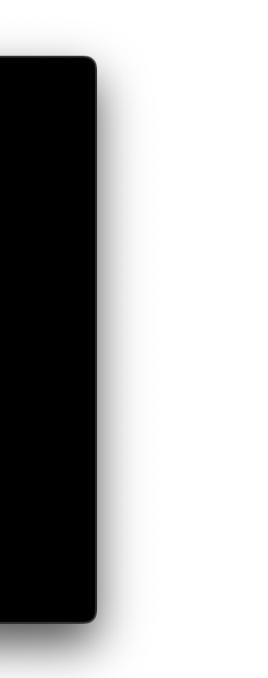
Enhancing Student Autonomy in Technical Education through Structured Workflows

### *My Teaching Context*



## Context and the Challenge

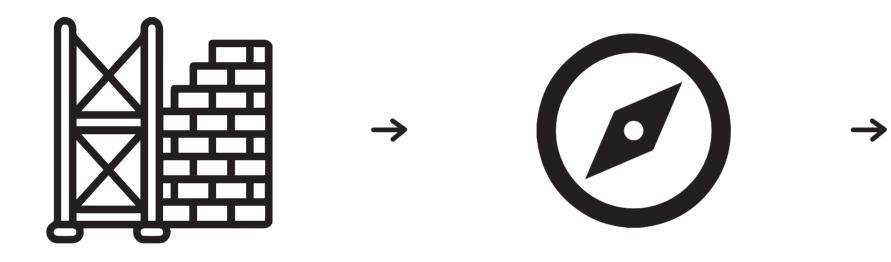




# How can a structured workflow incorporating scaffolded and flipped learning models enhance student autonomy and teaching efficiency in technical education?



Research Aims



Supportive

## Autonomous



## Flexible

## Initial Concept | Learning Pathway

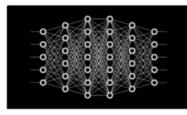


Advanced Wearable Technology & Physical Computing Prototyping: An Advanced Workshop



This Advanced Workshop Focus's On The Powerful Combination Of Raspberry Pi's & Python.

Exploring Al/LLM's for Wearable Tech & Physical Computing: A Hands-On Beginner's Workshop



Learn About Current AI Workflows For Wearable Technology & Computing! Introduction to The Internet of Things (IOT): A Beginner's Workshop



Discover How Everyday Objects Can Interact With Each Other Over The internet. Dive Into The Basics of IoT. CAD/CAM in 3D Modelling for Circuit Enclosures: A Beginner's Workshop



Dive into 3D design with Fusion 360! Learn to create custom enclosures for your circuits!



Steps Taken, In Order

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### End Goal

### The 'Learning Pathway Document' and its Core Elements

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ual: Document version: 1.0 [Classification: none] 3		ual: Document version: 1.0   Classification: none   3	Ual: Document version: 1.0   Classification: none   9	ua
ual: Document version: 1.0   Classification: none   3		Ual: Document version: 1.0   Classification: none   3	<ul> <li>For guidance on creating a great flowchart, refer to <u>"How To Make A Great</u> <u>Flowchart"</u> in the wearable tech skills &amp; guides on SharePoint</li> </ul>	
Step 1 → Step 2 →				

### Student Independently **Completes Section One**

This section outlines the student's goals for their project, detailing their current skills and expectations while setting a foundation for development.

### Student with Technician **Completes Section Two**

This section introduces the student to the technical area, enabling the technician to highlight missed opportunities, manage project expectations, and establish realistic timelines.

