

Blended Learning That Works: Inclusion, Student Partnership and Performance

Dr Salman Shahid

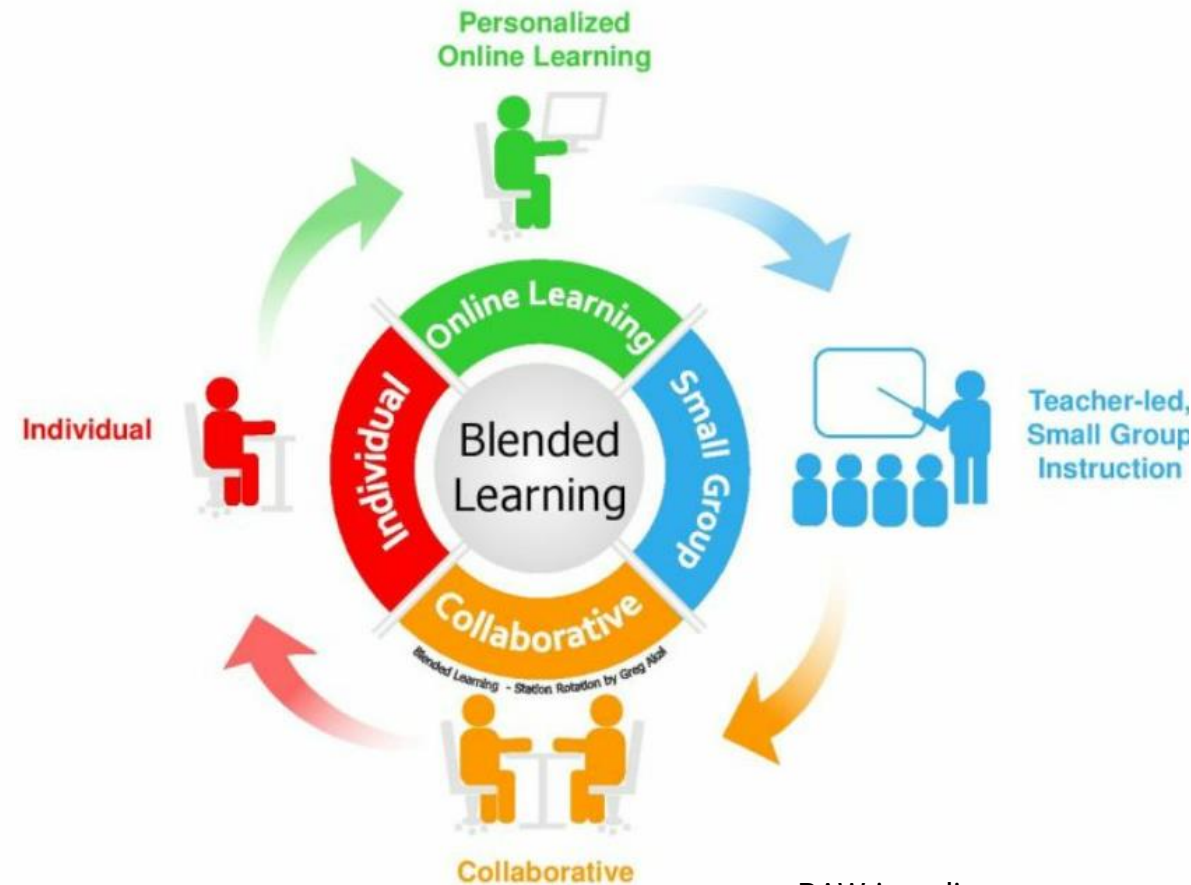
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What We Mean by Effective Blended Learning



Effective blended learning is an intentional sequence — asynchronous resources prepare students for active, interactive synchronous sessions, which in turn consolidate understanding and drive measurable outcomes including satisfaction, motivation, and academic performance.

Blended ≠ Recorded Lectures

Simply uploading recordings is not blended learning. It is passive content delivery with added complexity.

