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PROFESSIONAL PORTFOLIO 2



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Generative AI Statement

PG Cert tHE – The Use Of Generative Artificial Intelligence (Ai) - Declaration.

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Use of Generative AI in Assessment		
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STRUCTURE	For this assessment, you can use Generative AI to support you in structuring your submission, including creating a draft argument structure, identifying parts and headings, etc.	Yes ☒ No ☐
PROOFREADING	For this assessment, you can use Generative AI to check your own text/creation for grammatical and syntactical mistakes, including rephrasing of your own work within specific standards.	Yes ☒ No ☐
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I acknowledge the use of Microsoft Copilot (<https://copilot.microsoft.com>) on 29/04/2026 to proofread my work using the following prompts:

- *Proofread the following passage for SPaG errors. List any issues without changing my written content and suggest any relevant improvements to structure.*

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1 Teaching Intervention Cycle 1

1.1 Introduction

This teaching intervention cycle took place within the Quality and Business Improvement module I deliver as part of the Degree Apprenticeship (DA) provision in the School of Engineering. The module is attended by part-time learners who are employed across a range of engineering and manufacturing sectors and who bring markedly diverse levels of industrial experience, academic confidence, and prior exposure to theoretical manufacturing concepts (V1). As is typical of DA cohorts, the group comprised a combination of mature, highly experienced practitioners alongside younger apprentices who were comparatively early in their professional and academic development (V1, K1).

The DA delivery model presents a number of pedagogical opportunities, particularly in relation to contextualising theoretical concepts through authentic workplace examples (Boud and Solomon, 2001; Lester and Costley, 2010; QAA, 2022) (K1). However, it also introduces specific challenges linked to heterogeneity within the cohort. During a recent teaching observation (*See Ch.3.1*), it was noted that participation within my session was uneven: more confident, experienced learners frequently contributed verbally, shared workplace examples, and engaged readily in discussion, while less experienced and less confident students tended to remain passive observers. Although these quieter learners appeared attentive, their limited participation made it difficult to ascertain their level of understanding and restricted opportunities for them to articulate, test, and refine their critical thinking and understanding through dialogue (A4,V1, V2, K3).

Reflecting on this observation prompted consideration of how effectively my existing teaching approaches supported equitable participation and learning across the cohort. While discussion-based activities and tutor-led questioning were embedded within my sessions, these approaches relied largely on voluntary contribution and subsequently may not have consistently created conditions in which all learners felt psychologically safe to engage. In particular, the visibility of the difference in confidence appeared to influence who spoke and when, whose knowledge and understanding was legitimised, and whose learning needs were most readily identified during formative assessment. This raised concerns that some learners may have been disadvantaged, not by a lack of capability, but by reduced confidence in articulating emerging understanding to me as their tutor and within their peer groups (V1, V2, K3).

Within the context of engineering education, the ability to articulate reasoning, justify decisions, and learn collaboratively from peers is a core professional competence (Prince and Felder, 2006). Graduates and apprentices are routinely required to work within multidisciplinary teams, communicate technical judgement, and contribute to initiatives in environments where confidence and experience may vary widely. As such, it is essential that teaching practices not only transmit technical knowledge, but also facilitate psychologically safe learning environments that encourage dialogue, peer learning, and formative feedback (V4, K2).

The purpose of this teaching intervention cycle is therefore to explore how structured peer learning, formative feedback loops, and explicit attention to psychological safety can be embedded within my teaching practice to support more inclusive participation and learning. Specifically, the intervention seeks to utilise the diverse industrial expertise present within the cohort as a shared learning resource, while reducing barriers to participation for less confident learners. By intentionally designing activities that promote knowledge sharing, scaffold dialogue, and normalise uncertainty as part of the learning process, this intervention aims to enhance learner confidence, engagement, and understanding across the cohort (A1, A2, A5, V3).

1.2 Pre-intervention Practice and Reflection

Prior to the intervention, the teaching on this module was structured around a blended approach combining tutor-led explanation, group discussion, and applied problem-solving activities. This approach aligns with established principles of effective engineering education, which emphasise the integration of theory with practical application to support both conceptual understanding and professional relevance (Biggs and Tang, 2011; Aubrey and Riley, 2022). Opportunities for student discussion were routinely embedded, and learners were encouraged to contribute examples drawn from their own workplace to help contextualise theoretical concepts and promote peer learning (A2,A3, K2, V4).

From a pedagogical perspective, my previous delivery was informed by a constructivist approach to learning, which seeks to position knowledge as co-constructed through interaction and dialogue, rather than passively transmitted (Illeris, 2007). In particular, the DA delivery context offers significant potential for collaborative learning, as learners bring varied forms of tacit and explicit knowledge derived from their professional roles. Research suggests that such diversity can significantly enhance learning when it is intentionally leveraged through

structured peer interaction (Boud, Cohen and Sampson, 2013) (V3). However, reflective review of my initial lesson observation with my Practice Advisor, Greg Owen, highlighted limitations in how effectively these principles were enacted in practice (V5, A5).

Table 1: Summary of Feedback From Pre-Intervention Lesson Observation

Summary of Feedback Comments
<i>“Constant dialogue between the lecturer and students”</i>
<i>“Teaching resources were excellent and promoted active discussion throughout the session”</i>
<i>“Formative assessment took place throughout via Q&A interactions. This approach was highly effective for most of the students present; however, an area for development would be to consider how all student’s learning could be formatively assessed to the same extent.”</i>
<i>“This is a high-risk, high-reward class”</i>
<i>“During the early part of the session, there was an extended period of open question-and-answer discussion. Most students actively engaged, while some students did not contribute, it is noted that the students appeared to be listening attentively”</i>
<i>“This should be approached sensitively, as the students appeared to be younger than their peers and part of a cohort with significant industrial experience”</i>

Although discussion opportunities were present, they relied largely on voluntary, whole-group contribution. As a result, participation tended to be dominated by more confident, experienced learners, while less experienced or less confident students participated less frequently. This pattern is well documented in the literature, with research indicating that unstructured discussion can inadvertently reinforce existing confidence hierarchies within the peer group, particularly within heterogeneous adult cohorts (Brookfield, 2017). Consequently, it is important to recognise that silence cannot be reliably interpreted as disengagement or lack of understanding, but may instead reflect concerns about judgement, status, or perceived expertise (Fassinger, 1995; Fritschner, 2000; Kahu and Nelson, 2017; Ainscow, 2020) (V1, K1, K3).

This observation prompted me to reflect more critically on the concept of psychological safety within my teaching practice. (Edmondson, 1999, 2019) defines psychological safety as a shared belief that the learning environment is safe for interpersonal risk-taking, including asking questions, admitting uncertainty, and making mistakes. Psychological safety has been shown to play a significant role in enabling participation, peer learning, and formative dialogue, particularly among learners who lack confidence or feel marginalised within a group (Nicol

and Macfarlane-Dick, 2006; Spomer, 2022). While I initially aimed to encourage open discussion, I recognise in reflection that I may not have sufficiently structured these activities to reduce the perceived interpersonal risks for quieter learners (V1,V2,V3, K1).

Similarly, although formative assessment opportunities were embedded informally through questioning and discussion, these did not consistently function as effective formative feedback loops (K3). Nicol and Macfarlane-Dick (2006) emphasise that formative assessment is most effective when it provides learners with timely, dialogic feedback that promotes self-regulation and confidence, rather than merely appraising correctness. In the sessions delivered prior to the teaching intervention, feedback was often reactive and largely tutor-led, which may have limited opportunities for peer-to-peer feedback and risked reducing learners' sense of ownership over their own learning (Carless *et al.*, 2011; Boud and Molloy, 2012) (A3, K3).

Reflecting on this practice, I recognised a misalignment between my pedagogical intentions and the actual experience of learners on the module. While opportunities for peer learning existed in principle, they were not sufficiently scaffolded to ensure equitable participation or to fully capitalise on the collective expertise within the group. In particular, I had underestimated the extent to which confidence, rather than capability, influenced participation, as well as the degree of structured support required to create psychologically safe conditions for collaborative learning (V1, V2, V3). This highlighted the need for a more intentional approach to the design of peer learning activities and formative feedback mechanisms. Specifically, it became clear that for peer learning to function as an effective, inclusive delivery strategy within the cohort, it must be explicitly structured, supported, and normalised as part of the learning culture, rather than assumed to emerge organically (Boud and Molloy, 2012; Ashwin *et al.*, 2020).

1.3 Intervention Strategy

The intervention strategy was developed in response to issues identified through the initial teaching observation and subsequent reflection, namely uneven participation within the cohort, reliance on reactive tutor-led feedback, and the need to create learning conditions that better support confidence, peer learning, and formative dialogue. Drawing on evidence-informed practice, the intervention embedded structured peer learning, formative feedback loops, and explicit attention to psychological safety within session design (A1, A2, A3, A4).