This section serves as a log of major breakthroughs, unexpected problems, and their solutions, allowing the technician and academic team to track progress.

ing Pathway & Progress Log

### ject Log Sheets

o be completed regularly throughout your project. They are you keep your project on time and identify problems

### the Log Sheets

is are designed to help you track your progress throughout your project, , and record key learning moments. They also allow the technician to provide ent any additional support given. Keeping these sheets up to alse will help you and demonstrate your progress when presenting your project to your academic cad a blank log sheet here, or collect them from the Lab.

ion: Fill out your portion of the log sheet after each significant work might be after completing a workshop, a 1-lo-1 session, or work on your project.

ction: The technician will document their observations and any ance provided during 1-to-1 sessions or consultations. Remember technician, and tots of students so please bring spare sheets with d the technician if they have been caught up helping other students.

n these sheets, we'll ensure a clear and collaborative record of your project

### cess

Try to fill out your section of the log sheet promptly after each session

shy away from noting challenges / difficulties-they're a key part of learning! our log sheets to prepare for follow-up sessions and reflect on your project as

prehensive record of your journey from start to nents but also enhance your confidence as you

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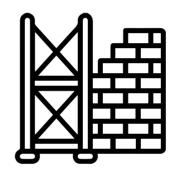


### **Student Completes Daily Log Entries**

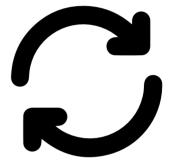
Core Pedagogical Methodologies







Known ADHD Support Tools Universal Design for Learning Best Practices Scaffolded Learning Methodologies



### Flipped Classroom

### Methodologies

## Tools & Known ADHD Support Mechanisms



**Regular Scheduled** 1-to-1 Reviews



Technician Accountability



& Visual Aids



Checklists & List Building



Broken Down Negotiated Milestones

0	-0
	•

Agreed-upon Tutorial & Workshop Planning

# **Consolidated Information**



*Inclusive Design, Supports All Students.* 

"Training in inclusive practice and learning aids the development of a clear and coherent educational programme for all students... UDL is particularly helpful for students and lecturers as the strategies are simple to implement, can have a positive impact on the learning experience of all students..." (Advance HE, 2025, n.p.)

## Universal Design for Learning (UDL)

UDL Top Design Tips	My Learning Resource Implementation
Support Relevant Goal-Setting	Students define their goals in a self-declared project brief, refined through an initial consultation to e
Communicate High Expectations for All and Recognise Variability	Structured support—workshops, one-to-one sessions, and tutorials—helps all students meet high st tools like checklists, visual aids, and milestones adapt the workflow to individual needs, providing a creativity.
Promote Disciplinary Expertise	Specialised learning resources and a scaffolded approach build foundational knowledge and encour where the student chooses to engage.
Focus on the Process, Not Just the Outcome	A dynamic log tracks progress and challenges, with workshops and feedback guiding steady growth
Guide Self-Reflection	Consultation and feedback sections encourage students to assess their progress, view failures as le refine their approach over time.

CAST (2024) Top 5 UDL Tips for Fostering Expert Learners. CAST Inc.

### 11

ensure they are achievable.

standards. Customisable a clear framework for

ourage deeper engagement -

th and reflection.

