Dynamic Digital Scaffolding:

An approach to encourage autonomous learning using intelligent automation

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Atlantic Technological University

Introduction

This research project aims to increase autonomous learning using digital scaffolded resources. The over-arching aim is to move away from the 'one size fits all' approach to online learning.

*Autonomous - having the freedom to govern itself or control its own affairs.

Research Questions

"Which of the implemented teaching strategies provide the most effective scaffolded supports in an online learning environment?"

"Which learning modalities are most effective in engaging students in an online learning environment?"

# Research Topics

Independent Learning

Independent Learning is a very important skill for HE but "is poorly understood by students and is seen by politicians as a poor substitute for face to face teaching" (Hockings et al. 2018)

Adaptive Learning

The most effective adaptive learning environment:
- Monitor user activity,
- Interpret/infer preferences,
- Represent these inferences using appropriate models,
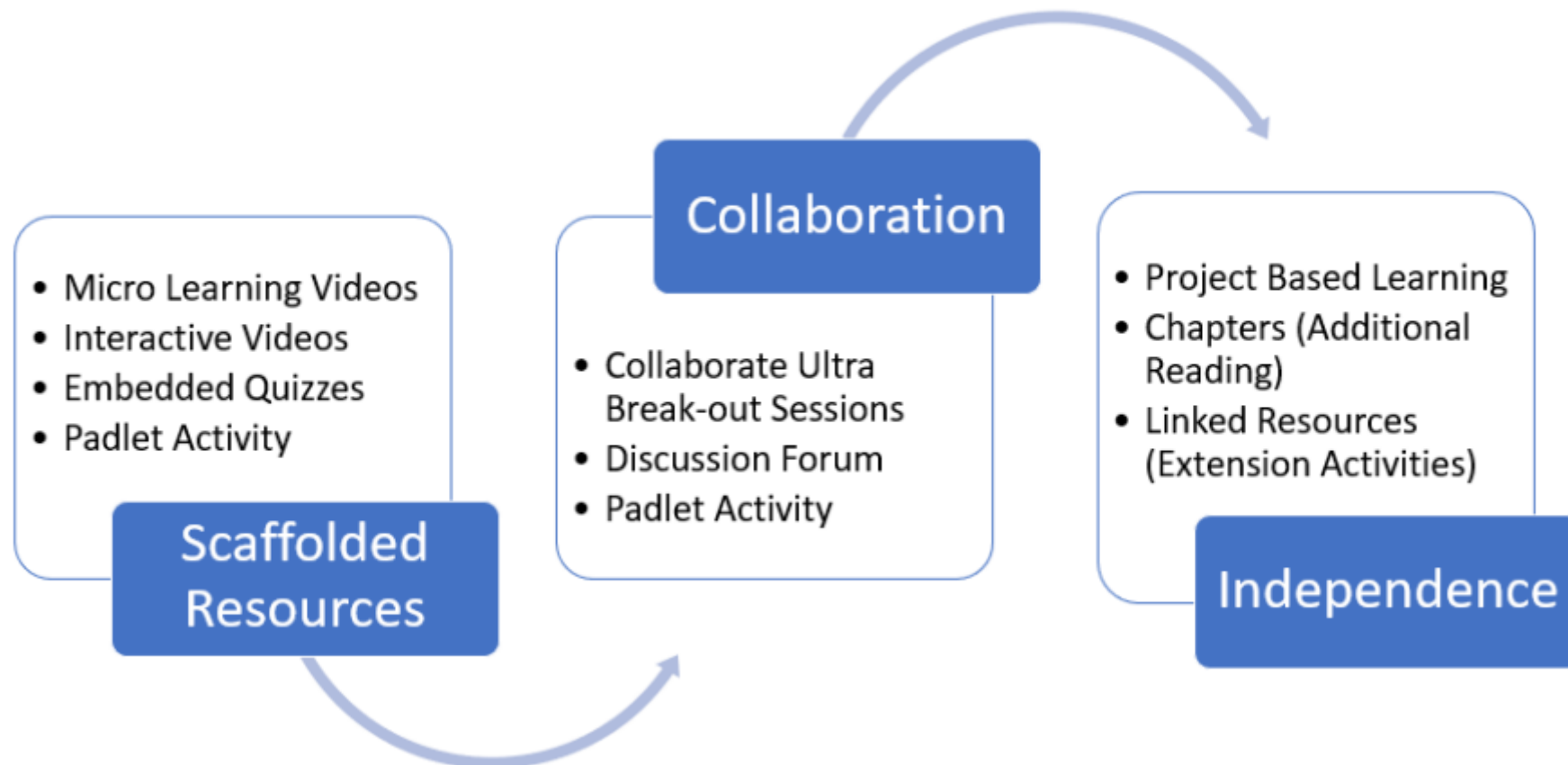- Use inferences to dynamically facilitate learning.
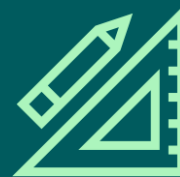
Micro/Nano Learning