This approach was informed by principles of adult learning described in Knowles' model of andragogy (Knowles, 1980; Knowles *et al.*, 2020), recognising that Degree Apprenticeship learners value autonomy, draw heavily on prior professional experience, and prefer learning that is problem-centred and immediately applicable to practice (QAA, 2022; Curto-Reverte *et al.*, 2025). Consequently, the intervention emphasised learner agency, structured peer dialogue grounded in workplace contexts, and applied tasks requiring justification, comparison, and professional judgement, to support participation across differing levels of confidence and experience (K1, K3, V1, V4).

Central to this design was the recognition that heterogeneous DA cohorts represent a pedagogical asset when diversity is intentionally leveraged (Boud and Solomon, 2001; Lester and Costley, 2010). Research on peer learning highlights the value of learners generating explanations, challenging assumptions, and engaging in evaluative dialogue (Boud, Cohen and Sampson, 2013), particularly within applied disciplines such as engineering where professional judgement is developed through discussion and comparison (Jonassen, Strobel and Lee, 2006; Trevelyan, 2014) (V3, V4). However, as unstructured peer interaction can reinforce confidence hierarchies and marginalise quieter learners, the intervention sought to balance learner autonomy with structure to support inclusive participation (Brookfield, 2017) (V1, V2, K1).

1.3.1 Structured Peer Learning Design

To support more inclusive participation, students were organised into intentionally mixed peer groups informed by three key factors, as outlined in Table 2 below.

Table 2: Peer Group Composition Factors

Factor	Description
Formative observation	Observed participation patterns in prior sessions, including the frequency of voluntary contributions, willingness to ask questions publicly, tendencies to defer to others or dominate discussion, and behaviours such as initiating discussion, waiting for tutor validation, or relying on peers for reassurance.
Low-stakes learner self-disclosure	Preliminary formative activities invited learners to indicate prior experience with the subject matter and to self-identify areas of confidence or uncertainty. It was made clear to students that this disclosure was voluntary, not assessed, and used formatively rather than judgmentally.

Knowledge of the cohort	Contextual knowledge gained from informal discussions with students about workplace responsibilities, prior exposure to quality tools, and confidence with statistics and data analysis.
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The composition of the groups sought to balance industrial experience, confidence in participation, and prior exposure to the subject matter. Groups were routinely reviewed to avoid the development of fixed expert–novice hierarchies (Topping, 2017; Bovill, 2020; Looman *et al.*, 2022). This approach builds upon the constructivist perspective on learning, with greater emphasis placed on the value of diverse perspectives in developing deeper understanding of complex theoretical concepts (Illeris, 2007; Aubrey and Riley, 2022) (A1, A2, A4, K2).

During initial trials of this new group structure, it was observed that, due to relative heterogeneity within the group, there remained a risk of participation becoming uneven. To support more equitable participation, the groups were further structured through the introduction of clearly defined, rotating roles, including explainer, questioner, and summariser (K2, K3). Mercer and Littleton (2007) demonstrate that role-based structuring supports exploratory dialogue by creating explicit opportunities for learners to articulate reasoning, challenge ideas, and co-construct shared understanding. By rotating roles, I aimed to prevent confidence or experience from becoming proxies for authority, enabling all learners to contribute meaningfully while encouraging more confident students to engage in listening, synthesis, and critical engagement rather than dominating discussion (V1, V2).

1.3.2 Embedding Psychological Safety

To facilitate a culture of psychological safety within my sessions, expectations around respectful dialogue, constructive challenge, and the normalisation of uncertainty were made explicit at the outset of each of the learning activities. I modelled this approach by verbalising my own thinking processes, including moments of ambiguity, and the consideration of alternative interpretations, to reinforce the message that openly engaging with uncertainty is a legitimate and valuable aspect of engineering practice (A4, V1). Whole-group discussions were preceded by informal think-pair-share or small-group deliberation, enabling learners to explore and refine ideas in lower-risk settings before contributing more widely (V1, A1). This approach aligns with research suggesting that structured dialogue reduces the perceived cost of speaking and supports broader participation (Edmondson, 1999; Prince, 2004; Roxå and Mårtensson, 2009; Collins, Brown and Newman, 2018)

1.3.3 Formative Feedback Loops and Learner Ownership

To address limitations associated with tutor-led, reactive feedback, the intervention embedded peer-to-peer formative feedback as a routine component of learning activities. Feedback tasks were designed to focus on reasoning and justification rather than correctness alone, requiring learners to articulate how and why decisions were made when developing simulation models or interpreting data (A3, K3). The use of simulation software functioned not only as an industrially-aligned tool but as a learning technology, enabling learners to compare reasoning, test assumptions, and engage in collaborative decision through shared model outputs (K4, K5).

This approach was informed by research on formative assessment and sustainable feedback, which emphasises that learning is enhanced when students actively engage in judging quality and regulating their own learning, rather than relying exclusively on tutor commentary (Sadler, 1989; Boud and Molloy, 2012). Hattie and Timperley (2007) further argue that feedback has greatest impact when it supports learner self-regulation by clarifying goals, progress, and next steps, rather than simply providing evaluative judgements. (Wisniewski, Zierer and Hattie, 2020). Peer feedback prompts were therefore provided to the learners to scaffold the dialogue and ensure alignment with the module learning outcomes. By engaging learners as both feedback providers and recipients, the intervention sought to enhance ownership of learning, develop the learners' evaluative judgement capabilities, and reduce dependency on tutor-led validation. (Sadler, 1989; Boud and Molloy, 2012; Ryan and Deci, 2020) (A3, A4, V3).

1.3.4 Alignment with Module Outcomes and Professional Practice

All peer learning and feedback activities developed as part of this intervention were explicitly aligned with the learning outcomes of the Quality & Business Improvement module and the professional competencies required within engineering education (K5). Tasks required learners to draw on workplace examples, justify methodological choices, and critique alternative approaches, reflecting the decision-making processes characteristic of quality practitioners in the field. Alignment was maintained by ensuring that collaborative activities directly supported assessed outcomes, thereby reinforcing their relevance and legitimacy from the learners' perspective. (Biggs and Tang, 2011) (V4). The revised session structure is detailed in the lesson plan presented in Section 1.3.5 (A1, A2, A3, A4, K2, K4, K5).

1.3.5 Lesson Plan (Post-Intervention)

Table 3: Post- Intervention Lesson Plan

Module: Quality & Business Improvement (Lecture 13)			
Location: IQ110			
Module Learning Outcomes	1. Apply a range of tools and techniques that can be used to investigate problems, assess risk, and analyse areas for improvement 2. Understand the main elements of the six sigma methodology		
Lesson Title: Modelling of Manufacturing Systems: Batch & Continuous Flow			
Resources: notes (system logic), Arena software, base model, scenario data sheets, formative quiz, case study (high-mix vs high-volume)			
By the end of the session, students should be able to:			
1. Develop a simple discrete event simulation model of a manufacturing system.			
2. Compare batch and continuous flow configurations using simulation outputs.			
3. Interpret simulation results to justify manufacturing system design decisions in a quality context.			
Activity	Time	Description	Notes
Recap & Session Introduction	10 mins	Recap previous session on manufacturing system types and performance metrics (throughput, WIP, utilisation). Introduce today’s focus on using discrete event simulation to compare batch and continuous flow systems.	Re-establish relevance to prior learning. Set expectations and reduce anxiety by emphasising that the focus is on reasoning and comparison, not mastery of the software.
Teacher-Led Mini-Lecture 1	20 mins	Introduce core DES concepts: entities, events, queues, resources, and logic flow. Walk through the structure of a simple manufacturing simulation model.	Scaffold conceptual understanding before software use. Diagrams and worked examples support learners with less prior experience.
Formative Task 1 (Peer-Based)	10 mins	Paired task: Students examine a production scenario and identify which elements would be modelled as entities, resources, queues, and events.	Low-stakes task to surface understanding. Peer discussion reduces fear of error and supports psychological safety.
Teacher-Led Mini-Lecture 2	20 mins	Demonstrate a base simulation model of a batch production system. Explain logic, assumptions, and performance outputs (throughput, WIP, lead time).	Emphasise modelling assumptions and limitations. Reinforce professional judgement rather than “correct” answers.
Formative Task 2 (Structured Peer Learning)	20 mins	Small-group task: Modify the base model parameters to represent a continuous flow system. Groups predict expected performance changes before running the model.	Justification and comparison. Mixed-experience grouping supports peer mentoring and knowledge sharing.
Class Debrief	20 mins	Groups share predicted vs actual simulation outcomes. Tutor facilitates comparison of batch vs flow performance and challenges assumptions.	Structured prompts ensure equitable participation. Tutor feedback (dialogic rather than evaluative).
Applied Discussion (Case-Based)	15 mins	Groups apply findings to a real manufacturing case (high-mix vs high-volume). Decide which system design is more appropriate and justify using simulation	Develop professional reasoning and transfer of learning to industrial contexts.
Capstone Simulation Task	30 mins	Group task: Extend the simulation model by introducing variability (e.g. breakdowns, setup times). More confident students explore sensitivity analysis; all groups interpret results.	Tiered task design: all students achieve core outcomes, with extension for advanced learners. Aim to support autonomy and confidence.
Plenary & Reflection	10 mins	Whole-group reflection: What did the simulation reveal that intuition alone might miss? Open Q&A and link to future summative assessment.	Reinforce relevance, aim to normalise uncertainty, and encourage reflective thinking.