Blended = Intentional Learning Design

True blended learning aligns asynchronous and synchronous elements to build knowledge progressively, with each mode serving a distinct pedagogical purpose.

Blended Learning — Previous Research

What the evidence shows

- Blended learning yielded higher average scores compared to non-blended learning.
- No significant differences between academic achievement, grade dispersions and gender performance differences in Blended learning settings.
- **The Gap in Research:** While blended learning is gaining popularity, there's a need for more research **how students interact with blended learning** and how can improve its **design especially in advanced level**.



Why This Study Matters

The Challenge

Students are increasingly diverse, bringing different needs, contexts, and expectations to higher education.

International students navigating new systems

Commuting students with limited campus time

Students balancing work and study

Neurodiverse learners

Students with differing digital confidence

The Key Question

Effective blended learning must be:

✓ Inclusive

✓ Accessible

✓ Effective

✓ Performance-Enhancing

Research Questions

- 1 Which student characteristics predict blended learning success?
- 2 Which design features drive positive learning outcomes?
- 3 What combination of factors best predicts success?

Methodology

Participants

100 MSc Chemical Engineering students. The cohort was intentionally diverse:

- A good balance of local and international students
- Range of prior digital learning experience
- Mix of full-time and part-time modes

Student Partnership

Students were involved at every stage — from questionnaire design and pilot testing through to data interpretation and resource development to making recommendations.

Data Collection

A validated survey instrument captured student perceptions across six constructs: learning management, digital confidence, BL perceptions, LMS engagement, task–technology fit, and synchronous interaction.

Analytical Approach

01

Descriptive Statistics

Profiling the sample and key constructs.

02

Independent-Samples t-Tests

Comparing subgroups by background characteristics.

03

Multiple Regression

Identifying significant predictors of each outcome variable.

Conceptual Framework

Student Characteristics

Learning management skills

Opinion of blended learning

Family support and social environment

Information technology literacy

Gender and age

Design Learning Features

Engagement with blended learning

Actual usage of LMS and its tools

Task-technology fit

Synchronous features and support

Satisfaction
Motivation
Perceived learning
Performance

Effectiveness
indicators

Measurement Scales

A table showing all the scales used in the study with their reliability (Cronbach's alpha) values.

Scale	Reliability	Scale	Reliability
Online tools and resources		Attitudes towards blended learning	
Usability	.82	Learner autonomy	.86
Navigation	.76	Quality of instructional methods	.68
Content	.87	Course structure	.70
Perceived usefulness	.84	Course interface	.89
Interactions		Interactions	.75
Student-student interaction	.68	Computer competence	.73
Student-content interaction	.70	Family support	.67
Student-instructor interaction	.81	Social support	.66
Technology quality		Workload management	.68
Availability	.69	Motivation	
Quality of materials	.77	Interest and enjoyment	.89
Internet reliability	.70	Perceived competence	.75
Moodle LMS	.77	Effort	.69
Face-to-face support	.84	Pressure/tension	.64
Self-regulation		Usefulness	.74
Goal setting	.68	Satisfaction	
Environment structuring	.72	Instructor	.68
Task strategies	.81	Course content	.66
Time management	.70	Technology	.71
Help seeking	.66	Interactions	.75
Self-evaluation	.682	Face-to-face sessions	.66

Learning Outcomes

Motivation

- Interest and enjoyment in tasks
- Effect/Importance
- Pressure/Tension
- Value/usefulness

Satisfaction

- Technology used
- Face-to-face sessions
- Interactions
- Instructor/Course content

Perceived Learning

- Discovery
- Accomplishment
- Knowledge construction

Performance

Demonstrated ability and achievement in tasks and assessments.

What Makes Students Successful?

Regression analysis revealed that not all student characteristics carry equal weight. Three factors emerged as the most powerful predictors of positive blended learning outcomes:



3 Digital Confidence

Students who felt capable of navigating digital tools engaged more fully with asynchronous content and LMS resources.



