

The science behind Blended Learning

Encouraging a more evidence based approach in higher education





The science behind Blended Learning

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The series 'The Science behind Blended Learning' on SURF Communities is a collaboration of SURF's Special Interest Group (SIG) Blended Learning and Vraagbaak Online Onderwijs. Each month they provide readers with one relevant article on blended learning and an inspiring question.

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Introduction

This book contains a curated collection of 12 articles from the monthly series 'The Science behind Blended Learning'. We firmly believe that progress is achieved through small steps, and that each step towards a more evidence-based approach to teaching and learning is significant. In order to encourage and support those involved in teaching and learning the Special Interest Group (SIG) Blended Learning initiated a monthly series of concise articles on the SURF Communities website titled 'The Science behind Blended Learning.'

The purpose of the Special Interest Group Blended Learning

An evidence based approach in blended learning means that lecturers, their trainers and advisors base their teaching and training work on scientific and proven results from educational literature. The SIG Blended Learning aims to motivate and support three different target groups in order to intensify their evidence based approach towards blended learning:

- Lecturers;
- Trainers / Coaches / Educators in Professional development in teaching and learning;
- Advisors and Supporting staff of lecturers (for example ICTO).

The SIG Blended Learning also stimulates these three groups to reflect on and to evaluate their own educational practice. We encourage and praise all lecturers, trainers and advisors who use blended



learning in their educational practice or who would like to start using blended learning principles to do this in a structured scientific way, which means evidence informed and evidence based (Image 1):

1. use research results from the literature to make relevant choices about their own education practice (i.e. how to teach students; how to support/train/professionalize lecturers)
2. reflect, evaluate and do research in their own educational practice.

An informative series for everyone involved in teaching and learning

The primary goal of 'The Science behind Blended Learning' is to offer easily accessible knowledge on the topic of blended learning. Each month, a member of the SIG selects a recent scientific publication on blended learning and shares key findings and why the article is worth reading. At the end of each article, readers are encouraged to reflect on how the research discussed aligns with their own teaching practices. In this book, you'll find details about the research questions, methodology, and data collection methods used by the researchers in each article (image 1). We emphasize a crucial outcome from each suggested scientific paper and explain why the SIG sees it as essential reading. You can use the QR code provided to read the articles online directly.

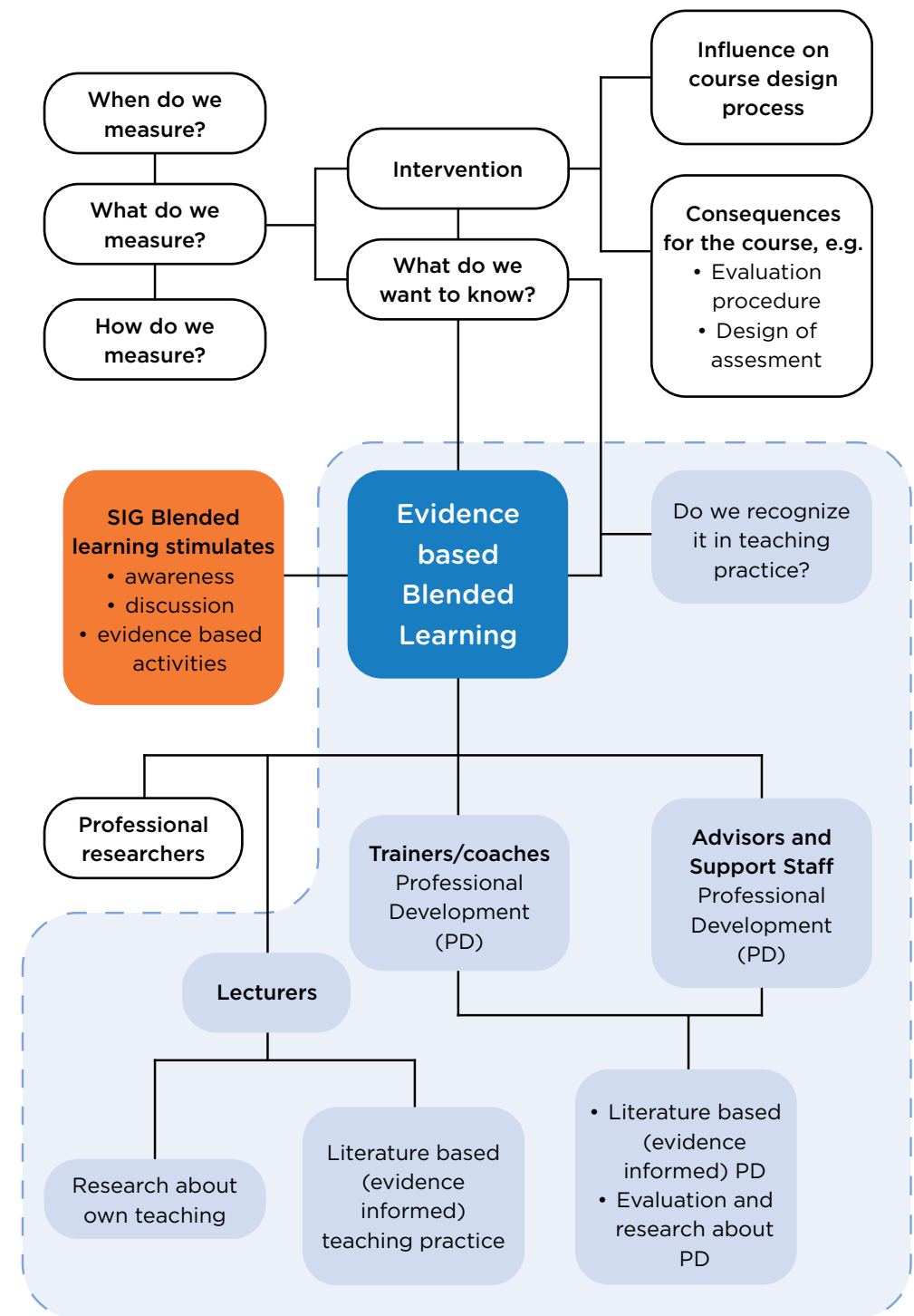


Image 1.