Micro/Nano Learning is breaking units of learning or activities up into smaller units/ activities so they are more consumable by students.
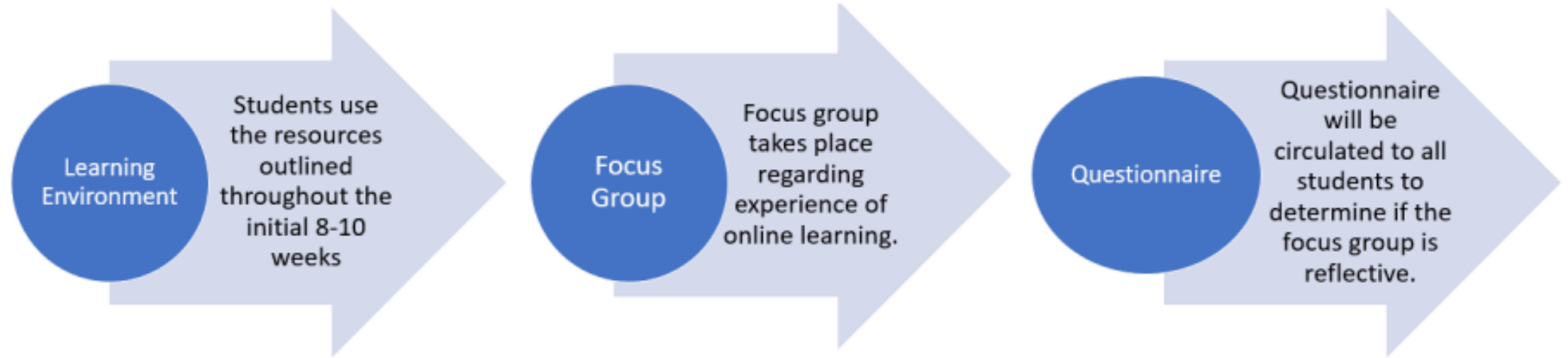
Digital Scaffolding

Digital scaffolding should only provide a temporary structure in the same manner as in a traditional classroom environment, it should eventually lead to self-regulated behaviour (Liu et al. 2022)

Teaching Strategies & Resources

Scaffolded Resources
- Micro Learning Videos
- Interactive Videos
- Embedded Quizzes
- Padlet Activity

Collaboration
- Collaborate Ultra Break-out Sessions
- Discussion Forum
- Padlet Activity

Independence
- Project Based Learning
- Chapters (Additional Reading)
- Linked Resources (Extension Activities)

Research Plan

Thematic Analysis

The focus group was transcribed using Otter.ai and this transcription was analysed using Nvivo. The following themes were identified in the thematic analysis:

- Flexibility
- Independence
- Online Learning (Collaborative Learning, Interactivity & Quizzes)
- Previous Education

Theme	Count
Flexibility	15
Independence	8
Online Learning	16
> Collaborative Learning	12
> Interactivity	11
>> Quizzes	3
Previous Education	7

Questionnaire Results

Question	Yes	No
Did you feel that the session was more interactive when there were small challenges/tasks to complete?	100%	0%
Did you feel like you were "part of a class" by being more connected to your peers during the live sessions?	93.3%	6.7%
Did you feel more engaged when the lecturer used their camera during the session to show their face as they were talking?	93.3%	6.7%
Did you feel that your learning was supported during the live sessions?	86.6%	13.4%
Did you experience any internet connectivity problems that prevented you from completing any of the live sessions?	20%	80%
If you missed any live sessions (not as a result of connection issues), did you watch them back at a later point?	100%	0%
Do you prefer asking questions of your peers in an app such as WhatsApp where the lecturer does not have access?	73.3%	26.7%
If you had a question about a topic on the course, would you contact your peers before contacting the lecturer?	60%	40%
If you are not doing something during a live class (and are just listening to the lecturer talking about a concept), do you feel that you lose concentration?	53.3%	46.7%
Are quizzes at the end of each online live session helpful in supporting learning?	93.3%	6.7%
Are quizzes at the end of each pre-recorded video helpful in supporting learning?	100%	0%