2 Positive BL Perceptions

Students who entered with a favourable view of blended learning reported higher satisfaction and motivation throughout the module.



1 Learning Management Skills

The ability to plan, organise, and self-regulate was the single strongest predictor of blended learning success across all outcome measures.



Students who can organise, plan, and self-regulate benefit most from blended learning — suggesting that supporting these skills is as important as designing content.

What Makes Blended Learning Work?

Beyond what students bring, the design of the learning environment itself powerfully shapes outcomes. Three design features proved most influential:

Synchronous Interaction

Live sessions featuring problem-solving, Q&A, and discussion were the strongest design predictor of student satisfaction, motivation, and self-reported learning.

Task-Technology Fit

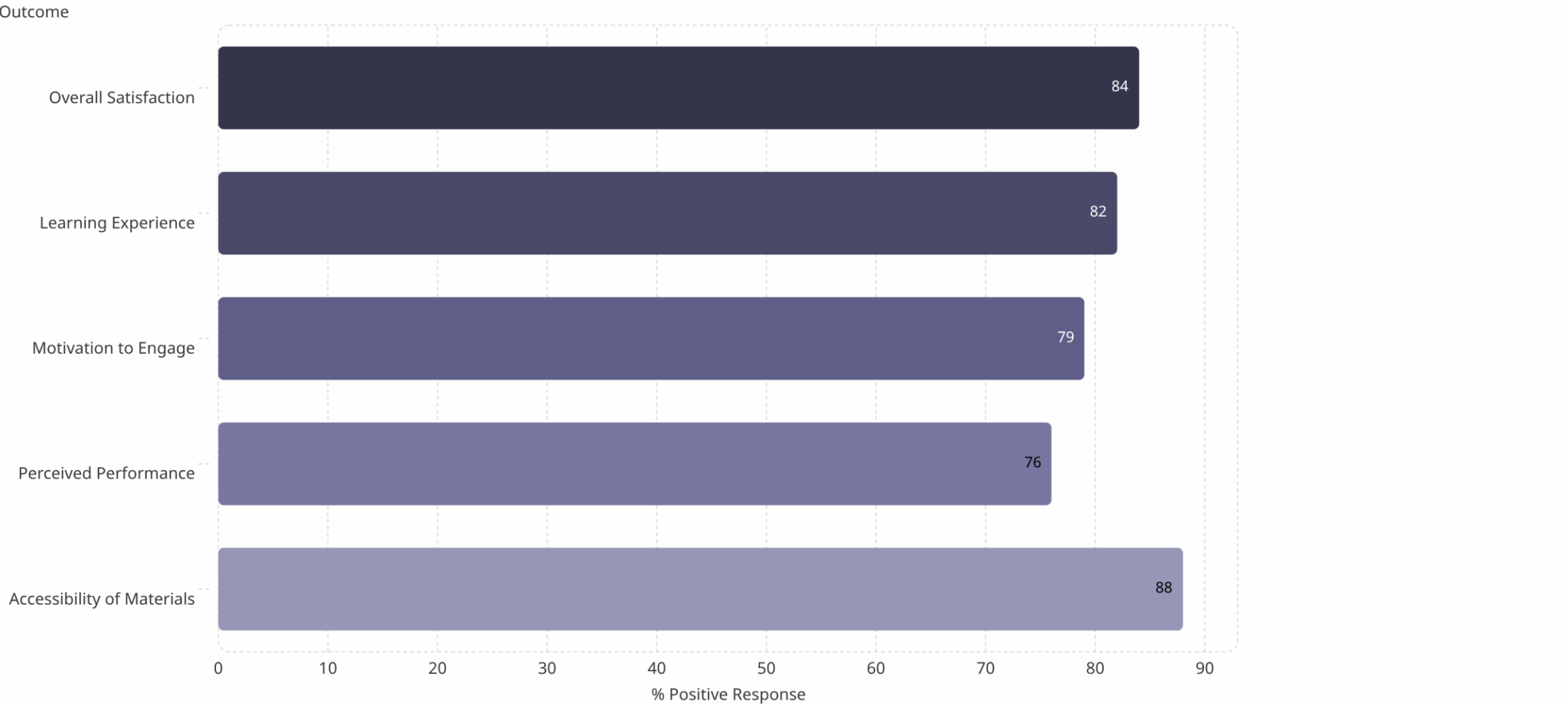
When digital tools genuinely matched the demands of learning tasks – rather than adding friction – students engaged more deeply and reported better outcomes.