The twelve collected research papers are classified into three main groups based on the perspective from which research on blended learning is conducted:

- **students' perspective** of blended learning (articles marked with the colour green). The research deals with the perception of learning, experiences with blended learning, and the learning success.
- **lecturers' perspective** (articles marked with the colour orange). The articles in this category handle teaching strategies, instructional design, and professional development in teaching and learning.
- **meta perspectives** (articles marked with the colour blue). This category includes articles that propose new models for blended learning and make predictions based on Learning Analytics.

Bridging the gap between theory and practice

The Blended Learning Special Interest Group is keenly interested in how the publications featured in the series 'The Science behind Blended Learning' align with the realities of higher education. On June 7, 2023 the SIG therefore organized a meeting at Breda University of Applied Sciences. Six publications from the series were discussed in small groups. Here you can find an overview of that day. In the last chapter of this book we thoroughly examine the publications highlighted in the series 'The Science Behind Blended Learning.'

We delve into the insights gathered from the discussion groups on June 7, addressing three critical questions:

- Can you relate to the scenarios described in the paper within your own professional practice?
- Can you (do you) implement the findings of this research in your practice?
- Do you have any recommendations for the authors regarding further research? Which recommendations resonate with you? Would you be interested in participating in such research?

We invite you, the reader, to consider how each article and its scientific content relates to your educational practice. Do the questions posed by the researchers strike a chord with your experiences? Feel free to visit the SURF Community Blended Learning online to share your thoughts and experiences: <https://communities.surf.nl/blended-learning>.

All members of the SIG Blended Learning hope you will thoroughly enjoy this publication.



Article 1 | Teaching strategies

Strategies to foster student engagement in blended learning

Natasa Brouwer



Strategies employed by teachers fertile ground to optimize student engagement in blended learning.

What to expect in this article

This study provides an overview of strategies by lecturers from different disciplines to increase students' behavioral, emotional and cognitive engagement in blended learning. Therefore 20 semi-structured interviews with lecturers are analysed. The role of digital tools to engagement is also mentioned. The strategies are categorized in three groups: (a) course structure and pace, (b) teaching and learning activities, and (c) teacher's role and relationships.

What strategies do teachers use to foster student behavioral, emotional and cognitive engagement in BL?

Why we think this article is a must-read

This article addresses student engagement, one of the key components of successful learning. The central research question is: What strategies do teachers use to foster student behavioral, emotional and cognitive engagement in BL?

This article is particularly interesting because it analyses and categorizes the strategies of lecturers in various disciplines from social sciences and humanities to natural sciences in higher education, from different perspectives. This article is a source of recent literature on blended learning as a "fertile ground to optimize student engagement" and references are given to the studies specifically focused on blended learning engagement. This research is a qualitative study that aims to provide an in-depth understanding of what teachers do.



What do the researchers measure in this paper?

The researchers investigate teachers' strategies to foster student engagement in BL in higher education.

How do the researchers collect data?

They conduct semi-structured interviews with the lecturers.

This study emphasizes the importance of fully exploiting and integrating both modes (synchronous and asynchronous) in BL in order to optimize student engagement.

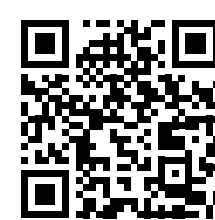
Questions to think about

- Do you recognize it in your practice?
- If you are a lecturer, which of the three strategies described in the article is most natural in your teaching practice or in the practice of your lecturers if you have a different role?
- Do you think that the strategies to foster student engagement are somehow dependent on the discipline, context or culture?

Strategies to foster student engagement in blended learning

Publication: Heilporn, G., Lakhal, S., & Bélisle, M. (2021). An examination of teachers' strategies to foster student engagement in blended learning in higher education. *International Journal of Educational Technology in Higher Education*, 18(1), 1-25.

Read this article online



Article 2 | Students' experiences

Peer feedback in a blended learning environment

Tanja Beks



Insights into peer review procedures, students' reflections on collaboration, and the comparison between peer feedback and teacher feedback in blended learning environment.

What to expect in this article

This study examines the nature of peer feedback during a collaborative writing assignment in a blended learning environment. The central questions in this article are: What are the characteristics of a collaborative writing product in a blended learning environment? And what effect does peer feedback have on the revision of a text in the context of a joint writing assignment in an online environment?

What are the features of collaborative writing in a blended learning environment? What effect does peer feedback have on the revision of a text within the framework of a collaborative writing task in a virtual environment?

Three methods of collaboration are used:

- joint production, where the students work simultaneously on the same task,
- sequenced production, where a student starts with the assignment and then passes it on,
- mirror production, in which all students work individually and in parallel and cooperation arises during the peer reviews and evaluations.