Questionnaire Results

13. There was a mix of multiple learning formats at different weeks throughout the course (all live sessions, half life/half pre-recorded and fully pre-recorded). Which learning format did you prefer most?
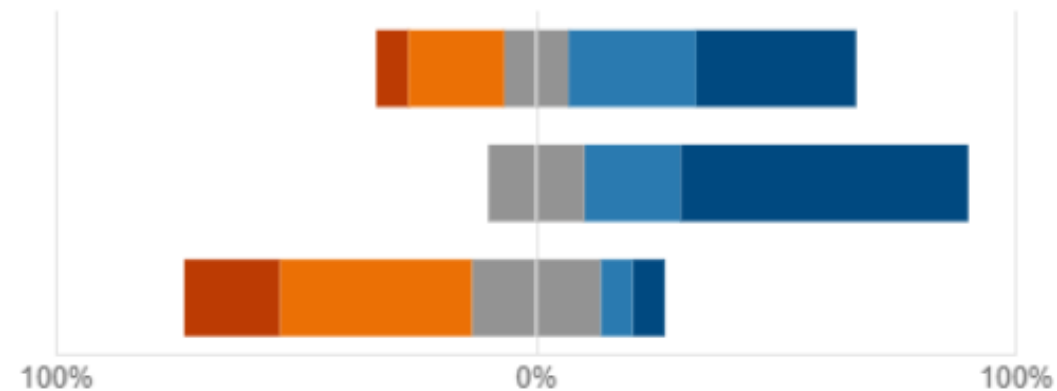
More Details

■ Least Preferable ■ Less Preferable ■ Neutral ■ Preferable ■ Most Preferable

All Live

Half Live / Half Pre-Recorded

Fully Pre-Recorded

100%   0%   100%

Questionnaire Results

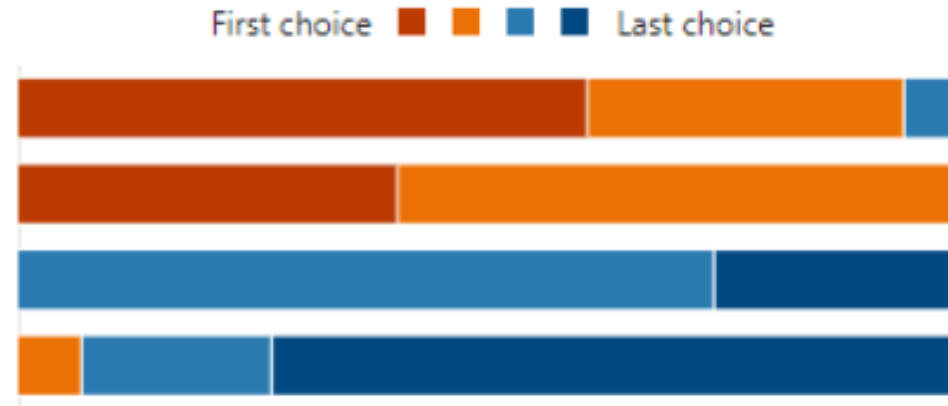14. When looking for help from your peers on the course, which of the tools identified below did you find the most useful?

More Details

Rank	Options
1	BlackBoard
2	WhatsApp
3	Microsoft Teams
4	Slack

First choice ■ ■ ■ ■ Last choice
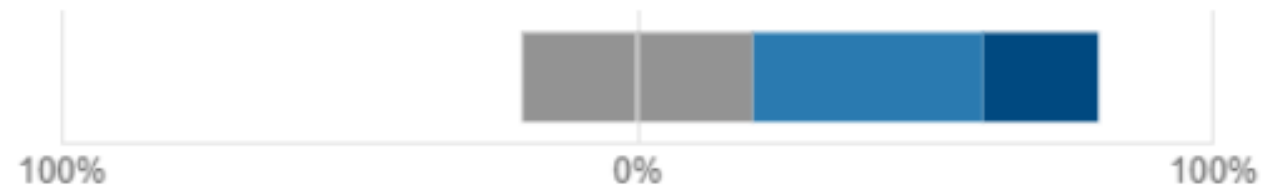
Questionnaire Results

16. Do you agree with the following statement? "Getting a chance to talk to your peers in a 'break out' session on BlackBoard Collaborate allowed you to feel more like you were in a class environment."