LMS Engagement

Structured, well-signposted Canvas pages that students used regularly were associated with higher performance and motivation.

Technology itself does not improve learning. Good design does.

Effectiveness of Blended Learning: What Students Reported



More than **80% of students reported positive learning experiences** across core outcome measures. Accessibility of materials received the highest rating, reinforcing the central argument that inclusive design directly supports student engagement and performance.



Chemical Engineering Blended Learning Guide

Student Partnership and Resources

(Developed by Student Partners)

Topic	Details	Specific tool guides	
Blended learning	Provides a justification of what blended learning is, why we are adapting to blended learning, how to design blended learning content, and what freedom you have as a lecturer when constructing blended learning materials	Front Page Banner Icons in titles Link to pages	Link to topic
Virtual learning spaces	Provides guidance on what is important in a virtual learning space, what the students want to see in a virtual learning space, how to plan a virtual learning space, what software is good for virtual learning spaces and how to use them, and what tools can be implemented in a virtual learning space	Blackboard Adobe sparks Padlet Quizlet Interactive graphs AnswerGarden PDF Displays	Link to topic
Pre-recorded videos	Provides guidance on what is important to keep in mind when producing pre-recorded videos, how to plan a pre-recorded video, and what tools work the best for pre-recorded videos	PowerPoint Record Camtasia	Link to topic
Synchronous sessions	Provides guidance on what is important when designing a synchronous session, and what activities work well in a synchronous session	Kahoot , Mentimeter , Socrative , Microsoft Forms , One-note	Link to topic
Assessments	Provides instructions on how to plan continuous coursework, and what to keep in mind to provide a fair assessment		Link to topic
Academic Advising	Lays out a set of tools that can be used to enhance your academic advising sessions and enhance the blended learning experience for yourself and your advisees		Link to topic
Useful resources	Gives all the tools provided by the department to enhance your experience with blended learning and lecturing materials		Link to topic
Student feedback	Outlines the feedback gathered from student surveys and other feedback provided by students on how blended learning materials should be designed		Link to topic

Example: Contents Page

Week 1 will cover a basic introduction to the main techniques and applications of public speaking skills, showing you why it is important to develop strong public speaking abilities. The informational parts are all found on this page, and you are expected to interact with these on your own time. We will then have a discussion in class to expand our views on what public speaking can be.

ILO's:

1. Knowing what public speaking is
2. Know the difference between public speaking in front of large and small groups
3. Be able to recognize the importance of precise public speech

Office hours: Thursday 29th September, Engineering Building A, 2A.007

Asynchronous Materials

1. [Introduction to Public Speaking](#) (Video 5 mins)
2. [Different Applications of Public Speaking](#) (Video 10 mins)
3. [Why do we need public speaking abilities](#) (Padlet)
4. [Introduction to Public Speaking in Front of Larger Groups](#) (Video 14 mins)
5. [Tutorial Questions 1 and 2](#)
6. [Introduction to Public Speaking in Meetings](#) (Video 13 mins)
7. [Tutorial Questions 3 and 4](#)
8. [Preparations for synchronous session](#)

Synchronous Session

1. Presentation and recap lecture (30 mins)
 2. Group problem-solving (45 mins)
 3. Group discussion of possible answers (30 mins)
 4. Q&A session (15 mins)
- Room 2A.010 is available for independent problem-solving with a GTA during the entire session