1.4 Post-Intervention Reflection

1.4.1 Post-Intervention Delivery

In practice, the use of the intentionally mixed peer group structure and implementation of rotating roles in group work activities positively influenced participation patterns within my sessions. The learners more readily engaged in role-based activities that required them to explain reasoning, pose clarifying questions, and synthesise group understanding before contributing to whole-group discussions. Compared to pre-intervention delivery, there was a noticeable increase in participation among learners who had previously contributed infrequently, it was noted that this was particularly apparent during small-group deliberation sessions, and I feel that this supported the view that providing more structure to the dialogue can be effective in lowering the perceived interpersonal risk associated with participation, the structured approach seemed to encourage learners to rehearse ideas in lower-stakes settings prior to wider contribution (V1, V2, K3, A5).

Peer-to-peer formative feedback became more visible and sustained as sessions progressed. It was encouraging to see that quieter learners increasingly sought clarification from peers and justified decisions collaboratively. These interactions were especially evident during applied tasks requiring the selection and justification of the chosen modelling approaches, where groups debated assumptions and interpretations before arriving at a shared judgement. Such processes are characteristic of applied engineering practice, where professional judgement is developed through discussion, comparison, and justification rather than through technical or analytical determination alone (K2, V4).

My role during delivery of these activities shifted accordingly. Rather than providing immediate confirmation or correction, I focused on observing group interactions, posing targeted questions to prompt reasoning, and only intervening selectively where misconceptions persisted. I noticed that, while this required a degree of restraint on my own part, it ultimately provided me with further insight into each learners' thinking process, and I believe it effectively supported the development of learner agency and judgement (A3, A4, K3).

Reflecting on learner engagement, one of the most significant changes was the tone of classroom interaction. Explicit framing of psychological safety, combined with open discussion of uncertainty and constructive challenge, appeared to legitimise questioning and partial understanding as integral to the learning process. Learners were more willing to admit uncertainty, test new ideas, and respond to peer feedback without seeking immediate tutor

validation. This was particularly evident among less experienced apprentices, who appeared to demonstrate greater confidence engaging within smaller peer groups before contributing to whole-group discussion (V1, V2, K1).

However, I noticed that this shift was gradual rather than immediate. In the early sessions, some learners remained hesitant to rely on peer feedback, which I believe reflected both the previous teaching approach and learners' expectations of tutor authority and feedback that had been commonplace prior to the intervention (K3). Over time, as peer discussion and feedback became more normalised, quieter learners demonstrated increased confidence in both giving and receiving feedback. This progression aligns well with research suggesting that learner ownership and confidence develop through sustained engagement in formative and dialogic feedback processes rather than isolated interventions (Kahu and Nelson, 2017). It was clear to me that the value of peer feedback was reinforced through repeated use (A3, K3).

1.4.2 Reflection on My Own Practice

From a professional development perspective, the intervention prompted me to reflect on my own facilitation practices. Allowing learners greater autonomy required me to tolerate periods of silence and uncertainty while groups worked through problems collaboratively. Although initially challenging, this reinforced the importance of creating space for learners to construct understanding through dialogue rather than relying on tutor-led exposition alone (A5).

The intervention also highlighted the importance of careful task design and pacing. While role-based peer activities supported engagement and inclusion, they required clear instructions, explicit success criteria, and sufficient time for reflection and synthesis. In some instances, limited plenary time limited opportunities for group consolidation of findings, prompting adjustments in subsequent sessions to prioritise focused debriefing and shared synthesis. (A5, K3).

Overall, the post-intervention delivery suggests that embedding structured peer learning, formative feedback loops, and psychological safety can positively influence participation, confidence, and engagement within heterogeneous Degree Apprenticeship cohorts. While the approach required a shift in both learner and tutor expectations, it supported more equitable participation and enabled learners to draw more effectively on the collective expertise within the group. For me, the intervention reinforced the value of a more intentional approach to activity design, reflective facilitation, and continuous improvement of my teaching practice in supporting inclusive, high-quality learning (A5, V4).

1.5 Evaluation of Teaching Intervention

The effectiveness of the teaching intervention was evaluated using a combination of qualitative and practice-based evidence gathered during and following delivery of the sessions, this comprised of two primary sources:

1. Reflective analysis of the post-intervention teaching observation conducted by my Practice Advisors (V5,A5) (*see Ch.3.2*).
2. Summarised module review feedback collected on completion of the module (K5).

In keeping with the formative and dialogic nature of the intervention, the evaluation does not focus on attainment outcomes, but on changes in participation patterns, learner confidence, the quality of peer interaction, and professional reasoning evident during the sessions (A3, K3, K5).

1.5.1 Evaluation of Post-Intervention Teaching Observation

The post-intervention teaching observation conducted by my Practice Advisor, Greg Owen, provided valuable feedback of the effectiveness of the teaching intervention (V5). Compared to earlier observed sessions, Greg noted a clear shift in classroom dynamics, including improved learner interaction and more balanced participation within small-group activities. In particular, evidence of learners supporting one another's understanding through explanation, questioning, and collaborative problem-solving was highlighted as a positive development.

A summary of key feedback comments from the observation is provided in Table 4.

Table 4: Summary of Feedback from Post-Intervention Lesson Observation

Summary of Feedback Comments
<i>“Jordan articulated the purpose of the session clearly, emphasising reasoning, comparison, and interpretation of simulation models developed later”</i>
<i>“Jordan facilitated learning effectively, alternating between short explanatory points and student-led activities”</i>
<i>“Asking students pairs to anticipate outcomes before running simulations was particularly effective and prompted discussion, Jordan encouraged students to articulate assumptions”.</i>
<i>“Peer-to-peer feedback was evident during group tasks, particularly when students compared models and discussed performance trade-offs”</i>

“The pace of the session was generally appropriate, though at times the transition between explanation and activity required careful management to ensure all students remained oriented to the task”

“Some students appeared to prefer contributing within small groups rather than speaking to the class. Supporting confidence in group discussion is an area for further development”

The feedback recognised the effectiveness of the mixed group structure and role-based peer activities in promoting participation from quieter learners. Learners were observed articulating partial or tentative ideas more confidently within small groups before contributing to wider discussion, which I feel can be interpreted as evidence that the learning environment supported psychological safety and reduced the perceived risk associated with participation (A4, A5, V1).

The quality of dialogue during applied simulation tasks was also noted as a strength. Learners were observed using appropriate terminology and collaboratively justifying and challenging system design decisions, indicating professional reasoning rather than surface level interaction with the software. In discussion with Greg following the intervention, he identified a clear shift in my teaching approach, noting reduced reliance on immediate tutor-led validation and increased use of targeted questioning to encourage collective reasoning (A2, K2, K3, K4).

Importantly, the observation also identified areas for continued development. In particular, Greg confirmed the need to ensure sufficient time for whole-group synthesis following peer activities, I agree that this should be more carefully implemented going forward to support consolidation of learning and shared understanding across the group. This feedback has informed subsequent refinements to session pacing and plenary design, and has proved invaluable in the continuous improvement of my teaching practice (K3, A5, V5).

1.5.2 Evaluation of Module Review Feedback

Additional evidence supporting the effectiveness of the teaching intervention was obtained through analysis of learner feedback collected following completion of the module. Module feedback was gathered in line with institutional quality assurance processes and provides a learner-centred perspective on key themes, including opportunities for engagement, clarity of learning activities, and perceived relevance to professional practice (K5). While acknowledging the limitations of module review data as a summative and subjective source, this feedback offers valuable support to comments made during the post-intervention teaching

observation (K5). Learners were asked to respond anonymously to a series of statements using a five-point Likert scale. The statements are summarised below:

1. The teaching sessions supported my engagement with the module content.
2. Learning activities helped me to understand how technical concepts apply in real manufacturing contexts.
3. I was able to contribute to discussions or group activities during teaching sessions.
4. Discussion with other students helped me to clarify my own understanding of key concepts.
5. I was encouraged to think critically about alternative approaches or solutions.