learning opportunities, and

## Scaffolded Learning

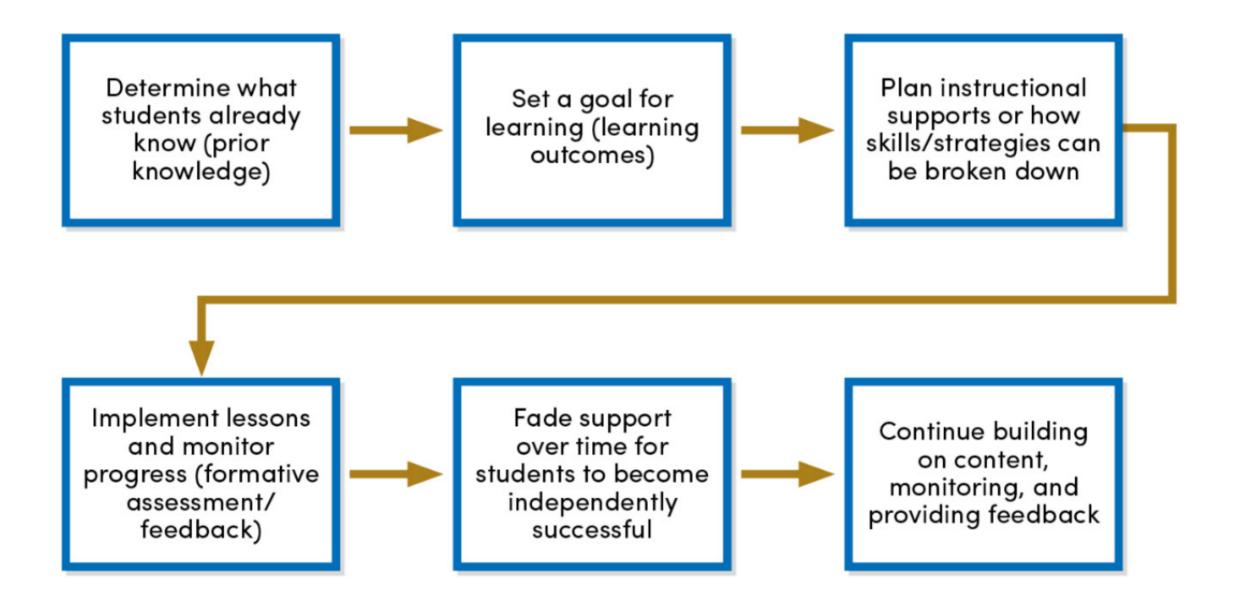
