

Evaluating blended learning: Bringing the elements together

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Introduction

This article provides a brief introduction to 'blended learning', its benefits and factors to consider when implementing a blended learning programme. It then concentrates on how to evaluate a blended learning programme and describes a number of evaluation frameworks found in the literature. It concludes by introducing a new framework.

What is blended learning?

Blended learning is a mixture of online and face-to-face learning. In the literature, blended learning is also known as 'hybrid learning' or the 'flipped classroom'. Although there has been some debate about an exact definition, Boelens, Van Laer, De Wever, and Elen (2015) define blended learning as "learning that happens in an instructional context which is characterized by a deliberate combination of online and classroom-based interventions to instigate and support learning" (p.5). The online element should not solely be an addition to classroom-based teaching; rather, blended learning requires the effective integration of both virtual and face-to-face methods (Garrison & Kanuka, 2004). For example, a university lecturer placing some selected course materials, such as a course handbook, on a virtual learning environment (VLE) would not constitute a sufficient 'blend'.

Blended learning appears to be most commonly used in Higher Education (HE) or adult education. The majority of the research literature is within the United States, but there is a growing body of literature about the implementation of blended learning in HE courses within the UK. The prevalence of blended learning within HE means that there is very little research regarding the use or impact of blended learning for primary or secondary students. Given the different motivations and expectations of adult and secondary learners, the lack of representation of younger students in the literature may mean that it is difficult to draw conclusions about the potential impact of blended learning for students in compulsory education (Sparks, 2015). This should be borne in mind when reading the literature review that follows.

What are the benefits of blended learning?

Improved outcomes

There is some evidence that the introduction of blended learning can lead to improved course outcomes, in terms of higher student retention as well as increased pass rates. Studies by López-Pérez, Pérez-López, and Rodríguez-Ariza (2011) and Boyle, Bradley, Chalk, Jones, and Pickard (2003) found that the introduction of blended learning in HE courses improved retention and correlated with improvements in students' attainment. Additionally, Stockwell, Stockwell, Cennamo, and Jiang

(2015) found that blended learning courses improved attendance at face-to-face classes, in self-report measures of student satisfaction, and in examination performance.

For students from non-traditional backgrounds, the evidence suggests that blended learning can improve retention, although it may not improve attainment. Holley and Dobson (2008) introduced a blended learning programme during the first term to counteract low dropout rates at London Metropolitan University. These students were usually late entrants to HE and therefore drop out rates were high as students often struggled to make a successful transition to university study. Nevertheless, students who were introduced to a new blended learning environment during the first term were less likely than previous cohorts to leave their course before completion. Additionally, Hughes (2007) found that using blended learning to identify and support 'at-risk' students improved coursework submission rates, but had no significant effect on attainment.

Strategic use of classroom time

The improvement in course outcomes due to blended learning has been partially attributed to a more strategic use of classroom time. Garrison and Kanuka (2004) argue that blended learning is effective because it questions the traditional lecture-based teaching model, allowing classroom time to focus on more active and meaningful activities. This has been corroborated by Delialioğlu (2012), who found that problem-based, rather than lecture-based, blended learning had higher levels of student engagement. Online activities can be used to either reinforce learning undertaken in the classroom, or they can serve as a basic introduction to topics before they are covered in more depth in class.

If pre-reading material is placed on the VLE, then classroom time can focus on deeper analysis or discussion of the topics. This may also allow teachers or tutors to spend more individualised time with students in class, focusing on areas of particular difficulty. Aspden and Helm (2004) found that blended learning especially helped students who lived far away from campus use their time at university more effectively as they were able to engage with materials at home prior to attending class. Additionally, they found that students who were struggling with particular topics in class were able to participate and engage with online materials and thus grow in confidence. Alternatively, blended learning can take the form of the 'flipped classroom', where students engage with online lectures and textbook material at home, before participating in group discussion and problem-solving in class. This may have greater benefits for some subjects than others: Stockwell et al. (2015) reported that this mode of blended learning was particularly successful in Science education because it allowed teaching to shift away from the traditional textbook model, and students were thus able to engage with scientific concepts on a deeper level.

Nevertheless, this strategic use of classroom time relies on students' successful completion of online activities. Blended learning thus depends on students' capacity to adopt resilient learning strategies, as well as their self-motivation to complete the course. The literature suggests that whilst blended learning may be a valuable tool which enables students to work independently and develop their study skills, individuals will inevitably respond differently to this challenge. In Wivell and Day's (2015) study, students reported that self-motivation, self-reliance and the ability to work independently were essential to their success on the blended learning course. However, students who already struggled in the face-to-face delivery struggled to adapt to the demands of the blended programme. Moreover, Pérez and Riveros (2014) found that whilst a blended learning programme generally increased students' autonomy and responsibility for their learning, a common complaint from tutors was that some students did not engage with the online activities or complete the online assignments. Similar findings were reported by Chen and DeBoer (2015), who found that the most successful students were those who engaged more frequently with the online materials.