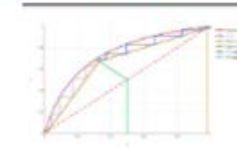
Tuesday 27th September
10.00 - 12.00
Engineering Building 2A.014

Module Timetable

Wk	Topics	Tutorial Problems	Activities	Location	Important dates
26th Sept	1. Introduction to something 2. Introduction to something else	Q1 - Q2		Engineering Building, Theatre	
27th Oct	3. A type of operation 4. Another type of operation	Q3 - Q4		Engineering Building, Theatre	
19th Oct	5. A practical method 6. One more method	Q5		Engineering Building, Theatre	
17th Oct	7. More in-depth of the method	Q6 - Q7 Q8 - Q9		Engineering Building, Theatre	Wednesday 19th October: Online Blackboard quiz 11.00 am - 12.00 pm
22nd Oct	8. Practical design 9. Another application	Q10 - Q11		Engineering Building, Theatre	
31st Oct	10. Links to final operation 11. A similar application	Q12 - Q13	Peer-review	Online via post	Feedback 31st November: continuous coursework release
29th Nov			Industry guest lecture	Online via post	
14th Nov	12. What method to use	Q14		Engineering Building, Theatre	
11th Nov	13. Multi-stage operations	Q15		Engineering Building, Theatre	
23rd Nov				Engineering Building, Theatre	Wednesday 23rd November: Exam for continuous coursework (subject 27th)

Interactive Tools for a Blended Learning Space

Enabled: Statistics Tracking



Interactive Graphs



AnswerGarden



Padlet



Quizlet

Feedback

Enabled: Statistics Tracking

What is Feedback?

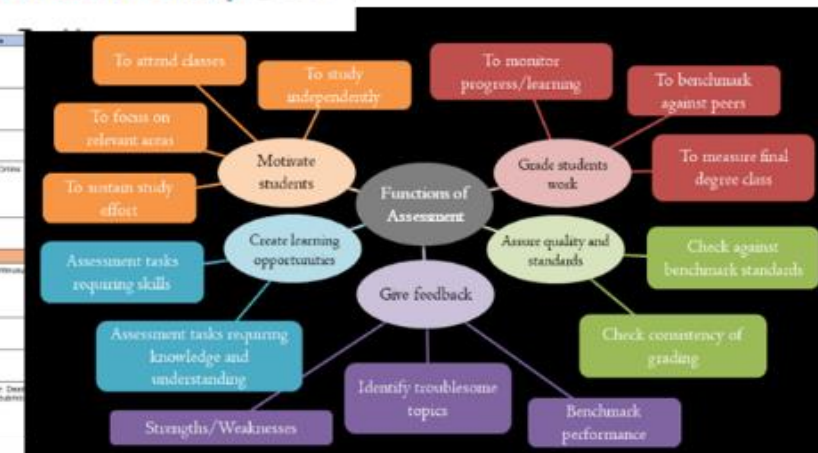
Standard against which the student is assessed



Gap between student's skill and knowledge and the desired standard

Level at which the student is performing

Assessment Reasons Mind Map



Inclusion and Accessibility by Design

Accessibility Features

→ Multiple Formats

Video, text, audio, and interactive quizzes to suit different learning preferences.

→ Recorded Content with Captions

Enables re-watching, flexible timing, and access for deaf or hard-of-hearing students.

→ Structured Canvas Pages

Consistent, predictable module layouts reduce cognitive load and aid navigation.

→ Flexible Access

Clear signposting allows students to find materials without requiring staff support each time.

