hehir et al., 2021; Nortvig et al., 2018). Social presence in the Community of Inquiry framework has three types: personal/affective, open communication, and group cohesion (Garrison, 2017). As explained by Watson et al. (2016, p. 56) "Affective expression refers to the sharing of personal beliefs, values, and attitudes; open communication focuses on building a sense of group commitment; and group cohesion refers to learners focusing on common intellectual tasks." In their longitudinal study of nursing students, Metzger and Taggart (2020, p. 233) found various affective strategies to be important in building students' belongingness, being learning names, letters of introduction from their professors, relating personal success stories, and the use of icebreaker sessions. Success with these has also been reported by others (Fabrey & Keith, 2021; Goldwasser & Hubbard, 2019; Kilis & Yildirim, 2019; Sathy & Hogan, 2019; Thomas et al., 2014). Further, the importance of open communication is underlined in online environments due to the "absence of usual meaning-making cues such as gesture, voice tone and interactive immediacy supporting negotiation of meaning and clarification" by Delahunty et al. (2014, p. 247), warn in their review that "how an online instructor reacts is

possibly more crucial than their level of involvement in the discussions impacting on socio-emotional well-being perhaps more so than in face-to-face situations." Interestingly, Weiser et al. (2018) found in their three-way comparative study of synchronous learning environments that students using combined voice and video conferencing did not initiate learning interactions with their instructors, whereas those with only voice communication and others in traditional settings regularly did. The authors suggest the differences in behavior were due to a perceived higher risk of social embarrassment for participants when a video was used.

For blended learning, group identity and cohesion are important (Altebarmakian & Alterman, 2019). Student groups need to be created that mitigate or eliminate tokenism (Goldwasser & Hubbard, 2019). Purposeful relevant tasks should be set that are open-ended and collaborative (Delahunty et al., 2014) and a teacher presence 'felt', that is available if needed to keep discussions on track (Altebarmakian & Alterman, 2019; Lin & Nguyen, 2021; Thomas et al., 2014). To this end, discussion protocols in blended synchronous learning environments were welcomed by students, who took on greater leadership roles as facilitators within groups (Zydney et al., 2019) and for online discussion forums, whereas Altebarmakian and Alterman (2019) suggest the use of a nested threaded structure, as opposed to a sequential stream of messages, enabling students to see the overall picture and target their own contributions to conversations. As noted by Thomas et al. (2014), group identity is often maintained by students through Skype and Facebook outside the online teaching environment. Further, O'Brien and Freund (2018, p. 4) suggest that "the effective use of social media could potentially aid social inclusion, encourage active learning and enhance student engagement" and they report upon the lessons learned that social media was a useful scaffold for students' learning, but there was a need for expectations and marking criteria to be made explicit, and for institutional support for its use. Additionally, Forbes (2017) explores the use of social media within a teacher training program for sharing content and supporting collaborations, underlining the need for all to adhere to professional standards and to act in socially responsible ways.

Cognitive presence

This presence contributes to the learning experience of a student through the construction, and confirmation of meaning "through sustained reflection and discourse in a critical community of inquiry" (Garrison, 2017, pp. 23-24). For encouraging students' cognitive engagement through blended learning, Heilporn et al. (2021) investigated successful synchronous and asynchronous teaching practices by interviewing 20 instructors across differing disciplines at four universities in Canada. They report those effective strategies to include interactive learning activities using supportive digital tools, relating content to professional practice and current events, and offering students options in topics, resources, and assessment formats (p. 12). Others underline the importance of providing options in setting up assessments (Coy, 2016; Fabrey & Keith, 2021; Sathy & Hogan, 2019), and embedding collaboration into assessment to promote social interactions (Giray, 2021; Thomas et al., 2014) with a detailed suggestion by Altebarmakian and Alterman (2019, p. 2) to prescribe "an activity where each individual student is tasked with writing a certain section for a final essay on their own and then the group works together to fit each of their individual section together into a larger whole."