Consequently, as independent study skills and self-motivation are essential to students' success on blended learning programmes, it may be pertinent for providers to help students develop these skills by offering additional study skills sessions. Students' likely self-motivation should also be borne in mind when developing blended learning programmes. The age of students and the compulsory nature of online assignments may affect this. For example, HE students may be more self-motivated by being able to choose their course and will be used to a more independent style of learning, whilst secondary students may be less motivated to engage with the online elements as they are more familiar with a classroom or lecture-based model. Alternatively, making the online tasks compulsory, or contributory towards a student's final grade, may increase engagement and submission by offering higher extrinsic motivation.

Online discussion

A further potential benefit of blended learning is the additional opportunity for peer and tutor interaction through online discussion. Online discussion in blended learning can either be asynchronous (such as discussion boards) or synchronous (such as Instant Messaging). However, these potential benefits are perhaps the greatest source of contention in the literature, with studies differing in their findings regarding students' enjoyment and perceived utility of online discussion.

For groups who have few face-to-face classes together, online communication can facilitate a sense of community. Aspden and Helm (2004) found that online communication through a blended learning environment enabled students to make and maintain connections with other students and their learning institution even when off campus. However, they cautioned that blended learning could not counteract pre-existing negative relationships between teachers and students, and teachers need to engage with the online environment for blended learning programmes to be successful. Students in So and Brush's (2008) study were also more likely to report higher satisfaction with the blended learning programme if they perceived there to be high levels of collaborative learning online. Furthermore, Garrison and Kanuka (2004) argue that students' comments in asynchronous online discussion are more likely to be thoughtful and supported by evidence than face-to-face classroom discussion. Consequently, they argue that online

discussion in blended learning develops a community of inquiry, which in turn entails greater levels of cognitive learning and critical thinking.

Conversely, other studies have shown that, in practice, asynchronous communication is often neither enjoyed nor utilised by blended learning students. Taylor, Nelson, Delfino, and Han (2015) found that students reported that online discussion was the least useful element of their blended learning course. Similarly, Pye, Holt, Salzman, Bellucci, and Lombardi (2015) indicated that students were broadly ambivalent about the utility of online discussion. Only half of the students in their study reported having useful online discussions or using the online environment to work with others. Similar findings have been reported by Ginns and Ellis (2007) and So and Brush (2008).

Nevertheless, online communication in blended learning is not restricted to peer discussion and should also involve teachers and tutors. Although Reed's 2014 study of staff attitudes towards blended learning at a UK university found that they considered online discussion forums to be the least important elements of VLEs, blended learning offers the opportunity for teacher-student engagement outside of the classroom and enhanced feedback. The literature indicates that where students have been able to communicate with tutors online, they have found this useful (Hughes, 2007). Subsequently, for blended learning to be most useful, tutors should use the online environment to offer feedback on online work, and to assist with students' queries or problems. It is likely that tutors would need training in this area.

Implementing blended learning programmes

Implementing a blended learning programme requires coherent and co-ordinated planning to be successful. Garrison and Kanuka (2004) highlight the variety of policy issues that universities need to consider. These include strategic planning of financial, technical and human resources, course scheduling (e.g., if fewer face-to-face lectures will take place), and tutor and student support. These will all need careful consideration if universities and/or schools contemplate introducing blended learning elements.

Additionally, a recurrent theme in the literature is that for blended learning programmes to be successful, two things are essential:

1. Comprehensive teacher or tutor training
2. Ongoing evaluation.

Tutor or teacher training is especially critical in universities where teachers are responsible for curriculum and assessment design in addition to implementing blended learning. Reed (2014) found that HE staff identified a lack of staff support/training and a lack of skills as the biggest barriers to implementing blended learning programmes at their institution. Boyle et al. (2003) and Hughes (2007) suggest that their programmes would not have been successful without specialist training, cautioning that others wishing to introduce their own programmes should ensure that teaching staff are trained to deal with all aspects of blended learning.

Furthermore, the literature suggests that ongoing evaluation of blended learning programmes is essential when implementing new courses. Boyle et al. (2003) argue that implementation of blended learning should be reasonably conservative at first, to allow for appropriate tutor training and to allow students to adapt to new learning styles. Programmes should be adapted over a number of years

to meet specific student and tutor needs, and therefore ongoing evaluation is critical to the success of blended learning. Additionally, Pombo and Moreira (2012) suggest that ongoing evaluation, during task development rather than solely at the end of the programme, gives a more thorough and multi-faceted evaluation which in turn ensures the overall quality of the course. We discuss different methods for evaluating blended learning later.