This research provides insight into the peer review process, the content and function of peer feedback, students' reflections on collaboration and, finally, peer feedback versus teacher feedback.



The majority of students indicate that a blended learning environment has a positive effect on their motivation because they are encouraged to reflect more critically on their writing.

Why we think this article is a must-read

Peer feedback and e-peer feedback aren't always experienced as valuable by students and lecturers. And in many cases the quality of the given peer feedback is perceived as unsatisfactory. This month's article demonstrates the opposite, in a blended learning environment.

These are the main conclusions from this study:

- Students indicate that they have learned more from giving peer feedback than from just receiving feedback from the lecturer.
- Feedback given by peers encourages students to critically reflect on their own writing.
- The majority of students indicate that a blended learning environment has a positive effect on their motivation because they are encouraged to reflect more critically on their writing.

Although unintended, different methods of collaboration are used in the research. These provide tools to use in your own teaching practice. One critical note is in order here though: the blended learning environment is somewhat underexposed in the conclusions of this study.

What do the researchers measure in this paper?

The researchers investigate experiences of students about collaborative writing in a blended learning environment and the effect of peer feedback on the revision of the written texts in a virtual environment.

How do the researchers collect data?

They introduced the intervention: collaborative writing assignments and peer feedback. They collect data with evaluation survey, qualitative interview with groups and a face-to-face session with all participants.

Questions to think about

In your teaching practice do you recognize that peer feedback is not always done justice? Despite the fact that you consider peer feedback a valuable tool for students to help each other substantively.

Peer feedback in a blended learning environment

Publication: López-Pellisa, T., Neus, R., & Rodríguez-Gallego, F. (2021). Collaborative writing at work: Peer feedback in a blended learning environment. *Education and Information Technologies*, 26(1), 1293-1310.

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Article 3 | Perception of learning

Measuring actual learning versus feeling of learning

Joyce Dekens



Active learning is more effective than passive lectures, even though students often perceive it differently. Strategies to improve students' acceptance and guidance in active learning.

What to expect in this article

In this research passive lectures are compared to active learning using identical course materials. Researchers found that in the active classroom students learned more but they felt they learned less. Students were also more positive about passive lectures. This of course stands in the way of successfully implementing active learning. The researchers discuss a few strategies to improve students' response to being actively engaged in the classroom. Properly guiding students in active learning in order to get on top of their own learning process is one of the recommended strategies.

What is the difference between students' self-reported perception of learning with their actual learning using (1) active instruction (following best practices in the discipline) and (2) passive instruction (lectures by experienced and highly rated instructors)?



Why we think this article is a must-read

When lecturers first experiment with active learning they are often afraid of negative reactions from their students. Some students simply want to hear their lecturer explaining the theory rather than looking for the answers themselves in an active setting. This article argues why it is important to maintain the activating learning style and

that students' perception of learning is often incorrect. The article also provides strategies on how to take students along in active learning.

Student evaluations of teaching should be used with caution as they rely on students' perceptions of learning and could inadvertently favor inferior passive teaching methods over research-based active pedagogical approaches

What do the researchers measure in this paper?

The researchers measure the experiences of students and their performances related to teaching strategies.

How do the researchers collect data?

They use questionnaires for students and assessment results.

Questions to think about

- In your own practice, do you experience a difference between actual learning versus students' feeling of learning?
- Does this article convince you and your (colleagues) to design more active learning?

Measuring actual learning versus feeling of learning

Publication: Deslauriers, L., McCarty, L. S., Miller, K., Callaghan, K., & Kestin, G. (2019). Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom. *Proceedings of the National Academy of Sciences*, 116(39), 19251-19257.

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Article 4 | Professional development in teaching and learning

Professional development for blended learning in higher education

Natasa Brouwer



A comprehensive evaluation framework for continuous professional development for university teaching staff in blended learning emphasizes the importance of technology, infrastructure, and changes at the institutional level.

What to expect in this article

This research looks at blended Learning from the perspective of continuous professional development of university teaching staff about blended learning. The approach of this research is to discuss how the professional development initiatives are evaluated and what we can learn from this. The authors use Guskey's five-layer framework that takes into account participants'

What are the common findings for participants' reactions? How is participants' learning evaluated?

responses, what they learned, organizational support and change factors, how participants use the new knowledge and skills, as well as student outcomes in the courses related to the studied professional development initiative. Authors conclude that especially at universities where lecturers have to divide their time between teaching and other tasks, special attention is needed for technology and infrastructure. The authors show that evaluation should take place at all five levels, with special attention to the changes at the institutional level.

Why we think this article is a must-read

The transforming of courses into a blended format is to enhance student learning, rather than just replacing face-

to-face lectures or making use of an additional learning platform. To make this change, professional development in teaching and learning is indispensable. The aim of the professional development initiatives for the university teaching staff is to help them implement effective teaching approaches to improve student learning outcomes.

Evaluation is an important element for development of blended learning that ensures transparency, continuity and efficient allocation of institutional resources. This study provides an overview of how best to organize the evaluation of professional development of academic teachers about blended learning and it gives recommendations on how to approach integration of evaluation into professional development initiatives for blended learning.

What are the factors of organizational support and change? How is “Participants use of new knowledge and skills” measured? What were the student outcomes?

