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ORIGINAL PAPER

Motivating students in competency-based education programmes: designing blended learning environments

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Abstract

Contemporary education increasingly involves a blended learning environment, which consists of a combination of offline and online delivery methods. Blended learning environments can motivate students to learn, but designing motivating blended learning environments is challenging and can result in environments that demotivate students. This conceptual article proposes a blended learning design that helps practitioners to design motivating blended learning environments. According to self-determination theory, students are motivated to learn when their three basic psychological needs for autonomy, competence, and relatedness are supported. Competency-based education (CBE) is intended to support students' basic psychological needs. We have constructed design guidance for CBE programmes that help practitioners to design a combination of offline and online delivery methods that (1) give students choices in time and place to support their need for autonomy, (2) adapt to students' competency levels to support their need for competence, and (3) stimulate students' relationship building with peers and teachers to support their need for relatedness. Although the design guidance is tentative, practitioners can experiment with it to design blended learning environments that motivate students to learn.

Keywords Basic psychological needs · Blended learning environment · Competency-based education · Delivery methods · Design guidance · Student motivation

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Introduction

Contemporary education increasingly involves blended learning environments, which consist of a combination of offline and online delivery methods. Offline delivery methods, such as a self-study textbook, classroom teacher assessment, or workplace group work, deliver instruction and assessment to students in a physical environment (e.g. a classroom or workplace). In contrast, online delivery methods, such as an online quiz, an online teacher lecture, or an online peer assessment, deliver instruction and assessment to students in an online environment. Students learn independently of their physical environment (Singh & Thurman, 2019) using computer networks (e.g. the Internet) in online environments.

Learning environments can demotivate students to learn, which became evident during the COVID-19 pandemic (Thornton et al., 2023). Although studies conclude that blended learning environments can motivate students to learn (Ballouk et al., 2022; Osman & Hamzah, 2020; Wang et al., 2021; Wong et al., 2020), it is unclear to practitioners how to design such environments (Ashraf et al., 2022). Consequently, practitioners face challenges in designing motivating blended learning environments (Boelens et al., 2017; Ong & Quek, 2023; Rasheed et al., 2020). This conceptual article proposes a blended learning design guidance to help practitioners in designing a combination of offline and online delivery methods that motivate students to learn. Conceptual papers present a novel theory that provides new insights to practitioners (West & Martin, 2023).

Theoretical basis of the blended learning design guidance

Self-determination theory (Ryan & Deci, 2000, 2017) is frequently used in studies to evaluate students' learning motivation in blended learning environments (Siddiqui et al., 2020; Wong, 2022; Zainuddin & Perera, 2019). According to self-determination theory, students are motivated to learn when their three basic psychological needs for autonomy, competence, and relatedness are supported. Supporting the need for autonomy refers to allowing students to make their own choices and promoting the experience of volition. Supporting the need for competence refers to challenging students and letting them experience mastery (i.e. feeling able to do it). Finally, supporting the need for relatedness refers to helping students to build relationships with peers and teachers to create a sense of belonging. Supporting all three basic psychological needs is essential because ignoring any of these needs can demotivate students to learn (Ryan & Deci, 2017).

Competency-based education (CBE), a student-centred approach, is intended to support students' basic psychological needs. In CBE, students progress by developing competencies (Malhotra et al., 2023), which are a combination of knowledge, skills, and attitudes to perform professional or real-life tasks. Because of its focus on these tasks, CBE has a strong position in vocational education (Misbah et al., 2022). First, CBE is intended to support students' need for autonomy by giving students more ownership over their learning process. Second, CBE is intended to support students' need for competence by optimally challenging individual students. Finally, CBE is intended to support students' need for relatedness by offering opportunities to build relationships with peers and teachers. Although instructional design models, such as the four-component instructional design model (Van Merriënboer & Kirschner, 2018; Van Merriënboer et al., 2002), can help in designing CBE programmes, they provide no design guidance that helps practitioners to

design a combination of offline and online delivery methods that motivate students to learn. Therefore, we posit the following research question: *What blended learning design guidance can help practitioners to design a combination of offline and online delivery methods for CBE programmes that support students' three basic psychological needs for autonomy, competence, and relatedness?*