Access to technology

The success of blended learning programmes inevitably relies on students' equitable access to technology. However, few studies have directly addressed whether access to home computers affects the perceived success of blended learning, or whether certain groups of students are disadvantaged. This is most likely because Internet and computer access in educational institutions has rapidly increased, and the vast majority of (if not all) schools and universities in the UK provide access to computers for students. Additionally, the most recent statistics indicate that 86% of UK households now have access to the Internet, up from 57% in 2006 (Office of National Statistics, 2015); although this leaves 14% of households without Internet access. Students and teenagers are the most prolific Internet users, the most recent large scale survey of Internet use found that 100% of university students and teenagers aged 14 and over had access to the Internet (Dutton, Blank, & Groselj, 2013). Additionally, 92% of students accessed the Internet on multiple devices, such as tablets and mobile phones. This indicates that, in the UK at least, the implementation of blended learning programmes is unlikely to be impeded by inequitable access to technology.

Evaluating blended learning

As Pombo and Moreira (2012) indicate, there are four elements that need to be taken into consideration when evaluating blended learning programmes:

1. What is the purpose of evaluation?
To improve student engagement, resources, or overall course quality?
2. Who should be involved?
Lecturers, students, course leaders?
3. How and when should evaluation take place?
Methods of data collection; during the course or at the end?
4. What should be evaluated?
Teaching, learning, course outcomes, resources, quality of assessment?

The literature offers several methods of evaluating blended learning programmes. These differ in their methods (e.g., which data they use), which aspects of blended learning are focussed on (e.g., technology, course content), whose viewpoints are considered (e.g., students', teachers', administrators') and the criteria used to make judgements about the success of particular programmes. Generally, evaluation criteria include a combination of data about course outcomes (attendance, retention and students' marks) and measures of student satisfaction and student engagement.

Measuring course outcomes

A number of measures can be used to evaluate course outcomes: these include grades and marks, activity, attendance, and drop out rates. Measurement can be enhanced and made easier by use of the blended

learning system as student activity and results can be captured by the system. Using outcome measures alone may not give the full picture due to the effect of motivation: statistical measures do not capture students' attitudes towards learning and the role of the blended learning system in facilitating this. Consequently, Liu, Bridgeman, and Adler (2012) note that "accountability initiatives involving outcomes assessment should also take into account the effect of motivation when making decisions about an institution's instructional effectiveness" (p.360).

Measuring learner satisfaction

An important course outcome that cannot be measured through attendance and assessment data is learner satisfaction. Whilst a researcher or teacher might consider a course to be successful if students meet or exceed expectations in assessment, learner satisfaction is important because it accounts for students' personal experiences of the course. This is becoming particularly pertinent in HE in the UK, where the National Student Survey (NSS) is a key measure of perceived quality from students' perspectives. The NSS covers teaching, assessment, support, organisation, learning resources, personal development and overall satisfaction (IpSOS MORI & HEFCE, 2016). These results are made available to prospective students through an independent website, *Unistats*, and headline measures of overall satisfaction are often promoted on universities' own websites and prospectuses. Additionally, learner satisfaction, as measured through the NSS, will become more important in the future, as the government introduces the Teaching Excellence Framework (TEF). The TEF is intended to provide a measure of teaching quality at all UK universities and will be used to justify institutional fee increases (Department for Business, Innovation and Skills, 2016).

Common measures of learner satisfaction in blended learning courses use self-report questionnaires to investigate how satisfied students were with the course overall, the perceived quality of teaching, and, in particular, their experience of the blended learning environment. The specific items vary depending on the purpose of the evaluation and the researcher's personal perspective, but there tend to be similarities between studies. For example, Shee and Wang (2008) and Wang (2003) explicitly focus on students' experiences in an online learning environment and subsequently focus on the learning community, the learner interface, the course content, and the personalisation of the online environment. However, whilst Sun, Tsai, Finger, Chen, and Yeh (2008) name their elements of learner satisfaction as the learner, instructor, course, technology, design and environment dimensions, they investigate similar factors to Shee and Wang (2008), such as relationships between peers and teachers, perceived ease of use of technology, and course flexibility. Consequently, for measures of learner satisfaction to be appropriate within a blended learning environment, they should investigate students' perceptions of the ease of use of the technology and online content, in addition to teaching quality and overall experiences of the course.

Measuring student engagement

Measuring student engagement allows a more complex analysis of students' experiences and learning than simply investigating course outcomes. Engagement is "more than involvement or participation – it requires feelings and sense-making as well as activity" (Trowler, 2010, p.7). Understanding engagement has become particularly important in

the HE sector, as universities now operate in a more competitive marketplace. Consequently, measuring and improving student engagement can be an institutional advantage when attracting and retaining students (Trowler, 2010). Fredricks, Blumenfeld, and Paris (2004) identified three elements of student engagement: behavioural, emotional and cognitive. These are now widely accepted, although there remains some debate about how these can be most accurately defined and measured. Generally, they can be defined as:

1. **Behavioural:** relating to students' actions. For example, class attendance, submission of work, contribution to class discussion, or participation in school-related activities (e.g., extra-curricular sports or school governance).
2. **Emotional:** relating to students' affective reactions in relation to their learning. For example, an emotionally engaged student might report that they were interested in their course and that they enjoyed learning.
3. **Cognitive:** relating to students' psychological investment in their learning. For example, the desire to go beyond the requirements of the class and the adoption of metacognitive learning strategies.