What do the researchers measure in this paper?

They look at what is being done in the professional development initiatives in each of the 5 levels of the Guskey's evaluation model.

How do the researchers collect data?

They analyse what other researchers have published about the effects observed in each of the 5 levels of the Guskey's evaluation model.

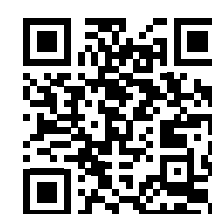
Questions to think about

- Can you recognize this in your institution?
- How is professional development for blended learning organized at your institution?
- Do you evaluate it?

Professional development for blended learning in higher education

Publication: Garone, A., Bruggeman, B., Philipsen, B., Pynoo, B., Tondeur, J., & Struyven, K. (2022). Evaluating professional development for blended learning in higher education: a synthesis of qualitative evidence. *Education and Information Technologies*, 1-30.

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Article 5 | Models

Blended learning as Instructional Model in Vocational Education: Literature Review

Jean Jamin



Significance and methodology of blended learning in vocational education, highlighting the benefits of flexibility, improved learning outcomes, and efficient teacher involvement.

What to expect in this article

This article explains blended learning and its meaning and importance in vocational education. It concerns a meta-analysis of 45 publications. These are each briefly explained schematically, indicating for each publication, among other things, which methodology was used, what the limitations were and what the most important

What is the blended learning model in vocational education?

findings are. A number of learning models are also described and the advantages that are attributed in the studies to working with blended learning. These include flexibility for learners, improved learning outcomes and the more effective use of the teacher in the learning process.

Why we think this article is a must-read

This article refers to 45 separate – perhaps partly less obvious – sources, each of which could be of interest. With the analysis and interpretation of all these sources, even the teacher who is not involved in blended learning on a daily basis, can quickly obtain an overview of the possibilities and advantages that are attributed to its use. Furthermore, the article provides a brief explanation of learning models that can be a starting point for exploring the possibilities in one's own situation.



What do the researchers measure in this paper?

The researchers study the models described in published studies and use data contained in published studies.

How do the researchers collect data?

They collect published papers through carefully designed literature study.

Four models for blended learning in vocational education:

1. Rotation model (consisting of rotation model, lab rotation, and flipped individual classroom rotation),
2. Flex model,
3. Self-blend model,
4. Enriched-virtual model

Questions to think about

- Do you want go back or are you already back to 'normal on campus education', or do you continue to do a number of learning activities online?
- Are you consciously looking for a mix in which on-campus and online learning activities reinforce each other?
- If so, is this article and its sources helpful?

Blended learning as Instructional Model in Vocational Education: Literature Review

Publication: Krismadinata, U. V., Jalinus, N., Rizal, F., Sukardi, P. S., Ramadhani, D., Lubis, A., Friadi, J., Syaiful Rahman Arifin A. & Novaliendry, D. (2020). Blended learning as instructional model in vocational education: literature review. *Universal Journal of Educational Research*, 8(11B), 5801-5815.

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Article 6 | Instructional design

How face-to-face activities impact the success of Blended Learning

Peter Dekker



Effectiveness of face-to-face activities in blended learning and their crucial role in integrating higher-order learning, boosting engagement, and fostering social interaction.

What to expect in this article

This review study of 59 studies investigated what makes face-to-face activities effective as a component in blended learning. Pedagogically, the face-to-face meeting plays an important role in blended learning. Learning activities, students and lecturers come together and integration takes place. There can be several reasons for you to choose a face-to-face learning activity. In this review study, the authors highlighted a variety of face-to-face activities related to three predominant pedagogical objectives:

- processing higher-order learning;
- increasing engagement;
- stimulating social interaction.

Which face-to-face activities are used, and what are their main characteristics? What is empirical evidence about the effects of face-to-face activities on student learning?



For each category, the authors describe which learning activities were implemented and how they were related to online learning activities. In all studies they found a positive effect in achieving the formulated learning objectives, although the researchers also state that there is a broad variation in the methods used to determine the learning objectives. The authors also cite the Community of Inquiry (Col) model, among others. Based on the

results, the authors call for the design of rich face-to-face activities in blended learning. Further systematic research into the topic of the face-to-face dimension of blended learning in higher education is needed. Such research should focus more on the role of teachers, as well as the physical layout of educational spaces.

There has been less focus on the face-to-face dimension of blended learning and there is a danger that face-to-face activities are not prioritized in designing for better student learning, missing out on important learning opportunities.

Why we think this article is a must-read

Many people still associate blended learning with emergency remote teaching we were forced into due to the covid pandemic. So why would online and face-to-face teaching together work well? Wouldn't it work better without the online component? On top of that, past research has mainly focused on the online component of blended learning. This study makes it clear that the success of blended learning also rests on the quality of the integrated face-to-face activities. Based on this review study, face-to-face activities should have a focus on either higher-order learning, and / or increasing engagement and / or creating social interaction.

What do the researchers measure in this paper?

They look at which face-to-face activities are used and what the observed effect is.

How do the researchers collect data?

They analyze what other researchers have published in 59 carefully selected studies published in the literature.

Questions to think about

- Within your institution, is blended learning still framed negatively?
- Is there a window to start the conversation about the added value of blended learning?

How face-to-face activities impact the success of Blended Learning

Publication: Buhl-Wiggers, J., Kjærgaard, A., & Munk, K. (2022). A scoping review of experimental evidence on face-to-face components of blended learning in higher education. *Studies in Higher Education*, 1-23.