Exploring differing assessment types, Gupta et al. (2020, p. 8) tabulate the respective effectiveness and relevance of different modalities for asynchronous and synchronous environments. For example, multiple-choice questions are reliable and cost-effective for examining knowledge but fail to assess complex skill sets adequately, and they are not appropriate for asynchronous testing due to the possibility of cheating. Additionally, the form of feedback is also important (Baik et al., 2019); it should be constructive, in a positive tone, and not single out any one student (Goldwasser & Hubbard, 2019), and it can take on various forms, textual, and/or audio-video (Borup et al., 2015; Dinmore, 2019; Kandemir & Kiliç Çakmak, 2021).

DISCUSSION

In setting out to answer the question "How can we build a 'sense of belonging' for higher education students through an inclusive curriculum design in a blended learning environment?", we determined three research questions and investigated each using two search strategies: systematic scoping review process and snowballing. Here, we discuss our findings in answer to each research question and based on these, we present a set of salient attributes and practices identified in the literature to build students' sense of belonging in blended learning environments, both synchronous and asynchronous, before detailing our conclusions and plans for future work.

WHAT DESCRIBES A 'SENSE OF BELONGING', INCLUSIVENESS, AND WELLBEING FOR STUDENTS?

All students strive to have meaningful engagements with their learning communities and institutions, and those with a strong 'sense of belonging' do better in their social adjustment to university and in program completions. In the past ten years, there have been two broadly accepted survey instruments to measure belongingness: General Belongingness Scale (GBS) in the wider community, and the Belongingness Engagement and Self-Confidence Survey (BESS) for tertiary students. Collated BESS results from across institutions reiterate much evidence from the literature that student belongingness is lower for differing ethnicities, minority groups, and those with circumstantial disadvantages. When investigating reports of practical efforts to improve students' 'sense of belonging', Garrison's Community of Inquiry framework has featured strongly in the literature over the past 20 years. The framework posits that a student's educational experience is influenced equally by three presences: social (inclusive of their relationships with others), teaching, and cognitive. This framework has found application in online and blended learning practices.

WHICH ASPECTS OF BLENDED LEARNING, SYNCHRONOUS AND ASYNCHRONOUS, PROMOTE STUDENTS' 'SENSE OF BELONGING'?

In describing blended learning, some authors were very prescriptive in deciding the proportions of online versus face-to-face traditional learning, while others had broader definitions. Regardless, the results of various meta-analyses suggest the proportion of blended learning, synchronous or not, has little or no effect through to a positive impact on learning outcomes and academic achievements. Rather, the consensus is that blended learning environments offered varied supports for different learner characteristics, thereby promoting student engagement amongst diverse cohorts. Consistently, students preferred blended learning over purely traditional instruction. For students, both blended synchronous and asynchronous learning provide opportunities to interact with their learning communities and develop relationships whilst providing flexibility in their study patterns. Therefore, online environments need to be crafted to foster student social interaction and encourage participation.

WHAT ARE THE STATE-OF-THE-ART BEST PRACTICES FOR CREATING INCLUSIVE CURRICULUM DESIGN FOR BLENDED LEARNING?

Our searches for best practices in creating inclusive curricula led to the widely adopted Universal Design for Learning (UDL) guidelines, which have been in use for over 30 years. The strength of UDL is in its general applicability through practical suggestions of how to provide multiple means of engagement, materials representation, and opportunities for student action and expression, thereby fostering an inclusive environment for all students, irrespective of ability, background, or discipline.

Additionally, in exploring inclusive curriculum design for blended learning, we found that many practitioners undertaking empirical research were referring to the perspective of Garrison's Community of Inquiry framework to guide their efforts in building inclusive learning in online and off-line

environments. Much practical "from the chalk-face" advice was offered in these articles that have been collated in our Results section, of which several suggestions mirror individual UDL guidelines.