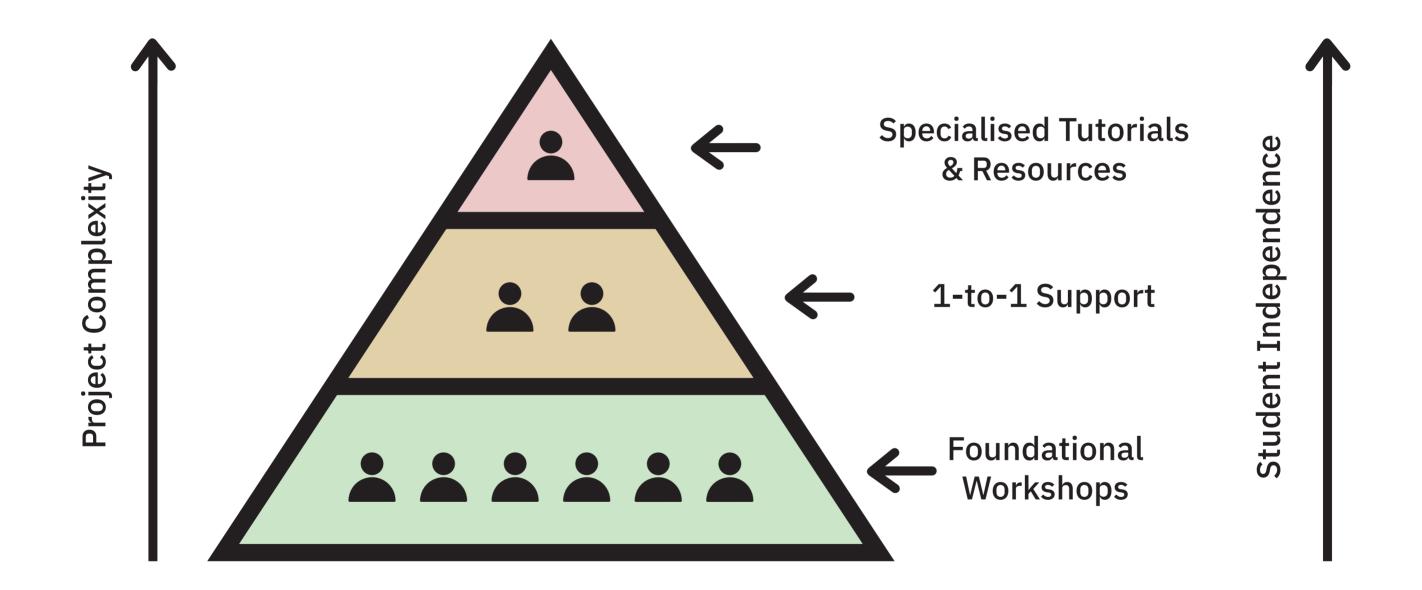
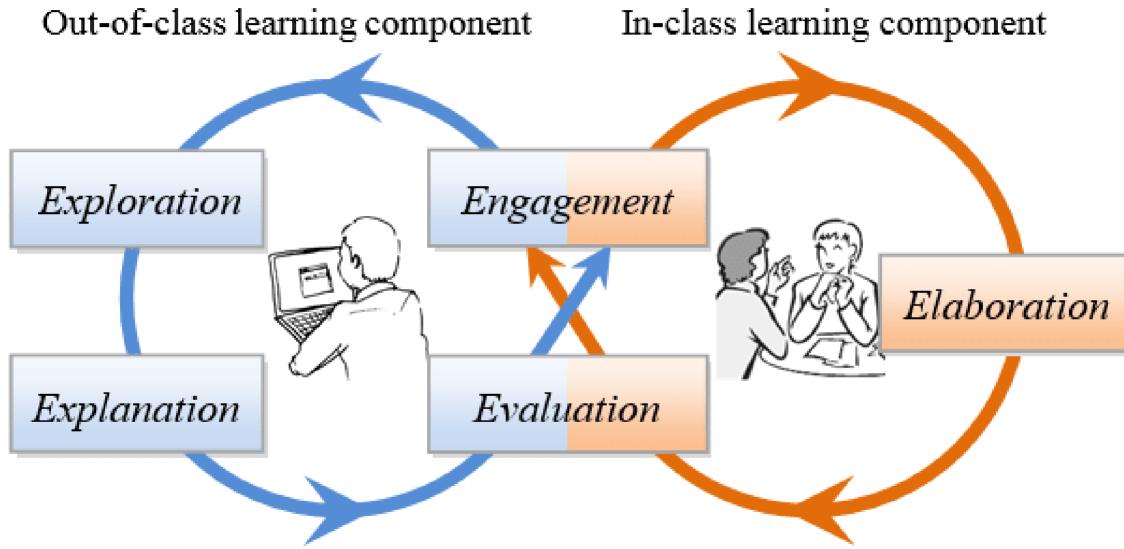