Where 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree

Responses to the statements were aggregated and expressed as proportions of the maximum possible score in each category, these are tabulated below:

Table 5: Summary of Module Feedback

Theme	Review Item	Aggregate Score	Normalised Score
Engagement	1. Sessions supported engagement with content	21	84%
Relevance	2. Learning linked theory to manufacturing practice	23	92%
Participation	3. Felt able to contribute in sessions	20	80%
Peer Learning	4. Discussion with peers supported understanding	22	88%
Critical Thinking	5. Encouraged comparison and justification	19	76%

Note: values represent aggregated and normalised summaries derived from a small-cohort module review (five respondents) and are used descriptively rather than inferentially.

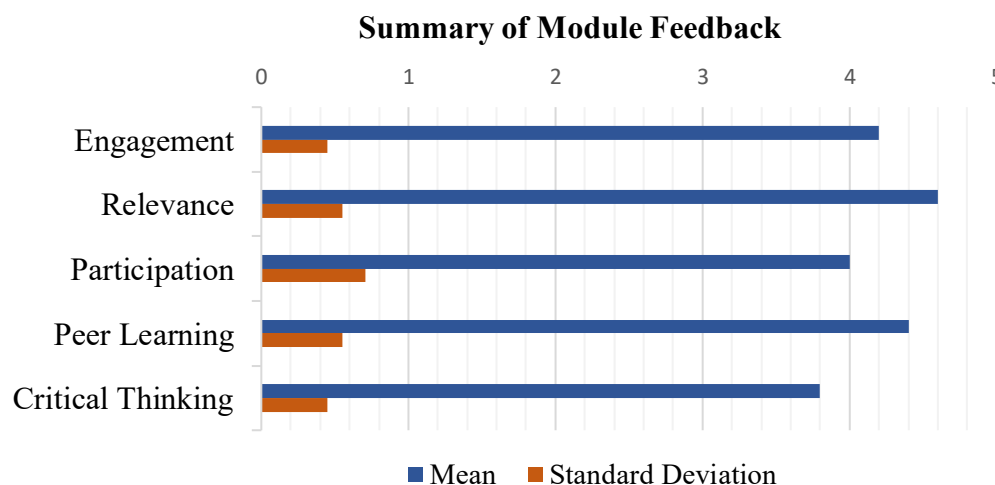


Figure 1: Graph Summarising Average Feedback Scores and Standard Deviation

Overall, responses indicated high perceived engagement and professional relevance of learning activities, with strong agreement that discussion with peers supported understanding of complex concepts. The high score for the peer learning theme (88%) supports the observation that learners increasingly relied on explanation, comparison, and collaborative reasoning during group work.

Scores relating to confidence in contributing during sessions were positive but comparatively lower (80%) than those for engagement and relevance. This suggests that while conditions for participation had improved, the development of learner confidence remains incremental rather than immediate

Items relating to critical thinking and comparison of alternative approaches were also rated positively (76%), indicating that learners felt encouraged to justify decisions and engage with multiple alternative solutions. Although not the highest-rated theme, this result aligns with qualitative observations made during delivery, that learners increasingly articulated assumptions and challenged reasoning during applied tasks.

The module review summaries provide supportive, though not definitive, evidence that the teaching intervention enhanced learner engagement, peer dialogue, and reasoning. When considered alongside the post-intervention teaching observation, the data collected offers useful evaluative feedback, suggesting that the intervention represents a meaningful enhancement to my delivery practice. Importantly, this process has informed the ongoing refinement of session structure, supporting the continuous improvement of my teaching and learning practice (A5, V3, K3).

1.5.3 Limitations of the Evaluation

Despite these positive indicators, a few limitations must be acknowledged. Firstly, the evaluation is based primarily on observational evidence and learner feedback rather than on controlled comparative data (Guskey, 2000). While changes in participation and dialogue were noticeable, these cannot be attributed solely to the intervention without considering other contextual factors, such as cohort dynamics, timing within the academic year, or increasing familiarity among learners. (K3)

Secondly, confidence and participation should not be conflated with attainment. Although increased dialogue and engagement are valuable, further analysis of assessment performance and written justification would be required to determine the extent to which the intervention

translated into measurable improvements in learning outcomes. Time constraints within the module delivery limited the scope for longitudinal evaluation during the intervention cycle.

1.6 Conclusion

This teaching intervention cycle has demonstrated that the intentional design and facilitation of structured peer learning, formative feedback loops, and psychologically safe learning environments can meaningfully enhance engagement and participation within a heterogeneous DA cohort. By moving beyond reliance on voluntary, whole-group discussion and reactive tutor-led feedback, the intervention supported more equitable involvement and enabled a broader range of learners to articulate reasoning, test understanding, and develop confidence through dialogue.

Evidence from post-intervention teaching observation and module review feedback suggests a clear shift in classroom dynamics. Learners were observed engaging more actively with peers, justifying decisions collaboratively, and demonstrating increased willingness to express partial or tentative understanding within low-risk settings. Notably, quieter and less experienced learners were seen to contribute more consistently within small-group activities, indicating that the intervention successfully reduced perceived interpersonal risk and supported psychological safety. These changes align with research that emphasises the importance of sustained, dialogic engagement in developing learner agency, confidence, and professional reasoning (V3).

While recognising the limitations of summative module feedback as a definitive measure, the comparison of observational evidence, reflective practice, and learner feedback offers a useful account of enhanced engagement, peer dialogue, and reasoning. Importantly, the intervention has informed my own professional development. It has prompted me to reflect on my facilitation practices towards greater learner autonomy, more deliberate pacing and structuring of activities, and increased emphasis on consolidation through reflective plenaries.

Overall, this intervention represents a meaningful enhancement to my teaching and learning practice. It reinforces the value of intentional, research-informed design in supporting inclusive participation and highlights the importance of continuous reflection and iteration when working within diverse DA contexts. The knowledge gained through this cycle provides a strong basis for further refinement and development of my teaching practice in support of inclusive, high-quality engineering education (A5, V3).

1.6.1 Recommendations for Continued Development

Reflecting on the intervention process, the following recommendations highlight opportunities for continued refinement and development of my teaching practice:

1. Build in more deliberately timed plenary debriefs following peer activities to consolidate learning and shared understanding (A5, K2).
2. Introduce more graduated participation techniques to support learners transitioning from small-group discussion to whole-class contribution (V1, V2).
3. Embed short, structured reflective prompts to help learners recognise the value of peer feedback and further develop evaluative judgement (A3, A4).
4. Refine task pacing and instructions further to ensure role-based peer activities remain clear, inclusive, and focused on learning outcomes (A5).
5. Collect more structured mid-module feedback to monitor the changes implemented more longitudinally going forward (K5).

1.7 References

- Ainscow, M. (2020) 'Promoting inclusion and equity in education: lessons from international experiences', *Nordic Journal of Studies in Educational Policy*, 6(1), pp. 7–16. Available at: <https://doi.org/10.1080/20020317.2020.1729587>.
- Ashwin, P. et al. (2020) *Reflective Teaching in Higher Education*.
- Aubrey, K. and Riley, A. (2022) *Understanding and using educational theories*. 3rd edition. London: SAGE Publications.
- Biggs, J. and Tang, C. (2011) *Teaching for Quality Learning at University*. Maidenhead: McGraw-Hill Education.
- Boud, D., Cohen, R. and Sampson, J. (2013) *Peer learning in higher education: learning from and with each other*.
- Boud, D. and Molloy, E. (2012) *Feedback in higher and professional education: understanding it and doing it well*.
- Boud, D. and Solomon, N. (2001) *Work-based Learning: A New Higher Education?*
- Bovill, C. (2020) 'Co-creation in learning and teaching: the case for a whole-class approach in higher education', *Higher Education*, 79. Available at: <https://doi.org/10.1007/s10734-019-00453-w>.
- Brookfield, S.D. (2017) *Becoming a Critically Reflective Teacher*. Wiley. Available at: <https://books.google.co.uk/books?id=gmbbDQAAQBAJ>.
- Carless, D. et al. (2011) 'Developing sustainable feedback practices', *Studies in Higher Education*, 36(4), pp. 395–407. Available at: <https://doi.org/10.1080/03075071003642449>.
- Collins, A., Brown, J. and Newman, S. (2018) 'Cognitive Apprenticeship: Teaching the Crafts of Reading, Writing, and Mathematics', pp. 453–494. Available at: <https://doi.org/10.4324/9781315044408-14>.
- Curto-Reverte, A. et al. (2025) 'The role of work-integrated learning in the European Higher Education Area: A systematic review', *Review of Education*, 13(3), p. e70114. Available at: <https://doi.org/https://doi.org/10.1002/rev3.70114>.
- Edmondson, A. (1999) 'Psychological safety and learning behavior in teams', *Administrative Science Quarterly*, 44, pp. 250–282.
- Edmondson, A.C. (2019) *The fearless organization creating psychological safety in the workplace for learning, innovation, and growth*. Hoboken, New Jersey: John Wiley & Sons, Inc.
- Fassinger, P.A. (1995) 'Understanding Classroom Interaction: Students' and Professors' Contributions to Students' Silence', *The Journal of Higher Education*, 66(1), pp. 82–96. Available at: <https://doi.org/10.2307/2943952>.
- Freeman, S. et al. (2014) 'Active learning increases student performance in science, engineering, and mathematics', *Proceedings of the National Academy of Sciences*, 111(23), pp. 8410–8415. Available at: <https://doi.org/10.1073/pnas.1319030111>.