Yet in our attempt to answer the overarching question of "how can we build a 'sense of belonging' for higher education students through an inclusive curriculum design in a blended learning environment?", we are frustrated on three accounts. Firstly, the UDL guidelines through their history (pre-digital) and nature (all learners in all environments) are too generic; they cannot add detail or specifics for blended learning environments. Secondly, like Raes et al. (2020, p. 286) in their recent review of synchronous hybrid/blended learning, we found that much research from 1990 to September 2021 is "still in its infancy" and further investigations are needed to discover meaningful effects and to discern scalable approaches. Thirdly, we discovered comparative studies between traditional face-to-face, purely online e-learning, and blended learning alternatives, but we found few targeted analyses of best practices for synchronous blended learning, as opposed to asynchronous electronic learning, designed to build students' sense of belonging through inclusive curriculum design.

We have collated our findings of successful practices and present them in Table 3 as salient attributes to build students' sense of belonging through inclusive curriculum design for blended environments, in either synchronous or asynchronous modes. The attributes identified include a holistic view of an inclusive curriculum design incorporating: (1) teaching design and organization, discourse, and directional instructions; (2) social aspects of communication; and (3) assessment and feedback. Note that where reported strategies have mirrored some of the individual approaches listed in UDL guidelines, these approaches have been incorporated into Table 3, where we have used the teaching, social and cognitive presences of Garrison's Community of Inquiry (COI) as a convenient means of presentation and summary. Finally, we note that many of the listed attributes were detailed in reports of action research efforts initiated in response to problematic situations, such as the diversity of student cohorts and more recently, the COVID pandemic. Since many institutions have recently moved to online environments and differing blended learning situations, we anticipate many more accounts of successes or otherwise, shortly.

CONCLUSION AND FUTURE RESEARCH

In presenting Table 3, we acknowledge that the attributes listed are an assemblage of observed practices and features gleaned from the education literature that have found success in promoting students' sense of belonging in blended learning, however not specific to synchronous versus asynchronous situations. In the absence of such detail, Table 3 is a compendium of features and practices rather than a prescriptive 'how to' set of guidelines for blended learning curricula. Nevertheless, we suggest that our compilation offers a useful springboard from which to initiate conversations and stimulate teaching practices and curricula design.

Originally, we set out to discover finer-grained advice specific to blended synchronous learning. Whilst we await reports of more empirical efforts stimulated by responses to the pandemic, we wonder if there is a set of attributes peculiar to blended synchronous learning, or are such attributes simply a facet of best teaching and learning practices that encompass face-to-face, online, and blended modes, synchronous and asynchronous? Does one size fit all? Or have we been distracted by the 'sleight of hand', that is, the assumption that the incorporation of digital technologies into our teaching spaces requires a different sort of teaching practice?

To better refine our position on how we build a 'sense of belonging' for higher education students through an inclusive curriculum design in a blended learning environment, we plan to evaluate and enhance the set of attributes presented in this paper. Through focus groups, we will collect academics' understandings of 'inclusive' curriculum delivery, assessment, and feedback in the subjects they teach; we will ask for their experiences and suggestions in creating a 'sense of belonging' for students, synchronously and asynchronously. As well, insights on technological affordances that academics find helpful in blended course implementation will also be sought. Student opinions on the

suitability, or otherwise, of various aspects of curriculum delivery, assessment, and feedback that help them feel included in their subjects, will be collected through focus groups and a survey instrument. Following on from this feedback, we expect to have a better understanding of the curriculum, technological affordances, assessment, and feedback in a blended environment that best promotes our students' inclusion and wellbeing. Guidance from these understandings will inform our teaching practices in the near post-COVID future.