We aim to construct a design guidance relevant to all CBE programmes, irrespective of the subject area. To construct this design guidance, we use self-determination theory as a lens for designing blended learning environments for CBE programmes that support students' three basic psychological needs. We have constructed blended learning design principles that prescribe how combinations of offline and online delivery methods support students' needs for autonomy, competence, and relatedness. Although the design principles provide helpful overall guidance, additional guidance is required to distinguish between different delivery methods in implementing the design principles. Therefore, we have constructed blended learning design guidelines involving the development of a hierarchy of interaction categories based on Moore's (1989) interaction model to distinguish between the types of interaction facilitated by delivery methods. Finally, we have constructed blended learning design phases to assist practitioners in applying the design guidelines. The design phases are intended to help practitioners design motivating blended learning environments. The following sections introduce the parts of the design guidance: blended learning design principles, design guidelines, and design phases.

Blended learning design principles

We suggest three blended learning design principles for CBE that prescribe how to support students' basic psychological needs using combinations of offline and online delivery methods. CBE is intended to support students' need for autonomy because they develop competencies at their own pace (Edwards, 2022). Students only move on to more complex learning tasks when they have mastered learning tasks at the current level of complexity (Van Merriënboer & Kirschner, 2018). In addition, students set their unique learning paths (Kicken et al., 2009; Voorhees & Bedard-Voorhees, 2016) by selecting learning tasks that allow them to work on their improvement points instead of following a prearranged learning path (Beckers et al., 2021). As a result, different students can work on different learning tasks at a given point in time.

Thus, CBE gives students choices in pace and path. When CBE incorporates a blended learning environment, offline and online delivery methods can provide students with choices in time and place for instruction and assessment. For example, out-of-class group work allows students to choose their time and place to work on group learning tasks. Additionally, online self-assessments enable students to decide where and when to perform their assessments. Such choices in time and place give students more opportunities to progress at their own pace and follow their own learning path. Therefore, we suggest the following first blended learning design principle: *to support students' need for autonomy, a combination of offline and online delivery methods for instruction and assessment in CBE should give students choices in time and place*.

Second, CBE is intended to support students' need for competence because students receive support adapted to their competency level to optimally challenge them. Therefore, students' progress is monitored and steered by regular and timely formative assessments (Gervais, 2016). Development portfolios involve collecting the results of completed learning tasks and formative assessments to inform teachers and students about students' levels

of competence (Van Merriënboer & Kirschner, 2018). Additionally, students can visualize their growth in competence in an *electronic* development portfolio via automatically generated graphics such as spider web graphs or line charts (Reigeluth & Karnopp, 2020).

When CBE incorporates a blended learning environment, offline and online delivery methods for instruction and assessment can adapt to students' competence levels to optimally challenge them. For example, an online intelligent tutoring system adapts support to students' competency levels (Kabudi et al., 2021). Additionally, in classroom teacher tutoring, the teacher adapts support by giving concrete examples or analogies when students struggle to perform their learning tasks. Additionally, in online teacher assessment, the teacher provides formative feedback to individual students, giving them insights into their progress (Leenknecht et al., 2021). Therefore, we suggest the following second blended learning design principle: *to support students' need for competence, a combination of offline and online delivery methods for instruction and assessment in CBE should adapt to students' competency levels.*

Finally, CBE is intended to support students' need for relatedness by offering opportunities for students to build relationships with their peers and teachers. In CBE, students often collaborate in small groups because learning tasks are based on professional tasks usually performed on a team. Working together on learning tasks helps students to build relationships. Alternatively, when students work individually on learning tasks, they assist each other in completing the learning tasks (Reigeluth & Karnopp, 2020). Furthermore, building relationships with peers creates a sense of belonging and helps to build a community (Zhu et al., 2021).

When CBE incorporates a blended learning environment, offline and online delivery methods for instruction and assessment can stimulate students to build relationships with their peers and teachers. For example, in an in-person teacher assessment, a teacher gives students personal attention to build relationships with them. Additionally, in classroom group work, students work on a joint product. Therefore, we suggest the following third blended learning design principle: *to support students' need for relatedness, a combination of offline and online delivery methods for instruction and assessment in CBE should stimulate students' relationship building with peers and teachers.*

Blended learning design guidelines

We propose blended learning design guidelines that focus on the interactions facilitated by delivery methods. For instance, a classroom teacher's lecture facilitates interaction between the teacher and students. The design guidelines categorize these interactions because different types differ in their potential to give students choices in time and place, adapt to their competency levels, and stimulate their relationship building. First, we describe the interaction categories and, second, we explain the differences between the interaction categories.