Figure 1. Office of Curriculum, Assessment and Teaching Transformation. (2025) Scaffolded Learning Process.

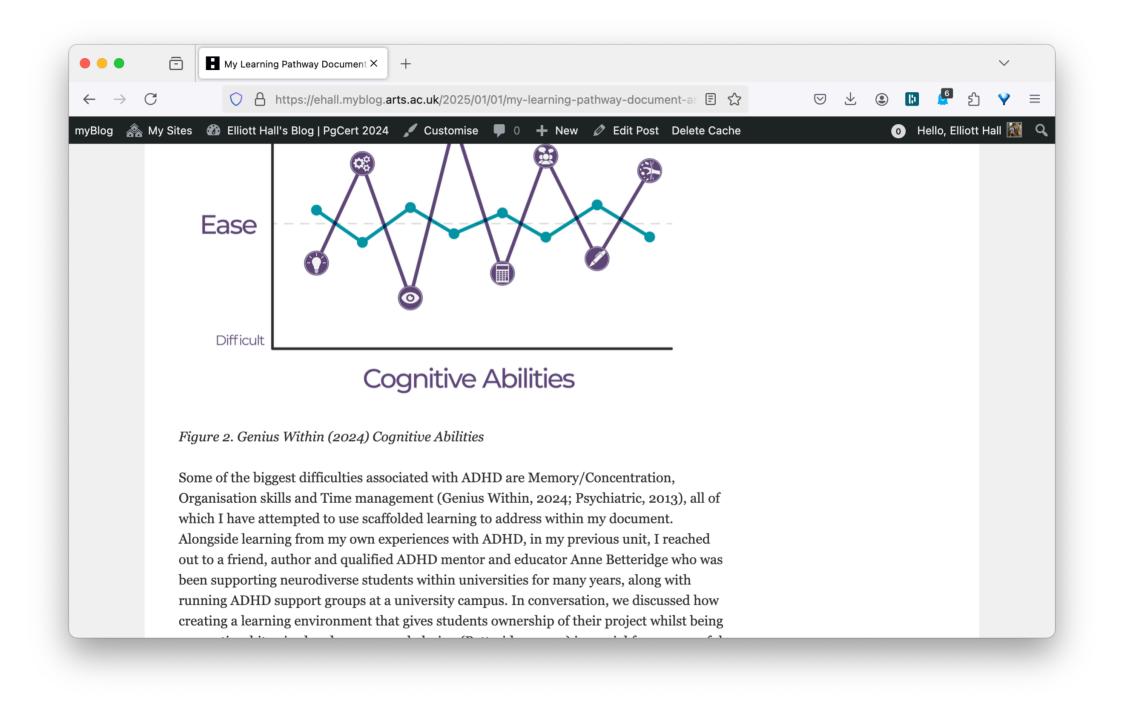
Flipped Classroom Model | Implemented Information Structure