Table 3. Salient attributes to build students' sense of belonging through inclusive curriculum design for blended environments, in either synchronous or asynchronous modes

COMMUNITY OF INQUIRY PRESENCES		
Teaching	Social	Cognitive
Design and organization • emphasize goals and break goals into short-term objectives • prepare materials ensuring well-paced course and activities • build fluencies with graduated levels of support for practice and performance through approaches, strategies, activities, and feedback • vary the methods for response and navigation by providing alternatives to interact with instructional materials and technologies, illustration through multiple media • consider proportions of synchronous vs asynchronous iterations to ensure continual student engagement • plan for group discussion • clarify vocabulary and symbols suing hyperlinks to definitions and explanations • encourage deep learning through explicit relationships between elements and connecting them to previously learned structures and through explicit cross-curricular connections **Discourse** • conscious choice of technology to support communication between teacher and students, and between students, on- and off-line • optimize access to tools and assistive technologies for navigation, interaction, and peer collaboration • offer ways to customize the display of information, both auditory and visual- content, text and fonts, layout, animation, and simulations **Directional instruction** • strong teaching presence where teacher is a role model and guide • relate course content to real world, optimizing for relevance and authenticity • maximize transfer of knowledge and generalization through scaffolds to connect to prior knowledge, mnemonics to help remember, electronic reminders, review, and practice • consideration of whether interactions should be voluntary or mandated	**Personal/affective** • promote expectations and beliefs that optimize motivation using reminders, guides, rubrics, and checklists • relate real-world personal success stories • highlight patterns, critical features, big ideas and relationships • promote understanding across languages and culture using electronic translation tools, online glossaries, use of images and videos • optimize individual choice and autonomy to participate in learning activities • learn names of students through use icebreaker sessions or practice-sharing activities at beginning of semester • regular emails from teaching staff – introduction and touching base **Open communication** • foster collaboration and community through group learning, peer interaction and support and group work • use multiple media for communication including social media and webtools such as discussion forums, animations • teacher presence as facilitator when needed • guide appropriate goal setting and facilitate personal coping skills and strategies through scaffolding with reminders, models, checklists and provide links to external support services • guide information processing and visualization by breaking up information up into smaller units, and progressively releasing it • be aware instructor reactions can be viewed differently by on- and off-line students • use communication protocols • use nested threaded structure for online discussion forums **Group identity and cohesion** • create groups that mitigate tokenism • tasks should be open-ended and collaborative	**Assessment** • offer differing options for assessment providing choices in topics, resources, or assignment formats • vary demands and resources to optimize challenges • use supportive digital tools such as online quizzes and discussion forums • promote active learning through problem solving, role playing, discussions • embed social interaction within assessment task • consider the appropriateness of assessment type for synchronous and asynchronous environments, such as open-ended or problem-based questions are suitable in asynchronous environment whereas time-bound, skill-based assessments, such as oral assessments, need to be synchronously • develop self-assessment and reflection through aids, templates, or charts to recognize a student's own progress **Feedback** • needs to be appropriate to task • needs to be constructive and positive • increase mastery-oriented feedback that emphasizes effort and improvement to encourage perseverance • enhance capacity for monitoring progress using templates to guide quality and completeness, checklists, and rubrics • provide feedback to the entire group and it should not single out a student within a group

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Literature identified in the systematic scoping review is marked with a *

Literature identified as a seed article for snowballing is marked with [a] for 'Sense of belonging' theme, [b] for 'Blended learning' theme, and [c] for 'Curriculum' theme.

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APPENDIX

The systematic scoping review identified 25 papers for inclusion in the study. These results are listed with the context, learning setting, and involved participants for each article supplied.

Overview of studies included in the systematic review using ERIC EBSCO and ERIC ProQuest. The listing is in alphabetical order of the first author. Dark grey shading shows articles found in both database collections, and the grey shading denotes the paper found only by the ERIC EBSCO search. All other papers were discovered using ERIC ProQuest.