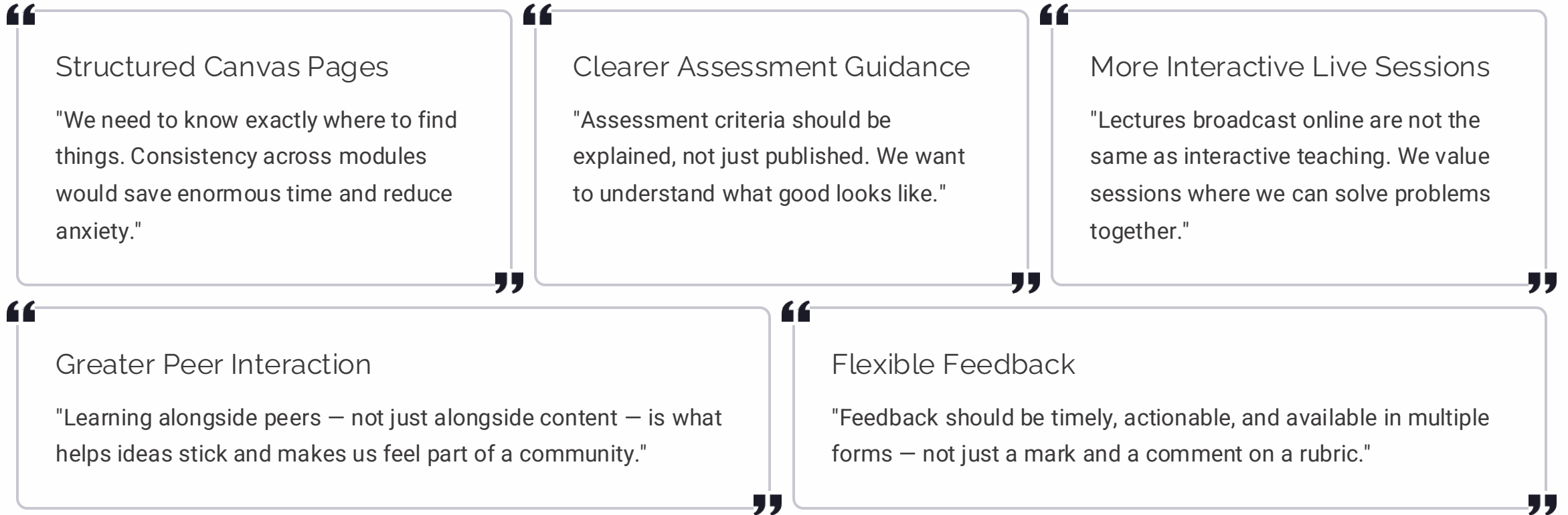
Removing Hidden Curriculum Barriers

Many students — particularly international and first-generation learners — struggle not with content, but with unspoken academic norms. Inclusive design makes these expectations explicit:

- Explicit assessment expectations from the outset
- Consistent module structures across units
- Transparent and timely assessment guidance
- Accessible, actionable feedback

Student Voice: Key Recommendations

When asked directly, students were clear and consistent in what they needed to learn effectively in blended environments. These recommendations emerged from the qualitative partnership strand of the research.



Implications for Curriculum Design

01

Design for Flexibility

Provide asynchronous content that students can access on their own schedule, reducing barriers for commuters, international students, and those in employment.

02

Design for Inclusion

Build accessibility in from the outset – multiple formats, captions, structured navigation, and explicit expectations should be standard, not supplementary.

03

Design for Interaction

Prioritise meaningful synchronous sessions over passive content delivery. Live time should be reserved for problem-solving, discussion, and feedback.

04

Design for Self-Regulation

Scaffold learning management skills explicitly – through structured study guides, progress checkpoints, and formative opportunities – especially early in the programme.

05

Design With Students

Embed student partnership throughout the design cycle. Students surface barriers, challenge assumptions, and generate solutions that staff alone cannot.

Conclusion: Blended Learning Works When...

Students Self-Manage

Strong learning management and self-regulation skills are the most powerful student-level predictor of success.



Technology Fits the Task

Digital tools must serve learning purposes – when technology aligns with task demands, engagement and outcomes improve.



Synchronous Engagement is Meaningful

Live sessions must go beyond broadcast – interactive problem-solving and discussion are what drive motivation and learning.

Accessibility is Built In

Inclusive design from the start – not retrofitted – ensures all students can participate and perform.