Interaction categories

The design guidelines categorize the types of interaction facilitated by delivery methods. Figure 1 presents the interaction categories that are organized into a hierarchy. Below, we explain these interaction categories.

Offline and online *delivery methods* facilitate *interactions*, which can be categorized into physical and digital interaction categories. Offline delivery methods can facilitate both physical (e.g. a classroom teacher lecture) and digital interactions (e.g. a classroom

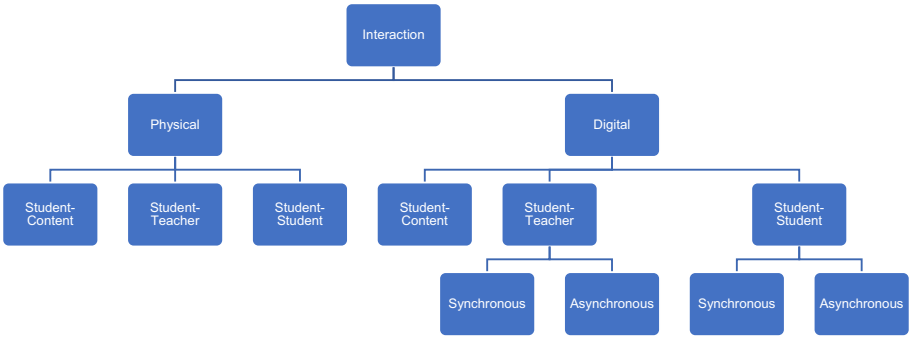

Fig. 1 Interaction categories

digital quiz). In contrast, online delivery methods facilitate only digital interactions (e.g. an online digital quiz). To further categorize the psychical and digital interaction categories, we use the three types of interaction described by Moore (1989): student–content (S–C), student–teacher (S–T), and student–student (S–S) interaction. Student–content interaction refers to interaction between a student and the content of learning materials. Student–teacher interaction refers to interaction between a student and a teacher or between a group of students and a teacher. Student–student interaction refers to interaction between two students or between a student and a group of students. Interaction occurs when the objects of the interaction (i.e. teacher, student, and content) mutually influence one another (Anderson, 2008).

The digital student–teacher and student–student interaction categories can be subcategorized as synchronous or asynchronous. Digital synchronous interaction occurs when students and teachers are in the same virtual space at the same time, while digital asynchronous interaction does not occur at the same time (Greenhow et al., 2022). Finally, eight interaction categories can be distinguished at the leaves of the hierarchy: (1) physical student–content (PHYSICAL-S–C), (2) physical student–teacher (PHYSICAL-S–T), (3) physical student–student (PHYSICAL-S–S), (4) digital student–content (DIGITAL-S–C), (5) digital student–teacher synchronous (DIGITAL-S–T-SYNC), (6) digital student–teacher asynchronous (DIGITAL-S–T-ASYNC), (7) digital student–student synchronous (DIGITAL-S–S-SYNC), and (8) digital student–student asynchronous (DIGITAL-S–S-ASYNC). The physical student–teacher and physical student–student interaction categories are also known as face-to-face interaction categories. Table 1 shows examples of delivery methods for instruction and assessment that facilitate the specific interaction for each of the eight categories.

Differences between the interaction categories

Each interaction category has unique characteristics. These characteristics explain why different interaction categories have different potentials to (1) give students choices in time and place, (2) adapt to students' competency levels, and (3) stimulate students' relationship building. Table 2 presents the blended learning design guidelines that indicate the differences in potential (low, moderate, high, or very high) for the eight interaction categories. Below, we explain the differences.