No.	Literature	Context, Learning setting and Participants	Purpose	Design and Methods
1	Armellini, C. A., Teixeira Antunes, V., & Howe, R. (2021)	United Kingdom	Examine student perceptions of Active Blended Learning and identify enablers and barriers to successful student experiences.	Thematic analysis of student focus group discussions (n=60)
2	Bader, L., & Kottstorfer, M. (2013)	Austria Masters students studying Global Studies subject at 2 different universities	Article providing an overview of the use of ICT in Global Studies subject compared to other studies and investigate student perceptions.	Mixed methods, analysis of subject deliveries across implementations, online student survey (n=60) and personal interviews with students and lecturers.
3	Dinmore, S. P. (2014)	Australia	Article examining student-centred learning pedagogies and need for inclusive university curricula.	Argues the adoption of Universal Design for Learning (UDL) is the most appropriate solution, giving examples of UDL implementation.
4	Cole, A. W., Lennon, L., & Weber, N. L. (2021)	United States Undergraduate students enrolled in F2F courses and online courses	Enquiry into factors that predict student engagement in online courses and their sense of belonging to the university. Also queried is the influence of participant's year-level.	Statistical analyses of surveys undertaken by students enrolled in F2F and online courses (n=246) and exclusively online courses (n=71). Surveys queried online learning engagement, learning climate, and college experiences.
5	Aparecida do Nascimento dos Santos, D., Schlünzen, E. T. M., & Schlünzen, K., Jr. (2016)	Brazil Teacher training at 2 different universities	Article exploring incorporation of inclusive and special education in teacher training programs	Mixed method study using questionnaires, reflective pieces, discussion forums and portfolios.
6	Falloon, G. (2012)	New Zealand Post graduate education students	Investigation of student perspectives and the factors influencing them in virtual classrooms	Mixed method investigation into student perceptions using semi-structured interviews, anonymous surveys, and screen recordings of sessions (n=22).
7	Farooq, O., & Matteson, M. (2016)	United States Library and Information Science	An investigation into engagement of online library and information science students and the challenges and barriers they encountered	Qualitative case study using voluntary instructor and student reflections (n=9) after sessions.

No.	Literature	Context, Learning setting and Participants	Purpose	Design and Methods
8	Forbes, D. (2017)	New Zealand Student and graduate teachers	Case study of the professional use of social media across programs and cohorts.	Narrative review of journals and reflective work of students and graduates using social media
9	Graziano, K. J., & Bryans-Bongey, S. (2018)	United States Deans and associate deans of teacher training programs	Review teacher training programs to demand for online teaching.	Survey of academics (n=215) responsible for teacher training programs to assess teacher preparations in the creation and use of online materials.
10	Gupta, M. M., Jankie, S., Pancholi, S. S., Talukdar, D., Sahu, P. K., & Sa, B. (2020)	West Indies India Medical and allied health professional training	Review article concerned with the impacts of the COVID-19 pandemic on systems associated with the delivery of education and training of medical and allied health care professionals.	Narrative review of methods of assessment in health education and analysis of possible approaches suitable for use during COVID-19 pandemic.
11	*Hehir, E., Zeller, M., Luckhurst, J., & Chandler, T. (2021).	United Kingdom	Literature review of remote learning impact on student connectedness	Systematic literature review
12	Ibáñez-Carrasco, P., Worthington, C., Rourke, S., & Hastings, C. (2020)	Canada Researchers of HIV from various disciplines	Longitudinal case study of training program using blended learning methods.	Mixed methods approach including focus groups (n=13), thematic analyses of self-reports (n=65), and interviews (n=3) from 2009 to 2019.
13	Johnson, G. M. (2015)	Australia 1st year educational psychology students	Investigation into factors of physical and psychological well-being which predict university student satisfaction with e-learning.	Analysis of student demographics and their responses to satisfaction survey and a health survey of cohorts in blended classes (n=154) and fully online classes (n-23).
14	Johnson, N. List-Ivankovic, J., Eboh, W. O., Ireland, J., Adams, D., Mowatt, E., & Martindatle, S. (2010)	Scotland 2nd year nursing and midwifery students	Case study of module teaching research and evidence-based practice.	Description of past practice and current practice using blended learning approach.
15	Kandemir, B., & Kiliç Çakmak, E. (2021)	Turkey	Systematic literature review of describing distance education's structure	Content analysis and data visualization using MAXMAPs software.