It is important to note that engagement does not always have to be positive: a student could be negatively engaged if they report dislike or anxiety towards their learning. Trowler (2010) identifies positive and negative elements of all three definitions (see Table 1).

Table 1: Examples of positive and negative engagement (Trowler, 2010)

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	<i>Positive engagement</i>	<i>Non-engagement</i>	<i>Negative engagement</i>
Behavioural	Attends lectures, participates with enthusiasm	Skips lectures without excuse	Boycotts, pickets or disrupts lectures
Emotional	Interest	Boredom	Rejection
Cognitive	Meets or exceeds assignment requirements	Assignments late, rushed or absent	Redefines parameters for assignments

Behavioural engagement has typically been investigated through student or teacher questionnaires, or classroom observations. It is also probably the easiest element of engagement to measure, as quantitative measures of attendance and submission of work can be used. Blended learning programmes can provide particularly rich data as it is possible to collect information about students' use of the online environment, including the frequency and duration of use. This may provide more objective data than self-report questionnaires.

Emotional and cognitive engagement are usually measured through questionnaires and interviews. Measuring emotional engagement is largely self-explanatory: students are asked about their feelings towards various aspects of their learning and classroom experience. Conversely, cognitive engagement is particularly difficult to measure, predominantly due to the inherent difficulty of assessing cognition. Consequently, measures of cognitive engagement predominantly rely on questionnaire items that aim to assess whether students are using deep or surface-learning strategies (Fredricks et al., 2004).

Existing evaluation frameworks

The majority of the literature evaluating blended learning has used a combination of author-designed questionnaires and course outcomes data. Students' opinions and experiences are often prioritised over those of teaching staff, and researchers have more often used questionnaires than interviews and focus groups. Several authors have created instruments for this purpose. These are typically either student questionnaires or rubric-based frameworks for evaluation by a researcher. Due to the diversity of methods and evaluation frameworks utilised in the literature, there is no one particular instrument that is seen to be the most effective for evaluating blended learning. We discuss some selected instruments and frameworks later in the article.

Web-Based Learning Environment Instrument (WEBLEI)

The WEBLEI is essentially a questionnaire investigating students' perceptions and experiences of online learning environments. It is divided into four areas or 'scales': the first three are based on categories in Tobin's (1998) qualitative evaluation of an online learning programme and the fourth focuses on information structure and design (Chang, 1999). The WEBLEI scales are: *Emancipatory activities* (looking at convenience, efficiency and autonomy); *Co-participatory activities* (looking at flexibility, reflection, quality, interaction, collaboration and feedback); *Qualia* (looking at success, confidence, accomplishments and interest); and *Information structure and design* (looking at how well the course and learning materials are structured and designed), (Chang, 1999). The scales are scored using a five-point Likert scale (Chang & Fisher, 2003). Some studies have used an additional survey with open-ended questions for a more in-depth analysis (see Chandra & Fisher, 2009).

Hexagonal E-Learning Assessment Model (HELAM)

HELAM is a conceptual multidimensional model for evaluating learning management systems in terms of perceived learner satisfaction (Ozkan & Koseler, 2009). It contains six dimensions (see Figure 1) assessed via a questionnaire. The instrument has been validated and all six dimensions were found to be important. The authors note the model is based on student perceptions only and does not consider the perceptions of other stakeholders such as teachers, system developers and administrators.

E-Learning framework

The E-Learning framework contains eight dimensions which can be used to "provide guidance in the design, development, delivery and evaluation of open and distributed learning environments." (Khan, n.d., para. 4). The dimensions are systemically interconnected to support learning (Figure 2) and are expanded in Table 2. The framework has been used to evaluate blended learning (e.g., Deegan, Wims & Petiti, 2015, and Gomes & Panchoo, 2015). The framework does not appear to contain any instruments for evaluation but provides a guiding structure with which to construct an evaluation.

Technology Acceptance Model (TAM)

A number of studies have focused solely on the technology aspects of blended learning and how they affect user satisfaction and course retention (Ma, Chao, & Cheng, 2013; Padilla-Meléndez, Del Aguila-Obra, & Garrido-Moreno, 2013). The Technology Acceptance Model (TAM)