Table 1 Examples of instruction and assessment delivery methods for each interaction category

Interaction category	Delivery methods	
	Instruction	Assessment
PHYSICAL-S–C	Self-study textbook	Take home paper-based test
PHYSICAL-S–T	Classroom teacher lecture	On-site teacher oral exam
PHYSICAL-S–S	Workplace group work	In-class peer feedback
DIGITAL-S–C	Self-study recorded lecture	Online digital quiz
DIGITAL-S–T-SYNC	Online teacher lecture	Online teacher assessment
DIGITAL-S–T-ASYNC	Online asynchronous teacher support	Online asynchronous teacher feedback
DIGITAL-S–S-SYNC	Online peer discussion	Online peer assessment
DIGITAL–S–S-ASYNC	Online discussion board	Online asynchronous peer feedback

First, each interaction category has a different potential to give students choices in time and place. The PHYSICAL-S–T and PHYSICAL-S–S (face-to-face) categories have the lowest potential because students interact at a determined time and place. Nevertheless, these categories could provide students with some choice in time and place. For instance, a classroom teacher assessment can allow students to choose a particular time for their assessment. The DIGITAL-S–T-SYNC and DIGITAL-S–S-SYNC (digital synchronous) categories have more potential than the face-to-face categories because students can interact from anywhere. The DIGITAL-S–T-ASYNC and DIGITAL-S–S-ASYNC (digital asynchronous) categories have more potential than the digital synchronous categories because students can interact with peers and teachers anywhere and anytime. However, the choice of time is somewhat restricted because students must wait for the actions or responses of teachers and peers, for example, when students collaborate in online asynchronous group work. Finally, the PHYSICAL-S–C and DIGITAL-S–C (student–content) categories have the highest potential because students can interact anywhere and anytime without having to wait for the responses of others, for example, when students study a recorded lecture.

Second, each interaction category has a different potential to adapt to students' competency levels. The PHYSICAL-S–C category has the lowest potential to adapt to students' competency levels because physical content remains unchanged. Nevertheless, using programmed instruction, self-study textbooks can somewhat adapt to students' competency levels (Brown & Green, 2020). The DIGITAL-S–C category has more potential than the physical student-content category because content can be adapted to students' competency levels using adaptive learning systems (Alamri et al., 2021). The PHYSICAL-S–S, DIGITAL-S–S-SYNC, and DIGITAL-S–S-ASYNC (student–student) categories have more potential than the digital student–content category because students can respond to new situations and thus adapt to their peers' competency levels better than learning systems (Li et al., 2021). Finally, the PHYSICAL-S–T, DIGITAL-S–T-SYNC, and DIGITAL-S–T-ASYNC (student–teacher) categories have the highest potential because teachers are more capable than students in adapting to students' competency levels (Huh & Reigeluth, 2016; Wald & Harland, 2022).

Finally, each interaction category has a different potential to stimulate students' relationship building with peers and teachers. The PHYSICAL-S–C and DIGITAL-S–C (student–content) categories have the lowest potential because these categories do not facilitate interaction with peers and teachers. Nevertheless, these categories can somewhat stimulate

Table 2 Blended learning design guidelines

Potential of the interaction categories to:	Interaction categories							
	PHYSICAL-S–C	PHYSICAL-S–T	PHYSICAL-S–S	DIGITAL-S–C	DIGITAL-S–T-SYNC	DIGITAL-S–T-ASYNC	DIGITAL-S–S-SYNC	DIGITAL-S–S-ASYNC
Give students choices in time and place	Very high	Low	Low	Very high	Moderate	High	Moderate	High
Adapt to students' competency levels	Low	Very high	High	Moderate	Very high	Very high	High	High
Stimulate students' relationship building	Low	Very high	Very high	Low	High	Moderate	High	Moderate

S–C = student–content, S–T = student–teacher, S–S = student–student, SYNC = synchronous, ASYNC = asynchronous

relationship building, for instance, when students read personal background information from peers. The DIGITAL-S–T-ASYNC and DIGITAL-S–S-ASYNC (digital asynchronous) categories have more potential than the student–content categories because students can interact indirectly with peers and teachers. The DIGITAL-S–T-SYNC and DIGITAL-S–S-SYNC (digital synchronous) categories have more potential than the digital asynchronous categories because students directly interact with peers and teachers (Hadad et al., 2024). Finally, the PHYSICAL-S–T and PHYSICAL-S–S (face-to-face) categories have the highest potential because students interact directly with peers and teachers who are in the same physical environment. Being in the same physical environment allows specific non-verbal communication (Koester, 2023), such as touching by shaking hands.