No.	Literature	Context, Learning setting and Participants	Purpose	Design and Methods
16	Lin, Y., & Nguyen, H. (2021)	Australia International student	Reflections and self-observations of first author's experience undertaking synchronous and asynchronous e-learning	Autoethnography methodology
17	Mu, K., Coppard, B. M., Bracciano, A. G., & Bradberry, J. C. (2014)	United States Doctoral occupational therapy graduates	Study to evaluate graduate outcomes in a traditional and a hybrid entry level doctorate of occupational therapy (OTD) program.	Retrospective study comparing academic and clinical fieldwork performances of students undertaking traditional (n=81) versus hybrid/blended programs (n=13).
18	Nieuwoudt (2020)	Australia	Study exploring the relationship between students' synchronous and asynchronous online class attendances with academic success	Data analysis of number of hours, times in synchronous and asynchronous activities, discussion boards, and academic grades of students studying two subjects in 2018 (m=164)
19	O'Brien, M., & Freund, K. (2018)	Australia Undergraduate economic students at regional university	Report of lessons learnt using social media blogging to assist students in undertaking research in a blended learning situation.	Mixed methods using surveys and interviews of students (n=25), staff interviews (n=5) and review of literature.
20	Orange, A., Heinecke, W., Berger, E., Krousgrill, C., Mikic, B., & Quinn, D. (2012)	United States Sophomore engineering students Four universities	Investigation into the use and effectiveness of Web 2.0 tools in synchronous F2F engineering classes supplemented by asynchronous content and communication.	Mixed methods evaluation using student and professor surveys, students' usage statistics, course grades and blog posts.
21	Pearson, V., Lister, K., McPherson, E., Gallen, A., Davies, G., Colwell, C., Bradshaw, K., Braithwaite, N., & Collins, T. (2019)	United Kingdom Disabled students at 3 universities	Enquiry of staff to identify inclusive practices for disabled students and identify issues and difficulties.	Mixed methods approach including surveys of academics (n=72), student support staff (n=82), curriculum production and technical staff (n=57) and associate lecturers (n=56) for knowledge and awareness of inclusive practices and support services. Focus groups of disabled students and some staff.
22	Peterson, A. T., Beymer, P. N., & Putnam, R. T. (2018).	United States Undergraduate teacher education students	Examination of the effects of synchronous versus asynchronous interaction on students' sense of belonging in online,small-group, discussions	(n= 52)

No.	Literature	Context, Learning setting and Participants	Purpose	Design and Methods
23	Quevedo, A. (2011)	Brazil, Catholic University 3rd year student teachers	Exploratory quantitative and qualitative study on the experience and impacts of blended learning in student teacher program.	Mixed methods, longitudinal investigation (2008, 2009 and 2010) using survey responses (n=84) and analysis discussion forum responses of student teachers using blended learning.
24	Seikkula-Leino, J., Ruskovaara, E., Hannula, H., & Saarivirta, T. (2012)	Finland Teacher training curriculum	Examination of curricula for academic teacher education and vocational teacher education.	Qualitative analysis of the curricula of academic and vocational teacher education providers looking for evidence of entrepreneurship education.
25	Tripathi, R. K., Kurle, D. G., Jalgaonkar, S. V., Sarkate, P. V., & Rege, N. N. (2017)	India 2nd year medical students studying in pharmacology subject	Study investigating the timing of introducing e-learning on students' performances and their perceptions in pharmacology subject.	Quantitative statistical analysis of students' performances on 40 multiple choice questions testing syllabus, pre and post interventions for 3 cohorts within subject, where e-learning was pre-subject (n=168), post-subject (n=168) or replacement of subject (n=173). Additionally, students undertook 14 question survey on their perceptions.

AUTHORS

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