- Fritschner, L.M. (2000) 'Inside the Undergraduate College Classroom', *The Journal of Higher Education*, 71(3), pp. 342–362. Available at: <https://doi.org/10.1080/00221546.2000.11780826>.
- Guskey, T.R. (2000) 'Evaluating professional development'. Thousand Oaks, CA: Corwin Press. Available at: https://unesdoc.unesco.org/notice?id=p::usmarcdef_0000135314.
- Hattie, J. and Timperley, H. (2007) 'The Power of Feedback', *Review of Educational Research*, 77(1), pp. 81–112. Available at: <http://www.jstor.org/stable/4624888>.
- Illeris, Knud. (2007) *How we learn : learning and non-learning in school and beyond*. London: Routledge.
- Jonassen, D., Strobel, J. and Lee, C.B. (2006) 'Everyday Problem Solving in Engineering: Lessons for Engineering Educators', *Journal of Engineering Education*, 95(2), pp. 139–151. Available at: <https://doi.org/https://doi.org/10.1002/j.2168-9830.2006.tb00885.x>.
- Kahu, E. and Nelson, K. (2017) 'Student engagement in the educational interface: understanding the mechanisms of student success', *Higher Education Research & Development*, 37, pp. 1–14. Available at: <https://doi.org/10.1080/07294360.2017.1344197>.
- Knowles, M. et al. (2020) *The Adult Learner: The Definitive Classic in Adult Education and Human Resource Development*. Available at: <https://doi.org/10.4324/9780429299612>.
- Knowles, M.S. (1980) *The modern practice of adult education : from pedagogy to andragogy*. Revised and updated ed. New York: Cambridge.
- Lester, S. and Costley, C. (2010) 'Work-based learning at higher education level: Value, practice and critique', *Studies in Higher Education - STUD HIGH EDUC*, 35, pp. 561–575. Available at: <https://doi.org/10.1080/03075070903216635>.
- Looman, N. et al. (2022) 'Exploring power dynamics and their impact on intraprofessional learning', *Medical Education*, 56(4), pp. 444–455. Available at: <https://doi.org/https://doi.org/10.1111/medu.14706>.
- Mercer, N. and Littleton, K. (2007) 'Dialogue and the Development of Children's Thinking: A Sociocultural Approach', *Dialogue and the Development of Children's Thinking: A Sociocultural Approach* [Preprint]. Available at: <https://doi.org/10.4324/9780203946657>.
- Nicol, D.J. and Macfarlane-Dick, D. (2006) 'Formative assessment and self-regulated learning: a model and seven principles of good feedback practice', *Studies in Higher Education*, 31(2), pp. 199–218. Available at: <https://doi.org/10.1080/03075070600572090>.
- Prince, M. (2004) 'Does Active Learning Work? A Review of the Research', *Journal of Engineering Education*, 93(3), pp. 223–231. Available at: <https://doi.org/https://doi.org/10.1002/j.2168-9830.2004.tb00809.x>.
- Prince, M. and Felder, R. (2006) 'Inductive Teaching and Learning Methods: Definitions, Comparisons, and Research Bases', *Journal of Engineering Education*, 95, pp. 123–137. Available at: <https://doi.org/10.1002/j.2168-9830.2006.tb00884.x>.
- QAA (2022) *Higher Education in Apprenticeships Characteristics Statement*. Available at: <https://www.qaa.ac.uk/the-quality-code/characteristics-statements/higher-education-in-apprenticeships-characteristics-statement>.

Roxå, T. and Mårtensson, K. (2009) 'Significant conversations and significant networks - exploring the backstage of the teaching arena', *Studies in Higher Education*, 34, pp. 547–559. Available at: <https://doi.org/10.1080/03075070802597200>.

Ryan, R.M. and Deci, E.L. (2020) 'Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions', *Contemporary Educational Psychology* [Preprint]. Available at: <https://api.semanticscholar.org/CorpusID:216535176>.

Sadler, D.R. (1989) 'Formative assessment and the design of instructional systems', *Instructional Science*, 18(2), pp. 119–144. Available at: <https://doi.org/10.1007/BF00117714>.

Spomer, K. (2022) Psychological safety and academic performance: A quantitative correlational study . Grand Canyon University.

Sweller, J. (2011) 'CHAPTER TWO - Cognitive Load Theory', in J.P. Mestre and B.H. Ross (eds.) *Psychology of Learning and Motivation*. Academic Press, pp. 37–76. Available at: <https://doi.org/https://doi.org/10.1016/B978-0-12-387691-1.00002-8>.

Topping, K. (2017) 'Peer Assessment : Learning by Judging and Discussing the Work of Other Learners', *Interdisciplinary Education and Psychology*, 1. Available at: <https://doi.org/10.31532/InterdiscipEducPsychol.1.1.007>.

Trevelyan, J.P. (2014) *The making of an expert engineer : how to have a wonderful career creating a better world and spending lots of money belonging to other people*. Leiden, Netherlands: CRC Press/Balkema (Balkema Book).

Wisniewski, B., Zierer, K. and Hattie, J.A.C. (2020) 'The Power of Feedback Revisited: A Meta-Analysis of Educational Feedback Research', *Frontiers in Psychology*, 10. Available at: <https://api.semanticscholar.org/CorpusID:210840113>.

2 Teaching Intervention Cycle 2



PG Cert tHE Portfolio - Teaching Intervention Cycle - 3

Improving Assessment Appropriateness on the Degree Apprenticeship Provision

The background and context

This intervention took place within the Control Technology module that I deliver to Level 6 Manufacturing Engineering Degree Apprenticeship (DA) students, who are employed within the manufacturing industry and studying alongside professional practice. Through my teaching, I have become increasingly aware that learners bring substantial experiential knowledge and expect assessment to be relevant, authentic and directly applicable to the workplace (A1,V3).

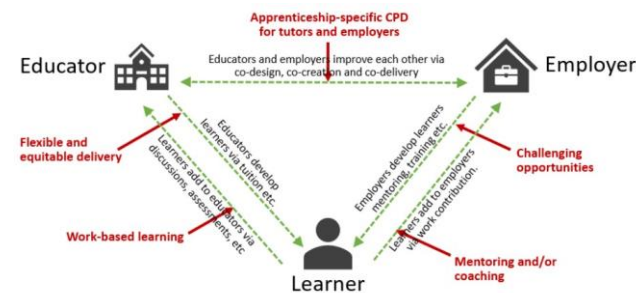


Figure 1: Degree Apprenticeship Learning Model (QAA, 2025)

The previous summative assessment design satisfied the competency requirements set out by the Engineering Council and aligned with required learning outcomes, with a strong emphasis on academic research and critical discussion. While this approach was academically valid, subsequent reflection highlighted that it provided limited opportunity for students to demonstrate applied programming competence, despite this being a core graduate skill identified as essential by our Employer Liaison Group (ELG) and the wider engineering industry. This prompted me to undertake a critical re-evaluation of the assessment's appropriateness, leading me to review its design through the lens of constructive alignment (Biggs, 2003) and adult learning theory (Knowles, 1970) (A1,V3).

The Problem

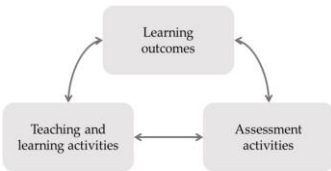


Figure 2: Constructive alignment diagram (Braßler, 2024)

On reflection, the key issue was a lack of coherence between the learning outcomes, my teaching activities and the assessment task. Although taught sessions emphasised programming, control logic and error handling, the assessment primarily rewarded literature synthesis. I observed that this reduced authenticity, limited student motivation and encouraged surface approaches to learning. I was also increasingly concerned that a research-based submission was vulnerable to inappropriate use of generative AI, which reduced my confidence in the validity of assessment submissions. I therefore identified a clear need for a more practice focused and robust assessment (A3,V4).