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Article 7 | Professional development
in teaching and learning

TPACK and Multimodal model as a framework for designing and implementing blended learning

Tanja Beks



Experiences with blended learning, emphasizing the use of the TPACK model for effective teaching with technology, while also considering the Multimodal model for course design.

What to expect in this article

This article presents a case study from Ireland on students' and lecturers' experiences of designing and implementing blended learning. In this study the TPACK model (Mishra & Koehler, 2006) and Multimodal model (Picciano, 2009) are used. TPACK is a framework for technological pedagogical content knowledge that provides lecturers with support to teach effectively with technology. TPACK is the main focus in this article. Multimodal is a design model for instruction and focuses on course content and materials and invites the lecturer to offer a wide range of learning activities to students.

What are the affordances and constraints of relevant existing conceptual models to explore teaching, learning and pedagogy in student and faculty experiences in blended learning programmes?



Besides focusing on the use of the two models, the article also reveals the factors that impact students' perceptions of their learning and performance in blended learning. For instance, students find curriculum flexibility important and it is (again) confirmed that professional development and adequate training are indispensable in the implementation of blended learning.

It's easy to think adding an LMS i.e. 'Blackboard' or 'Moodle' to your class strategy is going to enhance learning but TPACK demonstrates that there's a relationship between technology, content, and pedagogy, and the purposeful blending of them is key.

Why we think this article is a must-read

The reason for selecting this article is my interest in the TPACK model and how this design model can support blended learning educational design. The SIG Blended Learning has previously analysed ten design models and TPACK might be a good addition.

In addition, the case study provides more insight into the importance of face-to-face activities for students and the tendency of lecturers to overcompensate because they provide online teaching. The authors also make some observations, such as lecturers' assumption that students are sufficiently ICT competent to deal with educational assistive technology. And the fact that students are not always given a proper introduction to blended learning. My view is that the less obvious research findings from this article can be helpful for lecturers who involved in blended learning.

What do the researchers measure in this paper?

They measure the perception of blended learning, in particular the perception of the interaction using two models: TPACK and Multimodal model.

How do the researchers collect data?

They collect qualitative data in interviews with students and lecturers using qualitative case study approach.

Questions to think about

- What's your opinion on the TPACK model?
- Is it a model you would use when developing blended education?

TPACK and Multimodal model as a framework for designing and implementing blended learning

Publication: Foley, T., & Curtin, A. (2022). BLENDED LEARNING: THE "NEW NORMAL" IN EDUCATION DELIVERY. *International Journal of Distance Education and E-Learning*, 7(2), 21-34.

Read this article online



Article 8 | Perception of learning

Student perspectives on learning experiences in a higher education active blended learning context

Jean Jamin



Students' experiences with 'Active Blended Learning' (ABL) and the factors that influence their learning process.

What to expect in this article

This article deals with the experiences of students with 'Active Blended Learning' (ABL) at a number of universities in the United Kingdom. In the context of a university-wide introduction of ABL, a study was conducted into which factors students consider to be either helpful or unhelpful to their learning process. Based on a thematic analysis, data was collected on learning experiences, social experiences and the support experienced by students.

What are students' perceptions of Active Blended Learning (ABL) in relation to their learning, social and support experiences?

The article explains ABL: the social-constructivist design, the physical learning environment (without lecture halls), working with student teams, partnerships between students and teachers and connecting practice and theory. The active aspect of ABL and the blended aspect are both addressed.

It describes the research methodology and the students' findings. For example, students appreciate regular synchronous and asynchronous interactions with peers, lecturers, and the content made possible by the design and use of digital resources. Students see an important role for the tutor. Support is not only regarded important in an academic sense, but also aimed at student well-being. A picture emerges in which the obstacles are



What are students' perceived enablers and barriers to successful learning experiences in the context of the institutional shift to ABL?

addressed as well. For example, the use of technology is not perceived as optimal and the students' own contributions are also critically examined.

Why we think this article is a must-read

The article, which was published fairly recently, mainly deals with the students' perspective. At the same time, the research is set up in such a way that lessons can be learned with regard to an implementation process of blended learning in general. The article will evoke recognition in many professionals in higher education on various aspects. Thus, it may contain suggestions for their own situation. Learning with and in practice, working and learning with peers, connecting synchronous and asynchronous online and physical learning, the learning environment, the role of the lecturer and the behaviour of the student, are issues that many in higher education deal with on a daily basis. Finally, the explicit use of – if not the addition of – active learning to blended learning makes this an interesting article.

In Active Blended Learning students view support as a holistic, all-encompassing term that integrates academic and pastoral aspects. The boundaries between the different types of support are viewed as artificial and even unhelpful.

What do the researchers measure in this paper?

They measure students' experiences (learning, social, and support) as a result of a pedagogic shift to Active Blended Learning.

How do the researchers collect data?

They conduct focus groups between 15 and 30 minutes long and audio recorded them.

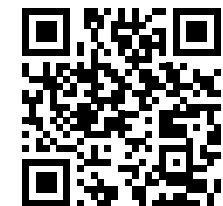
Questions to think about

- To what extent is blended learning also active learning in your situation? What do your students think of the use of blended learning? Do you use blended learning to better connect theory and practice? These are all questions that arise from this article.
- And more in general: What lessons can you learn from this research, for your own situation?