Blended learning design phases

We suggest three design phases (Fig. 2) to help practitioners to apply the design guidelines. The design phases are intended to help practitioners to achieve the goal of motivating students by using their existing CBE programme as a starting point. In these CBE programmes, practitioners have selected delivery methods to achieve several learning goals. For example, they have selected classroom self-reflection to stimulate students' self-responsibility, or classroom mentoring to help students to steer their learning. The design phases help practitioners to design a motivating blended learning environment tailored to their CBE programmes.

Design phase 1: identify and classify delivery methods

In the first phase, practitioners identify the offline and online delivery methods for instruction and assessment selected in their CBE programmes to uncover their current situation. Then, they classify the identified delivery methods using the interaction categories. Finally, practitioners use the design guidelines to reveal the potential of the classified delivery methods. Table 3 presents the results after applying the first phase to an example CBE programme.

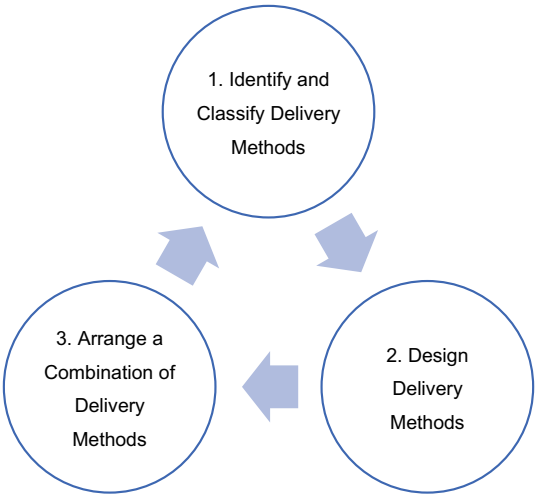

Fig. 2 Blended learning design phases

Table 3 Example CBE programme: results of Phase 1

Delivery method	Interaction category	Give students choices in time and place	Adapt to students' competency levels	Stimulate students' relationship building
Offline delivery methods				
Classroom group work	PHYSICAL-S–S	Low	High	Very high
Classroom digital quiz	DIGITAL-S–C	Very high	Moderate	Low
Online delivery methods				
Online recorded lecture	DIGITAL-S–C	Very high	Moderate	Low
Online teacher assessment	DIGITAL-S–T-SYNC	Moderate	Very high	High

Design phase 2: design delivery methods

In the second phase, practitioners design their delivery methods to implement the design principles. For each of their delivery methods, they consider how to (1) give students choices in time and place to support their need for autonomy, (2) adapt to students' competency levels to support their need for competence, and (3) stimulate students' relationship building to support their need for relatedness. It is recommended that practitioners start by considering the highest potential, revealed in phase 1, to design their delivery methods. Table 4 shows how practitioners designed the delivery methods in the example CBE programme.

Classroom group work has a very high potential to stimulate students' relationship building. To use this potential, students work on a joint product in small groups, which stimulates students to build relationships, which supports their need for relatedness (Reeve et al., 2022). In addition, the students help each other, which supports their need for competence. The classroom digital quiz has a very high potential to give students choices in time and place. However, students cannot complete the quiz anytime and anywhere because the quiz is delivered in the classroom. Thus, the potential to support students' need for autonomy cannot be used. The classroom digital quiz adapts the questions to students' competency levels (i.e. adaptive quiz; Ross et al., 2018), which supports their need for competence. The online recorded lecture also has a very high potential to give students choices in time and place. Students can choose to watch it anytime and anywhere, which supports their need for autonomy. The online teacher assessment has a very high potential to adapt to students' competency levels. The teacher provides feedback to students to help them to improve, which supports their need for competence. Additionally, the teacher gives students personal attention by asking individual students about their well-being to build relationships with them, which supports their need for relatedness (Ahmadi et al., 2023). Finally, the online teacher assessment gives students the choice of where to perform their assessment, which supports their need for autonomy.