More Details

■ Strongly Disagree ■ Disagree ■ Neutral ■ Agree ■ Strongly agree

Talking to my peers in a 'break out' session allowed me to feel more like I was in a class environment.
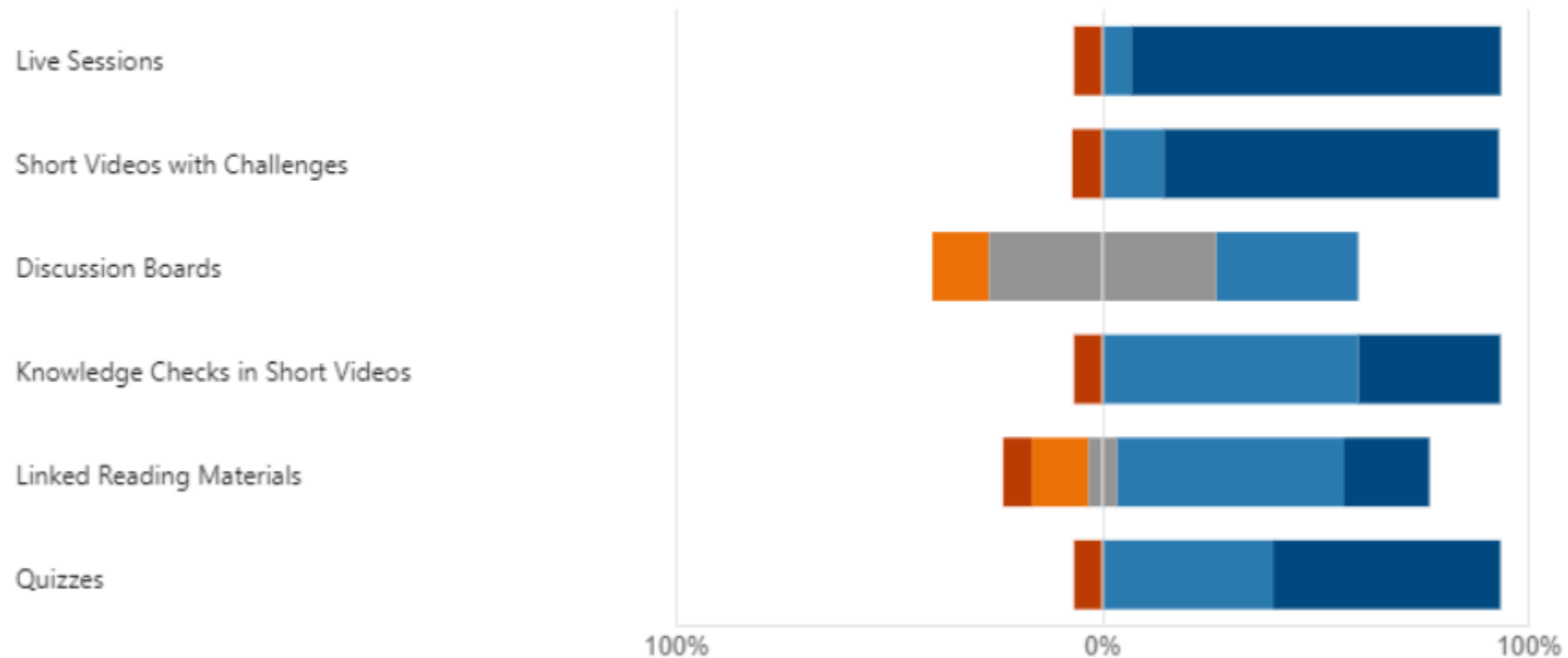
100%   0%   100%

Questionnaire Results

18. How helpful did you find the following learning tools?

More Details

■ Very unhelpful ■ Somewhat unhelpful ■ Neither helpful nor unhelpful ■ Somewhat helpful ■ Very helpful

Discussion

- Both the focus group data and the questionnaire support that the video content was the most helpful resource outside of the live sessions.

- The quizzes and knowledge checks were also very highly scored in the questionnaire. This is evidence that there is a positive impact from the dynamic digital scaffolds. However, further research will be required to determine how effective each of these supports are.

- In this research the main support was the embedded quizzes with linked resources or additional videos if the student answers the question incorrectly.

- There was also collaborative learning and co-creation activities that could have an impact on learner satisfaction, these can also be considered as a scaffolded resource.

- Students did not want to learn passively, responded well to interactive content and collaboration opportunities. They responded more to the visual learning and kinaesthetic than any other modality.

Limitations

The results of this research were interesting and warrant a further longitudinal study with a more diverse group of subject domains.

Thank you for listening.

Any Questions?

ATU Donegal

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