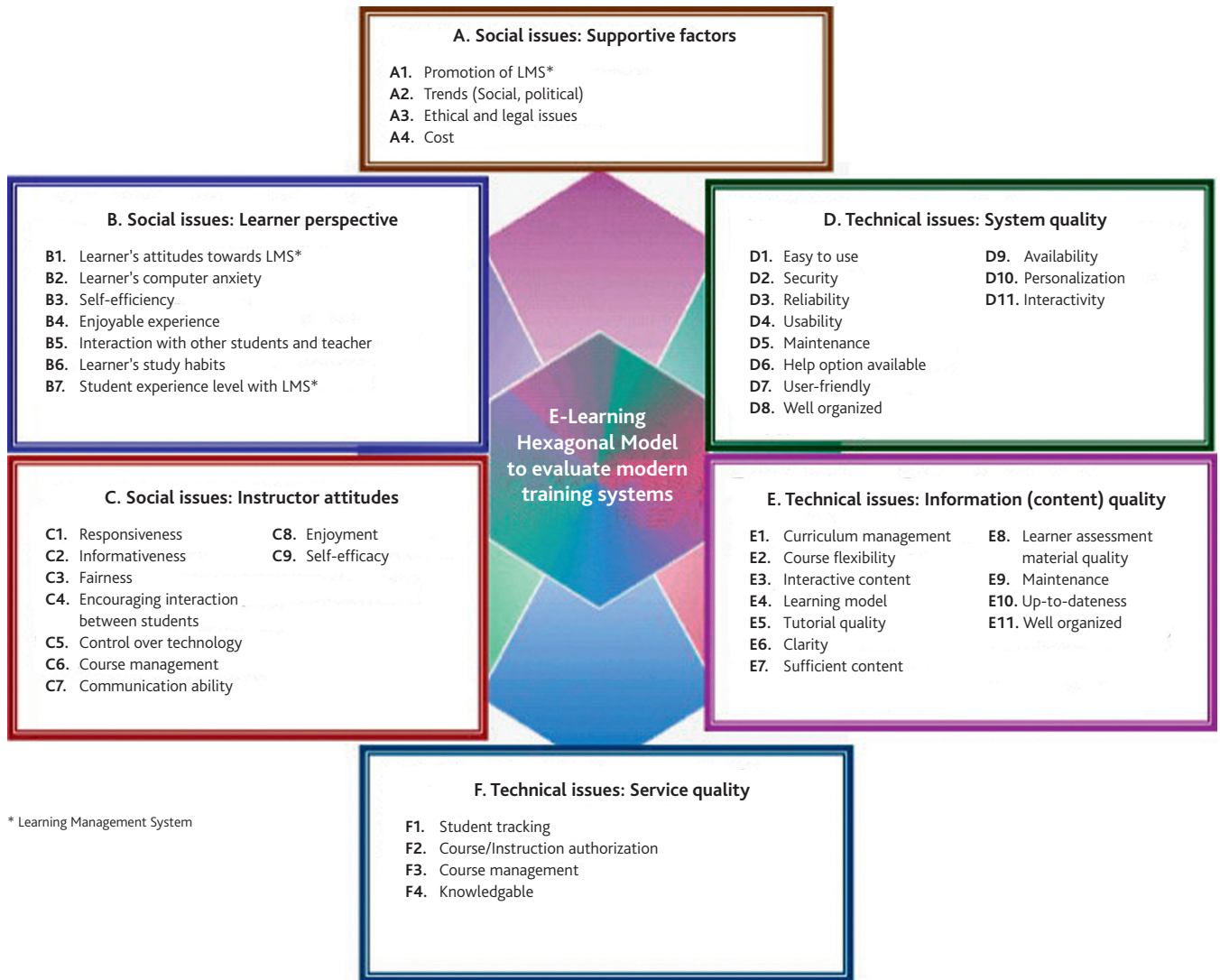


Figure 1: HELAM (Hexagonal E-Learning Assessment Model) (Ozkan & Koseler, 2009) *Reproduced with permission from Elsevier.*



Figure 2: E-Learning framework (Khan, n.d.) *Reproduced with permission of the author under the Fair Use Policy.*

Table 2: E-Learning framework

Adapted from Khan (n.d.) under the Fair Use Policy.

Dimension	Category
1. Pedagogical	Content analysis, audience analysis, goal analysis, media analysis, design approach, organization and methods and strategies of e-learning environments.
2. Technological	Infrastructure planning, hardware and software.
3. Interface design	Page and site design, content design, navigation, and usability testing.
4. Evaluation	Assessment of learners and evaluation of the instruction and learning environment.
5. Management	Maintenance of learning environment and distribution of information.
6. Resource support	Online support and resources required to foster meaningful learning environments.
7. Ethical	Social and political influence, cultural diversity, bias, geographical diversity, learner diversity, information accessibility, etiquette, and the legal issues.
8. Institutional	Administrative affairs, academic affairs and student services related to e-learning.