Module Learning Outcomes

1. Analyse and characterise feedback systems in both the time and frequency domains and design PLC systems to satisfy a control specification.
2. Analyse and characterise feedback systems in both the time and frequency domains and design PLC systems to satisfy a control specification.

Figure 3: Control Technology Module Learning Outcomes

The intervention

In response, I redesigned the assessment to centre on a practical, simulation-based programming task. Students are now required to design, implement and test a control system within an industry standard PLC simulation environment and provide a brief technical justification supported by relevant literature. I aimed to allow learners to demonstrate sequencing, logic design, validation and troubleshooting in a way that closely mirrors professional practice. The intervention reflects constructive alignment, as learning outcomes, teaching activities and assessment criteria are now more explicitly integrated into lecture and assessment design (A1,A4,K2,K4).

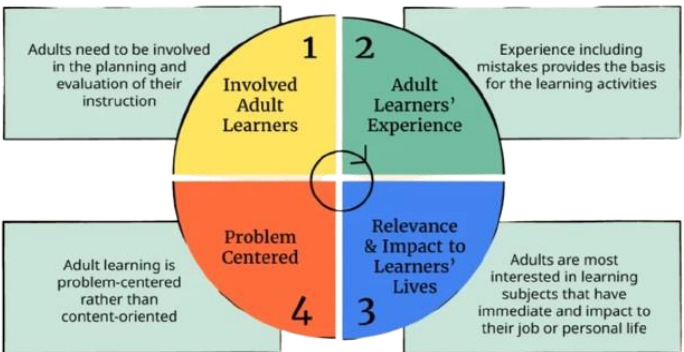


Figure 4: Knowles' 4 principles of andragogy adapted from (Nichols, 2026)

My design was informed by Knowles' (1970) principles of andragogy, recognising learners as self-directed, problem-centred and motivated by immediate professional relevance. Simulation-based assessment design supported inclusivity and safety while maintaining authenticity, enabling equitable participation regardless of access to industrial equipment at work. Emphasis on functional performance & professional reasoning strengthened assessment robustness against generative AI misuse (A4, V1).

The process

The intervention process followed the Gibbs (1988) reflective cycle, beginning with reflection on the causes of misalignment between learning outcomes and assessment. I reviewed the session learning outcomes to promote applied competence and rewrote assessment guidance and marking criteria to prioritise demonstration of skills (A1,A3,K2,K4). I then implemented the intervention by embedding formative opportunities through in-class simulation activities, utilising peer discussion to support learner confidence and self-regulation (A4,V1,V3).

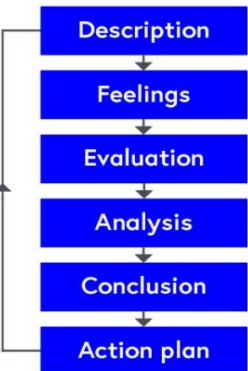


Figure 5: Gibbs reflective cycle diagram adapted from (Future Learn, n.d.)

The impact

Initial review with the ELG confirmed improved alignment between the assessment, industrial practice and intended learning outcomes. Evaluation of learner attainment indicates higher engagement, clearer evidence of individual achievement and modest increases in average marks, pass rates and attainment above 60% compared with the previous year. The focus on practical error handling, system validation and professional reasoning reduced susceptibility to inappropriate generative AI use, strengthening confidence in assessment outcomes (A3, V4).

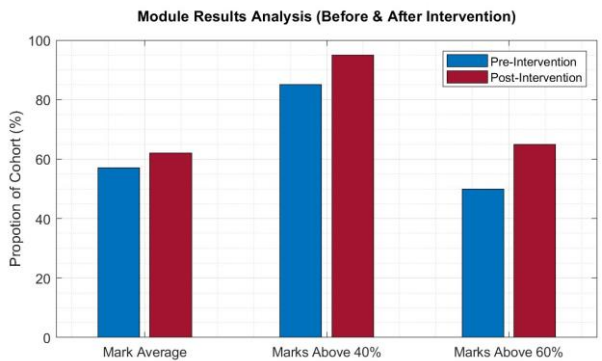


Figure 6: Graph showing post-intervention module results analysis compared with results from previous academic year

Learning & professional practice

Assessment that mirrors real-workplace practice is shown to increase construct validity, motivation and perceived relevance, particularly in professionally-oriented programmes (Gulikers et al, 2004)

The development of quality-assured, integrated assessments that reflect real occupational tasks critical to learner success and employer confidence (Konstantinou and Miller, 2020)

Well-designed, authentic, context-specific assessments are more robust in an AI-enabled environment as they prioritise professional judgement and situated application over reproducible outputs (QAA, 2024)

This intervention emphasised the value of authentic, workplace-aligned assessment in supporting learner engagement and achievement within DA provision. Redesigning the assessment strengthened my design and subject-specific pedagogy skills, while reinforcing professional values of inclusivity and evidence-informed practice. The experience demonstrated to me how constructive alignment can enhance confidence, professional identity and deeper learning in manufacturing engineering contexts.(A5,V3)

References

1. Biggs, J. (2003) Aligning Teaching for Constructing Learning.
2. Braßler, M. (2024) Students' Digital Competence Development in the Production of Open Educational Resources in Education for Sustainable Development, Sustainability, 16, p. 1674. Available at: <https://doi.org/10.3390/su16041674>.
3. Future Learn (no date) Self-reflective practice - Using Gibbs 1988 approach to self-reflection to review your volunteering activities., volunteering in the Classroom: Feedback, Reviewing and Improving STEM Activities.
4. Gibbs, Graham. (1998) Learning by doing : a guide to teaching and learning methods. Oxford Centre for Staff and Learning Development, Oxford Brookes University.
5. Gulikers, J., Bastiaens, T. and Kirschner, P. (2004) The Five-Dimensional Framework for Authentic Assessment, Educational Technology Research and Development, 52, pp. 67–86. Available at: <https://doi.org/10.1007/BF02504676>.
6. Knowles, M.S. (1970) The Modern Practice of Adult Education: From Pedagogy to Andragogy.
7. Konstantinou, I. and Miller, E. (2020) Investigating work-integrated learning and its relevance to skills development in degree apprenticeships, Higher Education, Skills and Work-based Learning, 10(5), pp. 767–781.
8. Nichols, R. (2026) How To Nurture Effective Peer To Peer Learning In Your Organization, People Managing People.
9. QAA (2024) Quality Compass navigating the complexities of the artificial.

Figure 2: Teaching Intervention Cycle 2 Poster

3 Report on Teaching Observations

Having completed three teaching observations across two different modules and cohorts, I have found the process both affirming and informative in shaping my ongoing development as an early-career academic. Collectively, the observations have enabled me to reflect critically on the effectiveness of my current teaching practice, while also evidencing how positive changes to session design can enhance student engagement and learning over time.

Feedback from Dr Greg Owen in the first observation was particularly encouraging in recognising the planning, structure, and industrial relevance underpinning my lesson plans, especially within the technically demanding context of contemporary developments in manufacturing engineering (A1, A2, K2). I was encouraged that the feedback recognised that content, which could easily have become entirely didactic in nature, was instead viewed positively as interactive and discussion-led. At the same time, this observation prompted me to reflect more carefully on the limits of dialogue-heavy formative assessment. While questioning was effective for many students, it became clear that some learners were less visible within these exchanges, particularly younger students studying alongside very experienced degree apprenticeship peers. This reinforced the importance of developing formative assessment strategies that promote more even engagement and that capture the learning of all students, not only those most confident to contribute (A3, V1, V2). This observation was instrumental in guiding my first teaching intervention and provided a useful baseline from which the effectiveness of the intervention actions could be evaluated.

I was very fortunate that Greg was also able to observe one of my post-intervention sessions with the same cohort and provide feedback on how this reflection informed my subsequent practice. In response to earlier feedback, I more intentionally distributed learning activities throughout the session and embedded structured peer discussion within the lesson plan (A2, A4). Encouraging students to work in pairs and within structured groups to predict and rationalise simulation outcomes proved particularly effective in supporting reasoning and conceptual understanding (K1, K2). The feedback confirmed that these changes facilitated more inclusive engagement and helped students articulate their thinking with greater confidence. However, the observation also highlighted the need to strengthen plenary discussions so that learning from peer activities is consolidated more explicitly at whole-class level, particularly where time constraints limit deeper reflection (A3).

The third observation, conducted by Dr Owen Williams, further reinforced the value of combining clear structure with applied, student-centred approaches when delivering complex technical material. The use of visual explanation, scenario-based questioning, and industrial case studies within the lesson plan supported students in transitioning towards additive-specific design thinking (A1, K1). The suggestion to introduce pre-session resources was particularly valuable, aligning closely with my ongoing aim to scaffold learning more effectively and manage cognitive load during contact time, especially within Level 4 modules (K2, K3, V1).