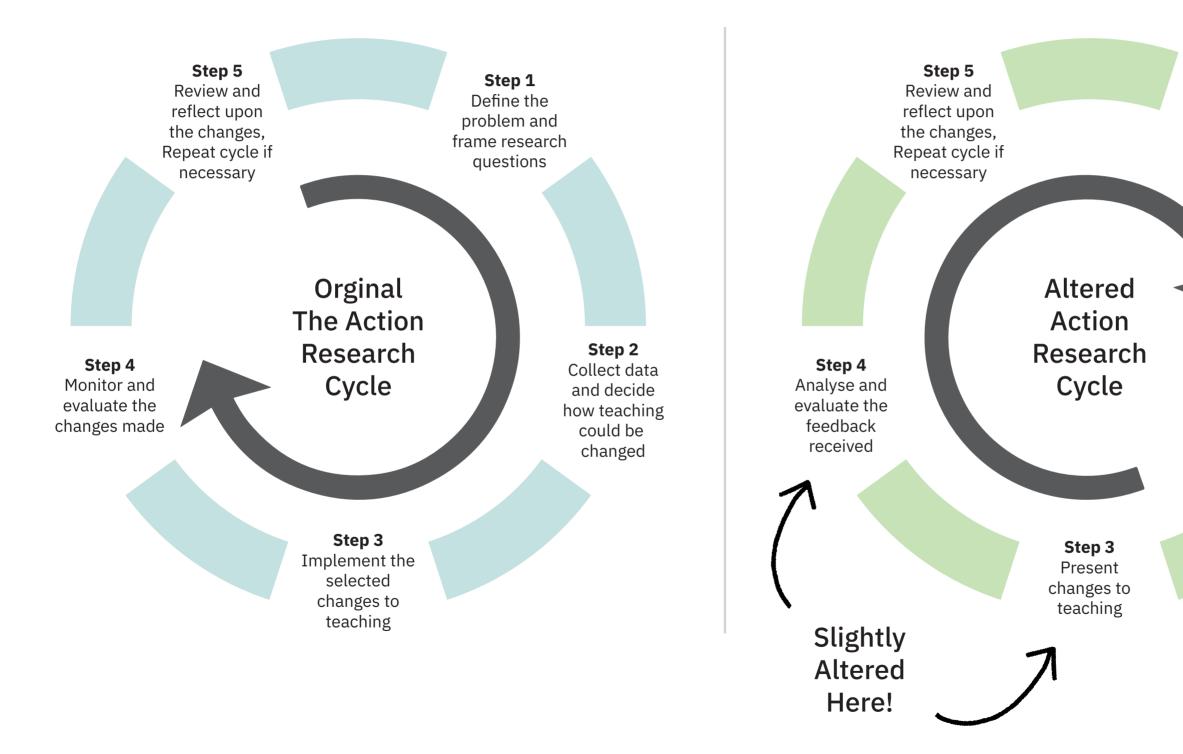
*Flipped Classroom Model* 



### Comprehensive Breakdowns



## Initial Project Plan and Iterative Change



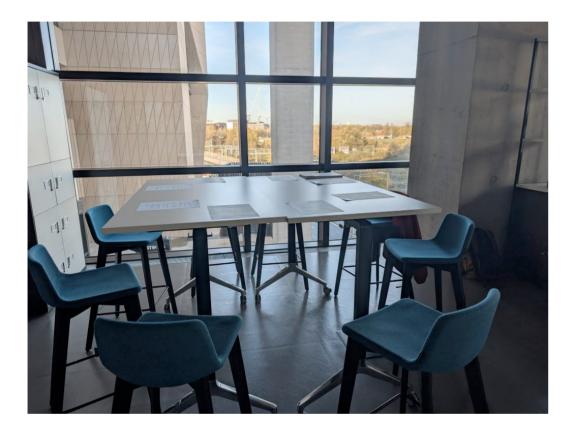
16

**Step 1** Define the problem and frame research questions

### Step 2

Collect data and decide how teaching could be changed

## Data Collection Methods | Dual Collection

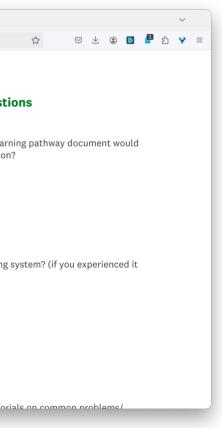




In-Person Qualitative Student Focus Group

••• =	SurveyMonkey - Collector	Detai X	• Wearable Tech PgCert   3 Follow X	+
$\leftarrow \rightarrow C$	https://www.su	urveymor	nkey.com/r/P63QBQC	
v	Vearable Tech	PgC	ert   3 Follow Up Q	uest
*			mentation of the present d your project or docume	
	Yes			
l	No - this would no	ot have	aided me	
	No - I only came fo	or occa	sional support.	
*	2. Did you prefer th prior to the book		lementation of the new b stem)	ookinį
	⊖ Yes			
	◯ No			
	🔿 Not Applicable (D	id not e	experience it prior)	
	○ Not Applicable (O	ther Re	eason)	
*	2 Lestly do you th	ink the	e implementation of grou	n tuto
			Follow-U	p.
		Q	uantitativ	'e (

### 17



### Anonymous Questionnaire

*Summary of Focus Group Findings – Reflections* 

"...with a lot of these projects, I found it very overwhelming being like, I will never achieve this project. I'm fully aware that this is too big. And then if it was broken down into little tiny tasks, we're like, hey, wait a second, that's very achievable." (Hall, 2024b, p.27)

*Summary of Focus Group Findings – Reflections* 

"...it's really useful for people who are neurodivergent, because you can basically forget within a second and get so immersed into another task and another part... and another part... that you forget what... the supposed outcome [was]. {Group Agrees}"(Hall, 2024b, p.12)

1) Students appreciated the structured approach of the document.

2) It helped them articulate ideas and communicating ideas to academic teams.

3) Students felt it would help them, manage their projects effectively.

4) Making projects more achievable by breaking them into smaller steps.

5) Feedback confirmed the document acted as a helpful roadmap for large, complex projects.

6) The feedback reinforced of creating accessible learning materials that benefit all students.