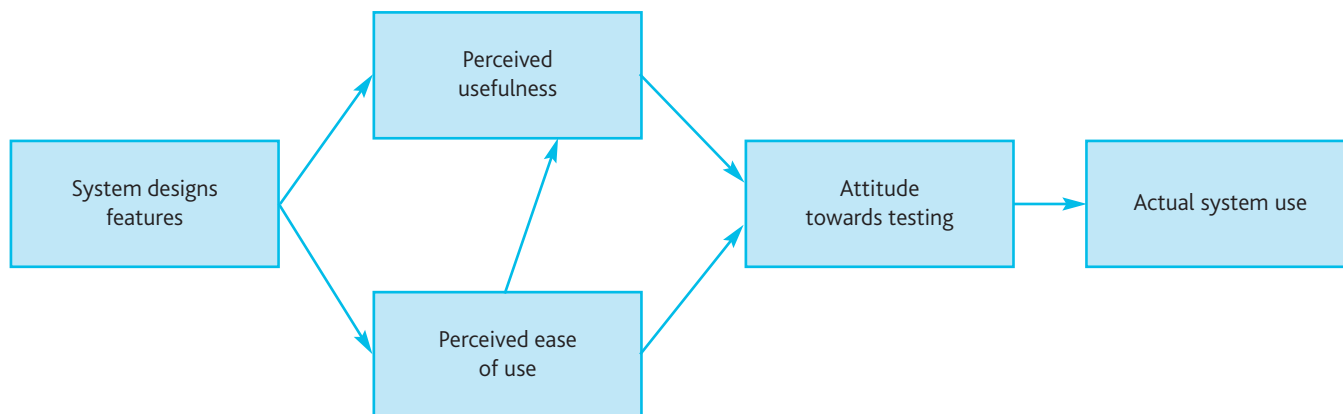


Figure 3: Technology Acceptance Model (Davis, 1993) Reproduced with permission. Copyright, INFORMS®, <http://www.informs.org>

(Davis, Bagozzi, & Warshaw, 1989) "specifies the causal relationships between system design features, perceived usefulness, perceived ease of use, attitude toward using, and actual usage behavior" (Davis, 1993, p.475). This is depicted in Figure 3.

Perceived usefulness (the degree to which a person believes that using a particular system would enhance their performance) and perceived ease of use (the degree to which a person believes that using a particular system would be free from effort) are two of the main predictors of system use (Padilla-Melendez et al., 2013). Caution should be taken if evaluating a blended learning programme solely on the basis of technological aspects as there are many other facets that influence programme effectiveness.

Rubric-based frameworks

Several researchers have created standards or rubric-based frameworks for evaluating blended learning environments. These are judgement-based and tend to be comprehensive in scope. Smythe (2011) argues that rubrics should be used as they cover a broad range of factors, such as instructional design and the use of technology, in addition to students' experiences of the programme. They are also beneficial as they provide a quick and efficient way for course designers to evaluate their programmes. Table 3 illustrates the factors measured by a selection of rubric frameworks and Figure 4 shows an example rubric (from the *Rubric for Online Instruction*, CSU, Chico, Copyright 2003/Revised 2009).

However, a key problem with rubrics is that they are inherently subjective due to their reliance on judgements. Although the example in Figure 4 uses criteria such as 'limited', 'adequate' and 'extensive', these terms are open to interpretation. Additionally, designers of rubrics do not provide advice about which data should be used to make judgements or how such information should be collected. This is especially pertinent when incorporating measures of student engagement in rubrics: should course designers conduct engagement questionnaires in order to provide a more accurate judgement? Consequently, whilst rubrics can provide a quick and broad overview of a blended learning programme, they lack the depth with which to fully evaluate the delivery of these programmes.

A new framework

As seen in the previous section, there are numerous frameworks and instruments for evaluating blended learning, although no particular one seems to be favoured in the literature. This is partly due to the diversity of reasons for evaluating blended learning systems, as well as the

Table 3: Dimensions measured by a selection of rubric frameworks

Author	Dimensions
California State University (2009)	Learner support and resources; online organisation and design; instructional design and delivery; assessment and evaluation of student learning; innovative teaching with technology; faculty use of student feedback.
Illinois Online Network (2008)	Instructional design, communication, interaction and collaboration; student evaluation and assessment; learner support and resources.
Maryland Online (2009)	Course overview and introduction; learning objectives; assessment and measurement; resources and materials; learner engagement; course technology, learner support; accessibility.
Mirriahi, Alonzo and Fox (2015)	Resources; activities; support; assessment.
Smythe (2011)	Student support and resources; course organisation; instructional design – learning objectives; instructional design – student engagement; assessment and evaluation of learning; use of technology.
The Sloan Consortium (2011)	Institutional support; technology support; course development and instructional design; course structure; teaching and learning; faculty support; student support; evaluation and assessment.

many intended audiences and perspectives for these evaluations. For example, some frameworks focus on technology over pedagogy, most focus on the student perspective rather than that of teachers or administrators, and some frameworks rely only on course outcome measures. Purpose also varies: some evaluations are designed for accountability, some for improvement, and others for marketing. However, we feel that it is important that any framework encompasses all aspects of the blended learning situation so that the interconnectedness is not lost. This approach still enables individual evaluations to focus on specific elements of a blended learning programme, but allows the researchers to see where these elements are situated within the wider context of blended learning, subsequently making it easier to identify omissions and acknowledge limitations. Additionally, we believe that a coherent overall framework permits researchers and evaluators to easily identify the relationships between different aspects of blended learning systems, such as between the institutional context and the support tutors are given when designing and implementing a blended learning programme.