Overall, this cycle of observation and feedback has strengthened my confidence in my teaching practice while also improving my awareness of where further refinement is needed. Going forward, I intend to continue embedding low-stakes formative assessment, refining opportunities for consolidation and reflection, and developing pre-session learning resources to support inclusivity across each of my modules (A3, A4, V3).

3.1 Observation 1

PGCert tHE OBSERVATION FORM -PSF 2023



Details of the Observation	
Observee	Jordan Jenkins
Practice Advisor / Expert peer observer	Dr Gregory Owen
Date of the Observation	09/01/26
Campus / Location	IQ
Date, Time, Duration	1pm SAIQ109
Subject Speciality	AI for Manufacturing Engineers – Predictive Maintenance
Type of activity	Lecture / MATLAB classwork exercise
This observation will contribute to the participant's portfolio of evidence to satisfy the assessment of the PGCert tHE and should be undertaken by an experienced academic colleague or professional colleague. Observation by a fellow participant on the programme is not permissible as a means of authenticating practice.	

Teaching/Support preparation [A1: Design and plan learning activities/programmes <i>i.e. Preparation, selection and organisation of content. Choice of teaching/learning methods.</i>
Comments – The PowerPoint slides were clear, well-structured, and appropriately designed, using an effective combination of text, graphs, and diagrams. – There was constant dialogue between the lecturer and students – Teaching resources were excellent and promoted active discussion throughout the session The way Jordan prepared and delivered the content was of a very high standard. He drew effectively on historical material and relevant examples to emphasise the significance of the key concepts. – An area of learning that could easily have become a traditional ‘talk and chalk’ session was instead brought to life through well-chosen examples, including contrasts between historical and contemporary characteristics such as cost and ethics. – The discussions that Jordan encouraged served as an excellent mechanism for engaging students. They also demonstrated his depth of subject knowledge and confidence, evidenced by his ability to ask open-ended questions, listen carefully to responses, and then probe further, consistently stretching and challenging students’ thinking.

Teaching [A2: Teach and/or support learning through appropriate approaches and environments.] <i>i.e. Beginning class, introduction, continuity with other sessions, students' prior knowledge. Clarity of presentation. Pace. Attitude to the subject matter. Use of appropriate reinforcement. Ending the session – summary, future work etc. Technique and Aids: General apparatus – board, data projector, use of handouts. Was effective communication achieved? Was there good student–teacher rapport? Were the aims/outcomes achieved? Appropriateness of teaching/learning methods.</i>
Comments – Jordan is a highly skilled teacher; his delivery and teaching resources are of a high quality and demonstrate a level of maturity that is particularly impressive for an academic at this early stage in his career. – A clear session overview was provided at the start of the class, offering a well-articulated outline of the session's purpose and structure. – One area for consideration would be to enhance the session overview by explicitly incorporating TSSBT (The Student Should Be Able To) statements. This would support the differentiation of learning outcomes (e.g. all students should be able to / most students should be able to / some students should be able to), enabling more explicit support, stretch, and challenge for learners of differing abilities. – A very effective recap activity was delivered, making clear use of open-ended questions to formatively assess students' prior knowledge of the subject area. – The recap demonstrated clearly that learning had taken place in previous sessions. This allowed the lecturer to appropriately dictate the pace of the session, which was particularly important in this small class of capable, professional, and highly motivated learners. – Jordan has established an excellent rapport with the class, characterised by a learning environment that is friendly, professional, and respectful. – This is a high-risk, high-reward class. Despite being Year 1 (Level 4) students, they already possess a strong level of subject knowledge. Such a cohort can be challenging without thorough preparation and confident subject expertise. However, when these elements are present, the experience is extremely rewarding. Jordan excelled in this session and should be commended for his performance.
Effective Learning Environments [A4: support and guide learners /V1 Respect individual learners/diverse groups of learners] <i>i.e General class atmosphere, level of participation, attention, and interest. Student attitude and ability to carry out classwork. Were learning problems identified and overcome? Awareness of individual needs. Attitude to students.</i>
Comments – Jordan has created an excellent learning environment that is respectful, inclusive, and highly conducive to learning. – He used praise and humour effectively to build rapport and support student engagement. – During the early part of the session, there was an extended period of open question-and-answer discussion. Most students actively engaged, while some students did not contribute.

It is difficult to draw firm conclusions about this student's learning history or confidence from a single observation. – Jordan is encouraged to consider strategies for sensitively engaging these students in future sessions. While the students appeared to be listening attentively, they did not actively participate. This should be approached sensitively, as the students appeared to be younger than their peers and part of a cohort with significant industrial experience, which may have contributed to their reluctance to participate.
Assessment [A3: Assess and give feedback for learning] <i>i.e Formative/summative assessment examples , Question and answer technique. Other evaluation procedures, class management, instructions to students.</i>
Comments – During the taught component of the session, there was continuous dialogue between the lecturer and the students. Formative assessment took place throughout via question-and-answer interactions. This approach was highly effective for most of the students present; however, as noted previously, an area for development would be to consider how all student's learning could be formatively assessed to the same extent. – An in-class exercise exploring “What type of machine learning approach is best for this problem?” was an effective method for assessing students' understanding. This was particularly strengthened by the use of probing follow-up questions. However, once again, some students did not actively engage in this activity. – The plenary at the end of the taught session was appropriate and provided a valuable opportunity to assess the learning and understanding of each student.
Core Knowledge • K1 How learners learn, generally and within specific subjects • K2 approaches to teaching and or/supporting learning appropriate for subjects and levels of study. • K3 Critical evaluation as a basis for effective practice. • K4 Appropriate use of digital technologies / resources. • K5 requirements for quality assurance, enhancement and implications for practice
Comments – K1 – The pace and academic level of the session were highly appropriate for this specific group of learners, enabling sustained engagement and effective progression through the material. – K2 – The session incorporated a well-balanced blend of teacher-led input, structured question-and-answer discussions, and practical learning activities, supporting varied learning preferences and active participation. – K3 – A substantial proportion of the taught content directly addressed this area, demonstrating clear alignment between learning activities, subject content, and intended learning outcomes. – K4 – The use of MATLAB as a teaching and learning tool, alongside rigorous discussion of artificial intelligence concepts, including humanistic and ethical perspectives, provided students with both technical and critical insight into the subject area.

Professional values • V1 Respect for individual learners /diverse groups of learners • V2 Promote engagement and learning and equity of opportunity for all to reach their potential. • V3 Use scholarship, research or professional learning, or other evidence informed approaches as the basis of effective practise. • V4 respond to the wider context in which higher education operates, recognising implications for practice. • V5 Collaborate with others to enhance practice.
Comments - V1/V2/V3/V4/V5 - All of the above were covered in depth
Examples of good practice: – An excellent rapport has been developed with the class, contributing to a positive and productive learning environment. – The teaching resources were of a high quality and effectively supported active discussion throughout the session. – The lesson plan, which began with a thorough discussion of the subject matter and was followed by a MATLAB exercise applying the concepts discussed, was highly appropriate and effective in consolidating students’ learning. Students were introduced to the theoretical aspects of the topic and then given the opportunity to apply this knowledge in practice. Action points: – Consider incorporating explicitly differentiated learning outcomes so that students can self-assess their level of understanding at the end of the session. – Reflect on how you might ensure that all students are actively engaged in a small-group setting, particularly when working with a cohort that has a diverse range of ages, experiences, and levels of confidence. – I debated whether to include this comment in the Examples of Good Practice section or here and have chosen this section based on the average ability and engagement levels typically seen across most classes. This session was very well delivered, skilfully facilitated, and highly engaging for this particular group. – However, with a class of lower ability or less maturity, it may be advantageous to integrate learning activities more evenly throughout the session rather than concentrating them primarily in the latter half. Even with strong resources and delivery, an extended period (over 110 minutes) without an active exercise could risk a reduction in student attention. – It may therefore be worth considering how class activities could be embedded earlier and more regularly throughout the session, enabling students to be actively “doing” from an earlier stage. While this could interrupt the flow of the session (for example, through logging on and off systems) and introduce the challenge of refocusing the class afterwards, it remains a valuable point for reflection.

- If this session were graded, it would be judged as a strong good. With the addition of more integrated activities throughout the session, while retaining the current high quality of delivery and student engagement, it would reach an excellent standard. Encouraging students to be more actively involved throughout the session not only aids learning but can also make the session easier to manage for you.

For Observee

This feedback has given me confidence that my session design and teaching approach are effective, particularly in terms of creating a positive and supportive learning environment (A1, A2, A4). At the same time, it has encouraged me to reflect more critically on how my teaching could be refined to ensure all students are supported equitably, particularly those who may be less confident or less experienced (V1, V2).