Table 4 Example CBE programme: results of Phase 2

Delivery method	Interaction category	Autonomy	Competence	Relatedness
		Give students choices in time and place	Adapt to students' competency levels	Stimulate students' relationship building
Offline delivery methods				
Classroom group work	PHYSICAL-S–S	Not used	Students help each other	Students work on a joint product in small groups
Classroom digital quiz	DIGITAL-S–C	Not used	Students get adaptive questions	Not used
Online delivery methods				
Online recorded lecture	DIGITAL-S–C	Students can watch the lecture anytime and anywhere	Not used	Not used
Online teacher assessment	DIGITAL-S–T-SYNC	Students can choose where to perform their assessment	Students receive feedback to help them to improve	Students get personal attention

Design phase 3: arrange a combination of delivery methods

In the third phase, practitioners work towards a need-supportive combination of offline and online delivery methods. Practitioners arrange their combination by removing, adding, or replacing delivery methods. Practitioners should know their students because students perceive the given support differently (Vansteenkiste et al., 2020). For example, few choices in time and place can support the need for autonomy for first-year students. On the other hand, more choices in time and place can be required to support the need for autonomy for adult students. In the example CBE programme, practitioners determined that students required more choices in time and place to work on their learning tasks to support their need for autonomy. Although students have several opportunities to choose their time and place because the lectures are recorded and the assessments are online, they still have to work in a classroom with peers on the learning tasks. To give students more choices in time and place to work on their tasks, practitioners can use the digital student–content interaction category, which has the highest potential as indicated by the guidelines (Table 2). This type of interaction can be facilitated by, for instance, online self-study work. However, practitioners should understand the trade-offs when replacing classroom group work (PHYSICAL-S–S) with online self-study work (DIGITAL-S–C). Figure 3 compares the potential of classroom group work with that of online self-study work to illustrate these trade-offs.

Replacing classroom group work with online self-study work results in more potential to give students choices in time and place but less potential to adapt to students' competence levels and less potential to stimulate students' relationship building. Another option for practitioners is to add self-study work instead of replacing it. After the third phase, practitioners might need to return to phase one, for instance, when new delivery methods are added. Several iterations might be necessary to work towards a need-supportive combination of offline and online delivery methods intended to support students' psychological needs for autonomy, competence, and relatedness.

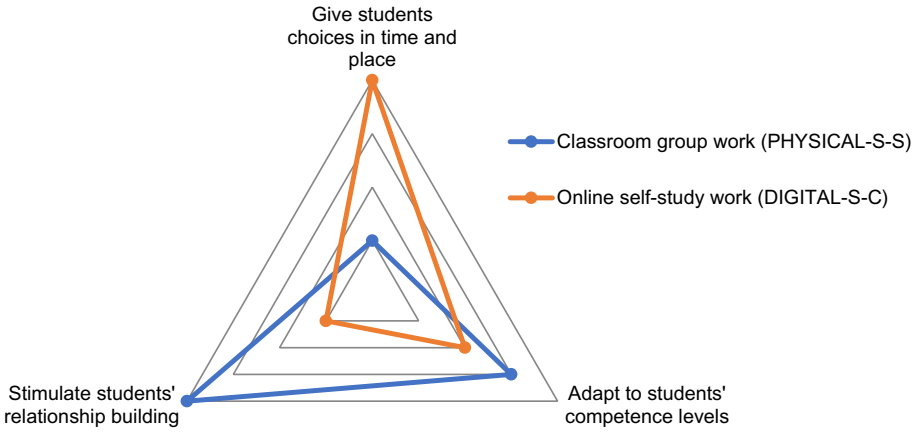

Fig. 3 Potential of classroom group work and online self-study work

Discussion

In this conceptual paper, we answered the following research question: What blended learning design guidance can help practitioners to design to a combination of offline and online delivery methods for CBE programmes that support students' three basic psychological needs for autonomy, competence, and relatedness? We argue that the proposed blended learning design guidance contributes to advancing the knowledge base of designing learning environments. First, we argue that blended learning design guidance helps practitioners to design environments that enable differentiation, which addresses the needs of individual students (Maulana et al., 2023). An environment designed with design guidance (1) allows students to choose their own time and place, (2) adapts to their individual competency level, and (3) stimulates the building of their relationships with peers and teachers. For example, in an online quiz, each student can choose when and where to complete it, which addresses their need for autonomy. Additionally, in classroom teacher tutoring, the teacher adapts support for each student, which addresses their need for competence. Furthermore, in a classroom teacher assessment, each student receives personal attention, which addresses their need for relatedness.