One way to conceptualise this is to categorise a framework into

Category 1	Baseline	Effective	Exemplary
Learner Support and Resources	A. Course containing limited information for online learner support and links to campus resources.	A. Course contains adequate information for online learner support and links to campus resources.	A. Course contains extensive information about being an online learner and links to campus resources.
	B. Course provides limited course-specific resources, limited contact information for instructor, department, and/or program.	B. Course provides adequate course-specific resources, some contact information for instructor, department, and program.	B. Course provides a variety of course-specific resources, contact information for instructor, department, and program.
	C. Course offers limited resources supporting course content and different learning abilities.	C. Course offers access to adequate resources supporting course content and different learning abilities.	C. Course offers access to a wide range of resources supporting course content and different learning abilities.

Figure 4: Example rubric for evaluating online learning environments (California State University, 2009)

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spheres of concentric influence¹ so that any evaluation can focus on a particular perspective but acknowledge the influence of other elements of the framework (see Figure 5). Three spheres of influence have been identified, each containing a number of elements. The outer sphere is *situation*: this encompasses the wider context as well as institutional elements. The mid-sphere is *course organisation*: this contains design and planning, content, technology and assessment. The inner sphere is *individual perspectives*: this focuses on the learner and teacher elements but also contains the crucial features of communication, interaction and collaboration which operate at this level.² These described spheres can

be thought of as the independent variables: the inputs and processes that form the facets of the blended learning programme. There is also the core of the sphere: this contains the *outcomes*, namely learner satisfaction, student engagement and course outcomes. These can be considered the dependent variables. These spheres and elements are detailed in Table 4, which also includes suggestions for measurement. An additional feature that runs throughout the framework is support. This is vital for a successful blended learning programme and should be conceptualised as influencing elements of each sphere, as well as the relationships between spheres. There is an inevitable interaction between institutional support, tutor support and student and tutor experiences. For example, a learner can receive financial support to take a course (context), careers support (institution), special needs support (design and planning), tailored learning (content), IT support (technology), formative tests (assessment), peer feedback (learner), and feedback on learning (teacher). Consequently, although support does not constitute its own element or sphere within the framework outlined, elements of support should be investigated in all three spheres.

The framework outlined here was developed by looking at many of the existing frameworks for evaluating blended and e-learning, listing all the constructs encapsulated by them and adding others that we considered to be missing. These were then grouped into spheres at the situation, course and individual level to develop what we consider to be a coherent overall framework. We believe this framework can be used beyond blended learning and can be applied to other technology-based learning situations.

1. 'Spheres of influence' is a term traditionally used in international relations. Its use here has no political basis.
 2. This framework has parallels with a context-based model for investigating impact in educational systems used by Cambridge English Language Assessment (Saville, 2010). The model stresses the dynamic interplay between the multiple macro (e.g., country, region, community and school) and micro (e.g., learner, teacher and class) contexts.