Students are Partners

Co-designing with students produces more relevant, more accessible, and more effective learning environments.

The future of blended learning is not more technology – it is better design, greater inclusion, and genuine partnership with students.

Acknowledgements

My hearty thanks go to

- Dr Thomas Rodgers
- **Marius Norbye**
- Omar Aldaihani
- Rayhan Rachmansyah Alfaridzi
- Odeneho Agyemang-Duah

Change starts with questions

Thank You

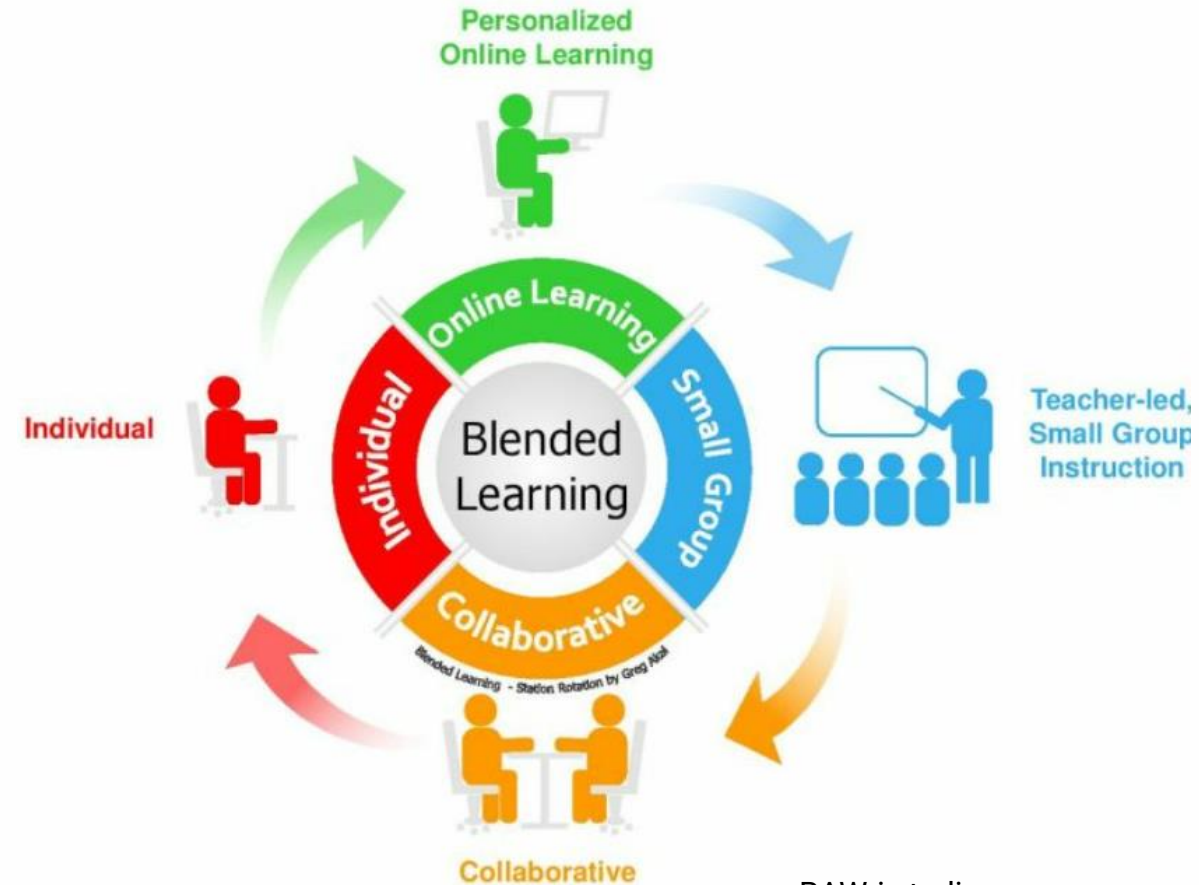


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