Student perspectives on learning experiences in a higher education active blended learning context

Publication: Armellini, A., Teixeira Antunes, V., & Howe, R. (2021). Student perspectives on learning experiences in a higher education active blended learning context. *TechTrends*, 65(4), 433-443.

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Article 9 | Models

Learning Technology Models that Support Personalization within Blended Learning Environments in Higher Education

Jean Jamin



Emerging models, platforms, and related opportunities to implement personalized learning in higher education blended learning settings.

What to expect in this article

This article describes the results of an integrative literature review of models that support personalization of student learning within blended learning environments in higher education. Based on 84 selected studies, reports, dissertations, etc., three 'models' – as such referred to in the article – are found that individually or in combination with each other can support personalization of studying in a blended learning environment: digital badges (micro-credentialing), adaptive learning technology and competence-based learning. The article identifies the models with regard to their qualities; strengths and weaknesses and gives examples of organizations where they are used.

Which emerging technology models can support personalization in higher education? What are the potential benefits and challenges of integrating personalized learning technology models in higher education settings?

The trend towards more personalized higher education and its benefits are discussed, as well as the challenges, barriers, theoretical and practical implications of implementing a personalized learning approach in higher education. It paints the picture of a complex challenge in which we are only at the beginning. Finally, recommendations for future research are discussed.

Adaptive learning, competency-based learning, and digital badges can support the implementation of personalized learning in higher education, which then has the potential to change the landscape of higher education.

Why we think this article is a must-read

The article attempts to answer two questions through a literature review:

- Which emerging (technology) models can support personalization in higher education?
- What are the potential benefits and challenges of integrating personalized (learning technology) models in higher education?

In higher education, the trend towards more personalized learning is undeniable. Labeled talent-oriented education, flexible education or personalized education, efforts are being made to gradually abandon one-size-fits-all education in favor of education that is based on the individual learning needs of the student.

This article provides starting points. Although it is suggested that it is still quite a challenge to really grow towards personalized learning; in the review many good practices have been found. These are mentioned with examples of the organizations concerned. If desired, they can be further researched. That is also an explicit recommendation: according to the article, much more research is needed and the article provides suggestions for this. In any case, a conclusion is already drawn in the article: without learning technology it is hardly possible to achieve adequate personalization.

What do the researchers measure in this paper?

They investigate experiences about the personalized learning in higher education.

How do the researchers collect data?

They conducted a literature study and carefully selected relevant publications for their study.

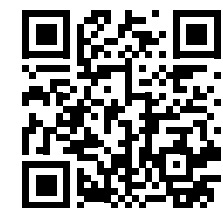
Questions to think about

- Is there flexibilisation in your curriculum and is it based on the individual learning wishes of students?
- If so, what points of reference or recognition do you find in the article or the cited sources?
- What do you think? Should we personalize or not (and why)?

Learning Technology Models that Support Personalization within Blended Learning Environments in Higher Education

Publication: Alamri, H. A., Watson, S. L., & Watson, W. H. (2021). Learning Technology Models that Support Personalization within Blended Learning Environments in Higher Education. *TechTrends*, 65(1), 62-78.

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Article 10 | Models

How students take more direction in their learning experience

Natasa Brouwer



The PEBIL (Personalized, Evidence-based, Inclusive Learning) model to accommodate diverse student needs while acknowledging the importance of in-person teaching alongside digital resources.

What to expect in this article

This article describes a study on the experiences of students with e-learning resources (ELRs) in blended learning. The aim was to define what students currently need to learn effectively. All students found that a good ELR should be interactive and engaging, and that ELRs should stimulate active learning and facilitate studying at their own pace. In addition, an ELR should present content in a concise way and enable students to consolidate information. What this means exactly can differ per student and can change over time.

Which platforms and interactive activities enhance the student learning experience? In which contexts is this best facilitated? What model of blended learning connects this and is tailored to students' needs?



The authors have developed a new model for blended learning, the PEBIL (Personalized, Evidence-based, Inclusive Learning) model, which encourages teachers to investigate what their students need to learn and what tools they use in different situations, taking into account individual differences. This study also revealed that students explicitly expect a variety of methods and that ELRs should not completely replace in-person teaching.

Why we think this article is a must-read

This article introduces a new model for blended learning, the PEBIL (Personalized, Evidence-based, Inclusive Learning) model, which is developed based on well-known educational principles and takes into account the need for evidence-based higher education. By working in an evidence-based way, it remains possible for the lecturers (institutions) to offer personalized and inclusive education.

Well-structured blended learning allows students to learn at their own pace at a time of their choosing and prevents students from simply being a passenger in their own learning experience and passively participating in the activities. The authors emphasize four crucial characteristics of e-learning resources (ELRs) that students must be satisfied with to effectively learn: (1) interactivity, (2) engagement, (3) appropriate length and complexity of the material, and (4) stable quality of the material, for example, no outdated information.

What do the researchers measure in this paper?

They investigate student perceptions of e-learning resources (ELRs), and student experiences with blended learning approaches.

How do the researchers collect data?

They conducted a survey and collected quantitative data. Qualitative data were collected from free-text items in the survey.

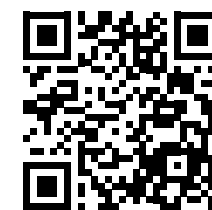
Questions to think about

- Do you recognize this in your institution?
- Does blended learning education at your institution comply with the PEBIL model?
- If yes, how do you evaluate this?