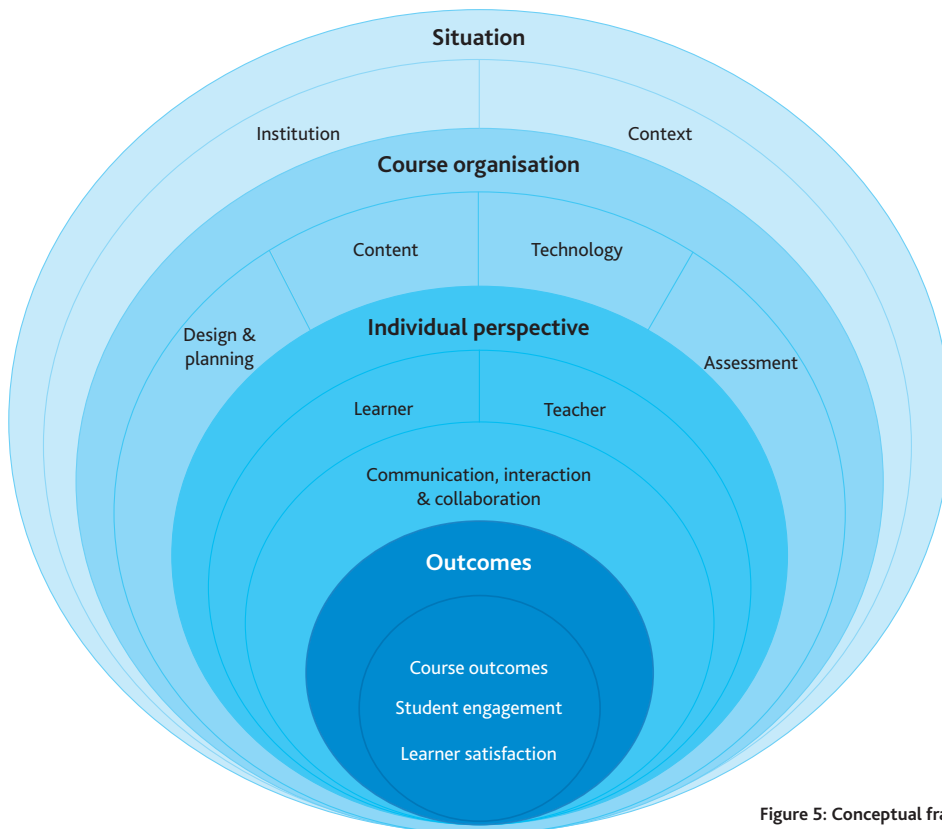


Figure 5: Conceptual framework for evaluating blended learning

Table 4: Framework for evaluating blended learning

<i>Level</i>	<i>Variable</i>	<i>Elements</i>	<i>Measurement</i>
Situation	Context	Socio-economic Ethical Legal Cost Accessibility Cultural Geographical Support	Can be investigated by independent evaluation based on full knowledge of the programme's context, but more likely through interview with, or questionnaire for, course administrators and/or teachers.
	Institution	Support Administration	Can be measured through self-report questionnaires, interviews or focus groups with course administrators and/or teachers.
Course	Design and planning	Curriculum management Organisation of teaching (the 'blend') Flexibility Support	Can be investigated by independent evaluation based on full knowledge of the programme's context, using course materials, but more likely through interview with, or questionnaire for, course administrators and/or teachers.
	Content (online and in class)	Relevance and scope Quality Breadth of content Breadth of methods of presentation and activities Validity Accuracy and balance Interactivity Accessibility Organisation Currency (up-to-dateness) Support	Can be measured through independent evaluation of the blended learning platform and course materials (in relation to curriculum or specification documents) or self-report questionnaires (from students). Existing elements from the latter could be taken from: • HELAM: Technical issues – information (content) quality • WEBLEI: Information structure and design activities.
	Assessment	Diversity Fit/relevance Support	Can be measured through independent evaluation of the blended learning platform and course materials (in relation to curriculum or specification documents) or self-report questionnaires (from students).
	Technology	Interface design Ease of use Security Reliability Usability Maintenance Accessibility Organisation Availability Personalisation Interactivity Currency (up-to-dateness) Support	Can be measured through independent evaluation of the platform or self-report questionnaires. Elements of the latter could be taken from: • HELAM: Technical issues – system quality • WEBLEI: Information structure and design activities • WEBLEI: Qualia • Online engagement scale (Krause & Coates, 2008) • The Technology Acceptance Model (Davis, 1993) can be used to explore the influence of technology.
Individual	Teachers	Attitude towards computers and technology Attitude towards learners Technological experience Teaching experience Subject knowledge Response time* Feedback* Support Provision of information	Can be measured through questionnaires, interviews and focus groups. Response time and feedback can be investigated using online platform data. There are few published instruments focussing on teacher perspectives. • Reed (2014): Learners' attitudes to technology in education.
	Learners	Attitude towards computers/technology Attitude towards learning Attitude towards teaching staff Motivation to take the course Study habits Technological experience Prior knowledge & learning experience Convenience Autonomy Perceived usefulness Perceived enjoyment Peer interaction/support* Group working and collaboration*	Can be measured through self-report questionnaires, interviews and focus groups. Existing elements could be taken from: • Peer-engagement scale (Krause & Coates, 2008) • Student-staff engagement scale (Krause & Coates, 2008) • WEBLEI: Co-participatory activities • WEBLEI: Emancipatory activities • HELAM: Learner's perspectives • HELAM: Instructor attitudes • Sun et al. (2008): Learners' attitudes to technology.

Table 4: Framework for evaluating blended learning (continued)

Level	Variable	Elements	Measurement
Outcomes	Learner satisfaction	With course (overall) With learning With teaching Utility of course for future plans/education	Can be measured through self-report questionnaires. Existing elements could be taken from: • Sun et al. (2008): Perceived learner satisfaction • NSS: Contribution of course to knowledge, skills and development.
	Student engagement	Psychological and cognitive engagement Behavioural engagement Emotional engagement	Can be measured through self-report questionnaires. Behavioural engagement can be investigated using online platform data. Existing elements could be taken from: • Academic engagement scale (Krause & Coates, 2008): psychological/cognitive engagement • Intellectual engagement scale (Krause & Coates, 2008): psychological/cognitive engagement • NSS: Elements of behavioural and cognitive engagement.
	Course outcomes	Grades and marks Online activity Attendance Drop out rates	Can be measured using the online platform data and teacher reports.

*Note: These elements entail the communication, interaction and collaboration aspect of the framework.

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