Second, we argue that the design guidance helps practitioners to design learning environments that prevent students' psychological needs from being thwarted, which is *detrimental* to students' motivation (Ryan & Deci, 2017). For example, students feeling coerced thwarts their need for autonomy (Patall et al., 2018). Additionally, students feeling insecure about their abilities thwarts their need for competence. Students feeling that teachers show no interest in them thwarts their need for relatedness (Buzzai et al., 2022).

Finally, we argue that the blended learning design guidance helps practitioners to evaluate and improve existing learning environments. When one or more students' needs for autonomy, competence, or relatedness are not supported, learning environments demotivate students. For example, in learning environments during the COVID-19 pandemic, building relationships with peers and teachers was insufficiently stimulated. Therefore, their need for relatedness was often unsupported, which in turn demotivated students to learn. The design guidance helps practitioners to design motivating blended learning environments by unlocking the potential of delivery methods and arranging a need-supportive combination of offline and online delivery methods.

We argue that design guidance also can help practitioners design blended learning environments beyond CBE programmes. The first design principle prescribes that practitioners should design a combination of delivery methods that give students choices in time and place to support their need for autonomy. In more traditional education programmes, practitioners can also give students choices in time and place. The second design principle prescribes that practitioners should design a combination of delivery methods that adapt to students' competency levels to support their need for competence. In more traditional programmes, practitioners can also differentiate between students. The third design principle prescribes that practitioners should design a combination of delivery methods that stimulate students' relationship building to support their need for relatedness, which is also possible in more traditional education programmes.

Further research should involve implementing blended learning environments developed with the design guidance to obtain evidence on how these environments support students' psychological needs for autonomy, competence, and relatedness. Additional research is needed to help practitioners to unlock the potential of their delivery methods. For this purpose, we should examine how interactions of the same interaction category can differ

in potential. For example, interactions categorized as digital student-content can vary from non-adaptive (e.g. online instructional videos) to adaptive interactions that use artificial intelligence techniques (Pulham & Graham, 2018). Although both non-adaptive and adaptive interactions are categorized as DIGITAL-S–C, adaptive interactions have more potential than non-adaptive interactions to adapt to students' competence levels.

An interesting research direction is allowing students to choose between alternative delivery methods. The design guidance helps practitioners to design a combination of delivery methods, but this combination is the same for all students. An example of allowing students to choose between alternative delivery methods can be found in hybrid environments (Raes et al., 2020), which enable students to choose between offline (e.g. a classroom teacher lecture) and online (e.g. an online teacher lecture) delivery methods. These hybrid environments were helpful during the Covid-19 pandemic when students could not come to school because they were in quarantine. Providing students with choices supports their need for autonomy (Ryan & Deci, 2020), but there is a trade-off in their support of the need for relatedness. Because research on choosing between delivery methods is currently limited, further research is needed to elucidate how choosing between delivery methods can support students' psychological needs.

Another interesting research direction is the timing, frequency, and sequencing of offline and online delivery methods. First, timing is a design factor. For example, offline delivery methods could be used at the beginning of CBE programmes to support students' need for relatedness. Second, frequency is a design factor. For example, students could be allowed to work at home during one day a week to support their need for autonomy. Finally, sequencing is a design factor. For instance, in a flipped classroom environment, students learn the content at home before applying it in class (Polat & Karabatak, 2021) to support their need for competence. Further research is needed to help practitioners to determine the timing, frequency, and sequence of their delivery methods.

Conclusion

Blended learning environments can motivate students to learn, but designing such blended learning environments is challenging. According to self-determination theory, students are motivated to learn when their three basic psychological needs for autonomy, competence, and relatedness are supported. However, no existing design guidance helps practitioners to support these basic psychological needs by designing a combination of offline and online delivery methods. This conceptual paper proposes a blended learning design guidance for CBE programmes to help practitioners to support students' basic psychological needs by designing a need-supportive combination of offline and online delivery methods. This combination is intended to support students' psychological needs by (1) giving students choices in time and place to support their need for autonomy, (2) adapting instruction and assessment to students' competency levels to support their need for competence, and (3) stimulating students' relationship building with peers and teachers to support their need for relatedness. Further research is required to advance the proposed design guidance and seek empirical evidence concerning how the guidance works in practice. Although the design guidance is tentative, practitioners can experiment with it to design blended learning environments for their CBE programmes that motivate students to learn.

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