How students take more direction in their learning experience

Publication: Hassoulas, A., de Almeida, A., West, H., Abdelrazek, M., & Coffey, M. J. (2023). Developing a personalised, evidence-based and inclusive learning (PEBIL) model of blended learning: A cross-sectional survey. *Education and Information Technologies*, 1-18.

Read this article online



Article 11 | Predictions

The effects of internal and instructional conditions in predicting academic success

Koos Winnips



Students matter the most in learning analytics. To measure what works in blended learning designs, we must look at the specific instructional approach, and how it fits to student.

Which students actions in the LMS should be measured to predict academic success? To what extent instructional context and to what extent internal conditions can explain the variability in the final course grades?

What to expect in this article

This study looks for indicators that explain academic success in blended learning courses in the same discipline, and with the same instructional approach (problem based learning). Further, it studies to what extent the instructional context and individual student features determine the final grade of students. Models were built and tested for several types of interactions of the students within the course's learning management system. It was found that factors of overall course engagement (time spent online, regular discussion forum posts and regular weekly course access) contributed to course success. But more so, individual factors were more important. This points to the need to capture data about individual students, that fits with the specific instructional design.

Why we think this article is a must-read

To learn what factors are important for the success of blended learning, this article shows we need to use analytics that are connected to the educational approach used. New findings from this study are that regular



posting in the forum, and regular weekly course access has effects on student success. Also this study shows a need to start using analysis tools that focus on specific instructional designs. So, to measure if the blended course design works, we should make the measurement tools specific. As in this case: the use of the course forum is highly relevant to the problem based learning format of the course. This helps us better measure the effects of blended course designs and which design fits which student.

Regularity of discussion forum postings is a significant factor for student success in this study. This is relevant here because many of the courses in this study are PBL based, and thus needed regular forum postings. So, success factors should fit with the learning approach used.

What do the researchers measure in this paper?

They study students behavior data in a digital learning environment.

How do the researchers collect data?

They collect learning analytics data (log database of the LMS) from 15 blended learning courses (50 course editions) at one university.

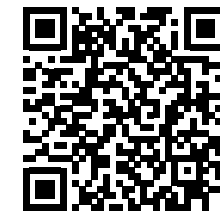
Questions to think about

- Do you recognize the importance regular course access by students and participating in discussion forums as important factors of student success?
- Or, do you use a different educational approach, and thus use different factors to measure success?

The effects of internal and instructional conditions in predicting academic success

Publication: Jovanović, J., Saqr, M., Joksimović, S., & Gašević, D. (2021). Students matter the most in learning analytics: The effects of internal and instructional conditions in predicting academic success. *Computation & Education*, 172, 104251.

Read this article online



Article 12 | teaching strategies

Increasing study success using peer-learning self-regulation strategies

Bianca van der Aalst



Facilitating peer learning self-regulation strategy enables students to get involved in their learning process and improve their academic performance.

What to expect in this article

This article describes a study of a novel approach for scaffolding student peer-learning self-regulation strategies in a blended learning environment. The researchers conducted an experiment among a group of 120 third-year software engineering students. In this approach peer groups are formed based on the learning potential of the individual students and the affinity they have with the group. In addition, the educational design encourages group interactions that facilitate and stimulate peer learning in small groups. Incentives are offered to stimulate social behavior. The research shows that effective online self-regulation strategies for peer learning consist of preparing and inspiring students to prevent social laziness and refusal to participate. It is important to facilitate and fully involve students in the actual online peer-learning discussion. The results show significant improvements in students' academic performance when using this approach.

What strategy teachers can use to pull up lower skilled or weaker students in a group?



Why we think this article is a must-read

Although it is a small-scale experiment and therefore requires further research, it raises an interesting topic. One of the challenges in designing and implementing effective blended education is the difficulty students have with self-regulating their learning process, while this

determines success in the online component of blended learning. In this article, the researchers link this challenge to the power and added value of peer learning. In this article, the researchers link this challenge to the power and added value of peer learning as shown in previous research. Peer learning, in turn, can increase student engagement, improve cognitive processing and increase student self-confidence.

This study has illustrated and explained the importance of peer learning self-regulation strategy, the logistics of forming small groups in educational settings, the relationship between learning technologies/systems and human behavior to better understand blended learning.

What do the researchers measure in this paper?

The researchers investigate the power of a scaffolding strategy to support peer learning and self-regulation to improve students' academic performance.

How do the researchers collect data?

The researchers conduct the experiment using their scaffolding strategy in the experimental group of students and they compare the results with the results obtained in the control group. The researchers collect the data of students' performance on a pre and a post-test in both groups.

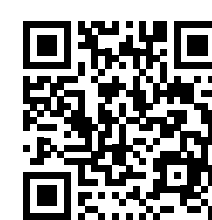
Questions to think about

- Do you recognize the difficulty students have in self-regulating the learning process, especially in the online part of blended education?
- Do you see possibilities to address self-regulation with this teaching strategy?
- Do you maybe have any experience or experiment with this yourself?
- If yes, are your observations comparable?

Increasing study success using peer-learning self-regulation strategies

Publication: Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2021). An approach for scaffolding students peer-learning self-regulation strategy in the online component of blended learning. *IEEE Access*, 9, 30721-30738.