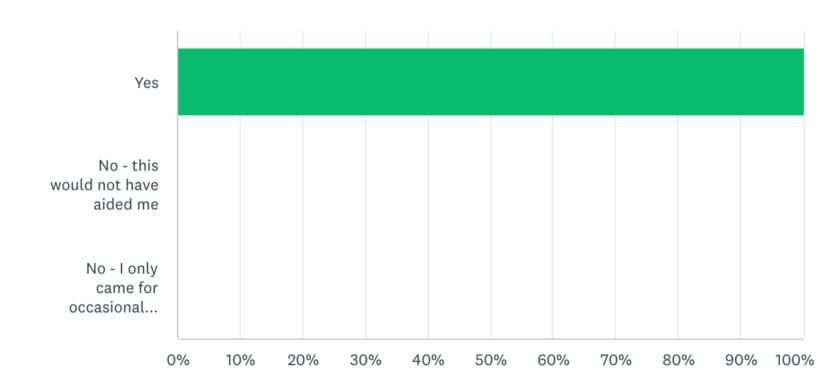
1) The document was seen as text-heavy and overwhelming by some students.

2) A greater focus on visual elements was recommended, such as drawings and imagery, to enhance understanding.

3) Students suggested the inclusion of more support with time management, like integrated timelines.

### Quantitative Data & Analysis | Q1

# Do you think the implementation of the presented learning pathway document would have supported you and your project or documentation?

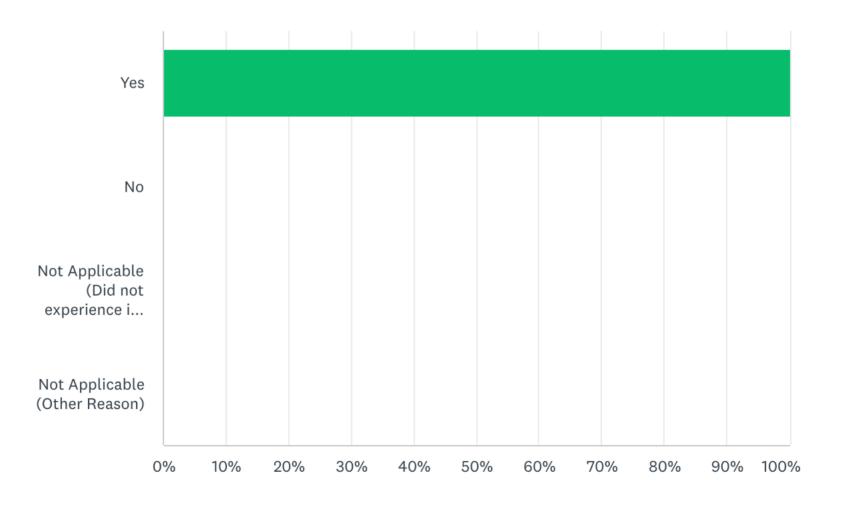


Answered: 6 Skipped: 0

### *Quantitative Data & Analysis* | *Q2*

# Did you prefer the implementation of the new booking system? (if you experienced it prior to the booking system)

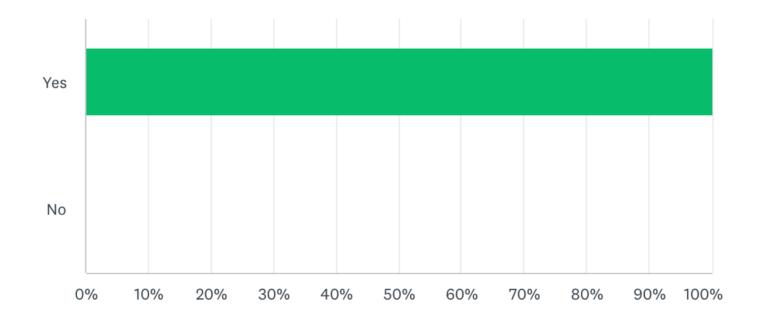
Answered: 6 Skipped: 0



Quantitative Data & Analysis | Q3

Lastly, do you think the implementation of group tutorials on common problems/topics would be useful? (i.e a scheduled drop in for for Fusion360, EasyEDA or other topic)