Read this article online



Discussion

In this section, you will read an analysis on how the authors of the 12 research papers approach their research. And we describe the results of a discussion on how the published research connects to our educational practice.

Education research can be conducted in various ways, depending on the specific information we seek and the data collection opportunities available to us. The publications in this book vary in terms of their research methods, what they measure, and how they collect data. The researchers in this series employ diverse research methods, including qualitative, quantitative, and mixed methods, and they gather data from various sources, such as:

- Interviews (1, 2, 6, 8)
- Survey (2, 3, 10)
- Behaviour (11) and performance (assessment) data (3, 11, 12)
- Literature study – analyzing other research (4, 5, 6, 9)

The aim of the series 'The Science behind Blended Learning' is to make the results of scientific publications accessible to practitioners in higher education: lecturers, trainers, coaches involved in professional development in teaching and learning, and advisors and support staff for teaching and learning. The articles within the SURF Communities are read an average of 250 to 1400 times. However, readers do not often provide feedback on how this relatively recent research aligns with their teaching practice.

To learn more about how the science behind blended learning is applicable to our present day practice, the SURF Special Interest Group Blended Learning organised a meeting at Breda University of Applied Sciences (BUAS) on 7 June 2023. The meeting was attended by education innovation professionals, consultants and teachers from several Dutch universities. Six of the publications collected in this booklet (2, 3, 4, 6, 7, 9) were discussed in small groups of 8-10 participants, focusing on the following question: 'How does this research publication align with your teaching practice?' This question was supported by three sub-questions:

A. Do you recognize the situation described in the paper in your practice?

All six discussion groups recognised the situations from the research articles in their own teaching practice. The experiences from their teaching practice reflected different aspects of concerns and benefits of the published research. This can be summarised in the following points:

- little use of active learning methods at the institution
- (lack of) evaluation of professional development activities
- support for teachers in the pedagogical use of digital technology and professional development in teaching and learning
- students value traditional methods over active learning methods
- positive experiences with peer feedback



B. Could you (do you) apply the results of this research to your practice?

The responses to this question were diverse. The group that discussed **paper 2** (López-Pellisa et al. 2021) found the results of this paper very applicable to their teaching practice, as peer feedback is frequently used.

On the other hand, the group that discussed **paper 3** (Deslauriers et al. 2019) found this paper very suitable as a tool to advocate the importance of active learning, but did not find it sufficient. The requirement to achieve positive student evaluations (from education management) can make it challenging for teachers to persist in using active blended learning, even if it leads to better learning outcomes. It is important that teachers get support from colleagues in using active learning methods, even with lower evaluations. And they should be given the necessary time to change the institutional culture. The discussion group for **paper 3** also suggested that it would be a good idea to inform students about the results.

The discussion group for **paper 4** (Garone et al. 2022) found this paper useful because it provides extensive information on effective evaluation practices. Currently, training for blended learning is evaluated, but the focus is primarily on users' experiences with Learning Management Systems (LMS). The feedback received is often not systematic, and established models like Guskey's or Kirkpatrick's are not consistently followed. Most evaluations remain at the level of participant reactions (Level 1 of Kirkpatrick's model). The group also expressed concerns that conducting evaluations at a professional level can be time-consuming, and

implementing them without a cultural change may prove challenging.

Participants who discussed **paper 6** (Buhl-Wiggers et al. 2022) regarding the face-to-face component in blended learning concluded that authentic learning tasks, conducted within learning teams, are highly appropriate for structuring face-to-face meetings. This design provides the strongest foundation for achieving optimal learning results. This design creates good preconditions for social interaction and student involvement, and encourages higher-order learning.

Paper 7 (Foley&Curtin, 2022) suggests professionalizing lectures through the use of TPACK and the Multimodal model, which can serve as a valuable guideline. However, the group had some reservations. The results described in the paper are derived from interviews and the experiences of a specific group of lecturers, which may not be easily reproducible in other contexts.

For the group discussing **paper 9** (Alamri et al., 2021), the paper served as a catalyst for a constructive discussion about the desirability of personalizing education, its connection with flexibility, and the role that blended learning could play in achieving this goal. They largely concurred that the blended organization of education offers significant advantages and may even be a prerequisite for enabling more personalized learning.

C. Provide the authors any recommendations for further research? Which recommendations do you find relevant? Would you like to participate in that research?

Most papers provide a list of recommendations for further research, except for **paper 2** (López-Pellisa et al., 2021), which does not offer any suggestions in this regard.

During the discussion groups in Breda, the questions about initiating their research did not result in concrete research intentions. Nevertheless, the group that discussed **paper 2** (López-Pellisa et al., 2021) proposed that it would be beneficial to conduct some interventions using a control group. They also expressed interest in comparing peer feedback online versus face-to-face. The group that discussed **paper 3** (Deslauriers et al., 2019) expressed concerns about the growing consumer-oriented attitudes that could hinder the introduction and acceptance of active learning methods. The group that discussed **paper 4** (Garone et al., 2022) emphasized the importance of creating space and time for lecturers and providing support for the team to encourage more reflection and evaluations, which would be a significant improvement and a step toward evidence-based practice.

Conclusion

We intend to continue 'The Science behind Blended Learning' series on SURF Communities and encourage reading one scientific publication each month, aiming to align or even apply the results to one's own teaching practice. This is a small effort but a significant step toward cultivating constructive discussions about the potential of blended learning for deep and flexible learning in higher education.



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