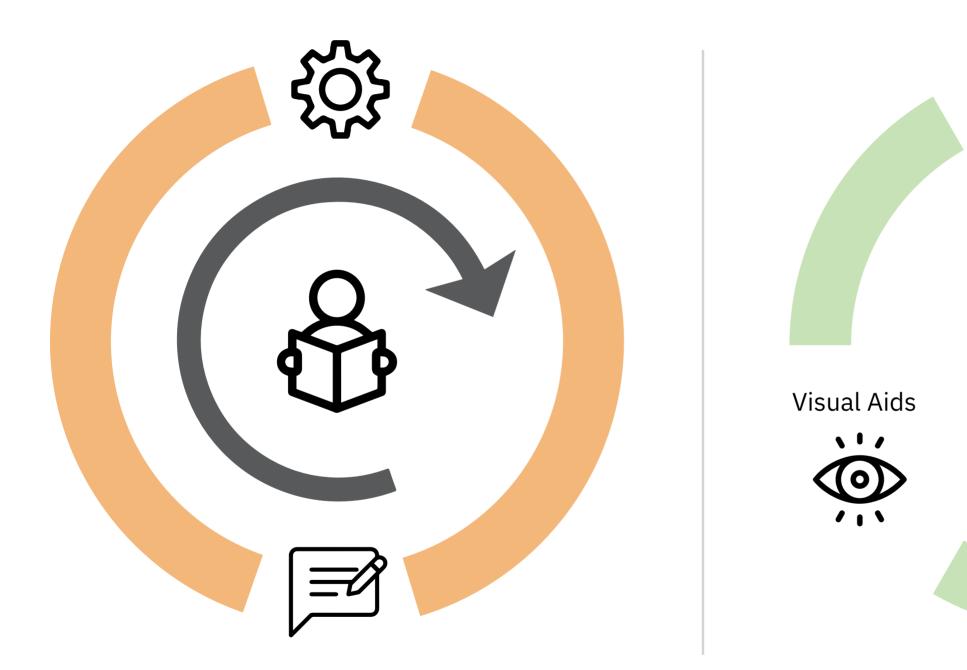
1) More visually engaging and less text-heavy.

2) A greater focus on visual elements, such as drawings, imagery and diagrams.

3) Develop additional resources to support with time management, like integrated timelines.

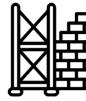
4) Creating a clear onboarding process.

Evaluation and Reflection



Student Centered Design

Structures Support



Accessible Design Practices



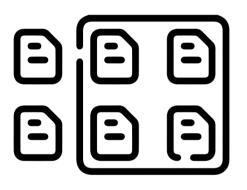






Evaluation and Reflection

Despite A Small Sample Size.





Feedback was Overwhelmingly Postive.

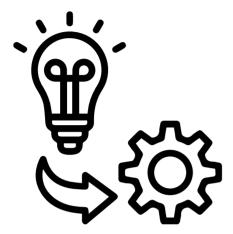
Excited to See How This Time Saving Will Benefit.



Whilst Providing More In-Depth Project Support & Student Autonomy.



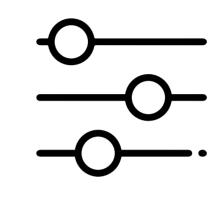
Conclusion and Next Steps



Implement the Revised Document



Continue to Gather & Analyse Data



Further Refine the **Document & Workflow** 



Continue to Collect Feedback



Apply My Findings to Other Teaching Resources





Share these Findings with Colleagues

*I hope my presentation has peaked your* interest in to the possibilities that my ARP has to offer technical education. For a more in-depth breakdown please consider taking a look at my blog ehall.myblog.arts.ac.uk

*I invite you to ask any questions you may have.* 



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Figure 2. Lo, C. K. (2017) 'Toward a Flipped Classroom Instructional Model for History education: A Call for Research', IJCH, 3(1), pp. 36–43. doi: 10.18178/ijch.2017.3.1.075.

Figure 1. Office of Curriculum, Assessment and Teaching Transformation (2025) Scaffolded Learning Process. University at Buffalo.

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Figure 3, 4 & 5. Hall, E. (2024a) Follow-Up Student Quantitative Survey.