I agree with the recommendation to make learning outcomes more explicitly differentiated using TSSBT statements, as this would help students better understand what is expected of them and reflect on their own progress. This fits closely with my aim to teach inclusively and to support learners with a wide range of prior knowledge, confidence levels, and professional experience. Reflecting on the structure of the session has also made me more aware of the need to introduce active learning opportunities earlier and more consistently, especially in longer sessions, to help maintain engagement for cohorts with lower academic maturity or confidence.

As a result of this observation, I plan to make greater use of frequent, low-stakes formative activities so that I can gain a clearer picture of all students' understanding as the session progresses. Engaging in this process has strengthened my approach to teaching and will directly shape my ongoing professional development and future session design (K3, V3).

Observer *AT.O ~ .*

Date 09/01/26

Observee *J.R. Jenkins*

Date 09/01/26

PGCert PARTICIPANTS

On completion of the peer observation reports for each module, compose a short reflective paragraph on your observation experiences for inclusion in your portfolio along with the observation sheets.

3.2 Observation 2

PGCert tHE OBSERVATION FORM -PSF 2023



Details of the Observation	
Observee	Jordan Jenkins
Practice Advisor / Expert peer observer	Dr Greg Owen
Date of the Observation	20/03/26
Campus / Location	IQ
Date, Time, Duration	1pm IQ109
Subject Speciality	Modelling of Manufacturing Systems: Batch & Continuous Flow
Type of activity	Lecture with practical activity
This observation will contribute to the participant's portfolio of evidence to satisfy the assessment of the PGCert tHE and should be undertaken by an experienced academic colleague or professional colleague. Observation by a fellow participant on the programme is not permissible as a means of authenticating practice.	

Teaching/Support preparation [A1: Design and plan learning activities/programmes] <i>i.e. Preparation, selection and organisation of content. Choice of teaching/learning methods.</i>
Comments – The session was clearly structured and well prepared, with a coherent lesson plan that aligned learning activities to the stated learning objectives. – The sequencing of content showed evidence of intentional design, with conceptual explanation preceding practical application. – Activities were distributed throughout the lecture supporting sustained engagement across the session. – Activities were clearly planned to encourage interaction and comparison of ideas.
Teaching [A2: Teach and/or support learning through appropriate approaches and environments.] <i>i.e. Beginning class, introduction, continuity with other sessions, students' prior knowledge. Clarity of presentation. Pace. Attitude to the subject matter. Use of appropriate reinforcement. Ending the session – summary, future work etc. Technique and Aids: General</i>

apparatus – board, data projector, use of handouts. Was effective communication achieved? Was there good student–teacher rapport? Were the aims/outcomes achieved? Appropriateness of teaching/learning methods.

Comments

- The session opened with a concise recap to prior knowledge and established continuity with earlier learning.
- Jordan articulated the purpose of the session clearly, emphasising reasoning, comparison, and interpretation of simulation models developed later.
- Jordan facilitated learning effectively, alternating between short explanatory points and student-led activities.
- Explanations of discrete event simulation concepts were clear and appropriately pitched, with worked examples used to illustrate system logic.
- The pace of the session was generally appropriate, though at times the transition between explanation and activity required careful management to ensure all students remained oriented to the task.
- Asking students pairs to anticipate outcomes before running simulations was particularly effective and prompted discussion, Jordan encouraged students to articulate assumptions.

Effective Learning Environments [A4: support and guide learners /V1 Respect individual learners/diverse groups of learners]

i.e General class atmosphere, level of participation, attention, and interest. Student attitude and ability to carry out classwork. Were learning problems identified and overcome? Awareness of individual needs. Attitude to students.

Comments

- The learning environment was respectful and supportive, with students working collaboratively in mixed groups.
- There was a good level of active contribution within the class, particularly when working through model predictions and interpreting outputs.
- The use of small-group breakouts prior to plenary effectively lowered the threshold for participation.
- Jordan was attentive to the wider group dynamics and intervened appropriately, using open questions to draw out contributions, avoiding placing individuals under pressure.
- Some students appeared to prefer contributing within small groups rather than speaking to the class. Supporting confidence in group discussion is an area for further development.

Assessment [A3: Assess and give feedback for learning]

i.e Formative/summative assessment examples , Question and answer technique. Other evaluation procedures, class management, instructions to students.

Comments – Formative assessment was evident throughout the session – Questioning, peer discussion, and group reporting were used as effective feedback mechanisms. – Jordan prompted students to justify and refine their thinking. – Peer-to-peer feedback was evident during group tasks, particularly when students compared models and discussed performance trade-offs. – Opportunities for group discussion were occasionally constrained by time, limiting the extent to which all groups' learning could be identified.
Core Knowledge • K1 How learners learn, generally and within specific subjects • K2 approaches to teaching and or/supporting learning appropriate for subjects and levels of study. • K3 Critical evaluation as a basis for effective practice. • K4 Appropriate use of digital technologies / resources. • K5 requirements for quality assurance, enhancement and implications for practice
Comments – Jordan demonstrated awareness of how learners engage with complex, applied material, particularly through the use of peer discussion and rehearsal before group discussion – Approaches were well matched to the subject matter and level, combining conceptual explanation with applied simulation tasks Jordan prompted students to justify and refine their thinking. – Jordan clearly showed evidence of critical evaluation of previous practice, particularly in the distribution of activities and the use of structured peer learning to address uneven participation.
Professional values • V1 Respect for individual learners /diverse groups of learners • V2 Promote engagement and learning and equity of opportunity for all to reach their potential. • V3 Use scholarship, research or professional learning, or other evidence informed approaches as the basis of effective practise. • V4 respond to the wider context in which higher education operates, recognising implications for practice. • V5 Collaborate with others to enhance practice.
Comments – The session demonstrated respect for different learner backgrounds and experiences – Engagement opportunities were promoted by activities that valued reasoning and justification. – It is encouraging to see that the session design was informed by reflective practice, particularly in response to prior feedback.

Examples of good practice:

The session demonstrated a thoughtful response to feedback identified in earlier observation, particularly in relation to participation and engagement. The use of structured peer learning and formative feedback contributed to a more inclusive learning environment, though differences in confidence between students remained evident in some places.

Action points:

- Further strengthening whole class discussion to consolidate learning from peer activities,
- Refining time management within the plenary reflection.
- Continue to support quieter students to transition from small-group to whole-group discussion at their own pace.

For Observee

This observation has helped me reflect on how my teaching practice has developed in response to earlier feedback and how the changes to the session design have impacted student engagement (A5, V3). The feedback confirmed that distributing activities throughout the session and using structured peer learning supported students in engaging with complex modelling concepts more confidently and actively (A1, A2, K2, V1). This has reinforced the value of embedding opportunities for discussion, prediction, and reflection rather than relying primarily on tutor-led explanation (A2, A4, K2).

The observation has also highlighted areas for further development, particularly around strengthening plenary discussions so that learning from group activities is consolidated more effectively at whole-class level (A4, K2). Moving forward, I plan to refine my time management during plenaries and continue developing strategies that support quieter students in transitioning from small-group discussion to whole-class contribution at their own pace (A4, V1, V2)

Observer 

Date 20/03/26

Observee 

Date 20/03/26

PGCert PARTICIPANTS

On completion of the peer observation reports for each module, compose a short reflective paragraph on your observation experiences for inclusion in your portfolio along with the observation sheets.

3.3 Observation 3

PGCert tHE OBSERVATION FORM -PSF 2023



Details of the Observation	
Observee	Jordan Jenkins
Practice Advisor / Expert peer observer	Dr Owen Williams
Date of the Observation	26/03/2026
Campus / Location	IQ
Date, Time, Duration	1pm IQ304
Subject Speciality	Design for Additive Manufacturing
Type of activity	Lecture
This observation will contribute to the participant's portfolio of evidence to satisfy the assessment of the PGCert tHE and should be undertaken by an experienced academic colleague or professional colleague. Observation by a fellow participant on the programme is not permissible as a means of authenticating practice.	

Teaching/Support preparation [A1: Design and plan learning activities/programmes] <i>i.e. Preparation, selection and organisation of content. Choice of teaching/learning methods.</i>
Comments The session demonstrated a good level of preparation. The structure of the lecture was clear and purposeful, with learning objectives aligned to both the module outcomes and the developmental level of the cohort. The teaching materials were well organised and sequenced, progressing from foundational concepts in additive manufacturing through to more advanced design considerations associated with DfAM. The lecture slides provided a coherent narrative, supporting students in moving from descriptive understanding to applied design reasoning. The selection of content reflected careful consideration of relevance and scope. Key concepts such as build orientation, anisotropy, residual stress, and topology optimisation were introduced at an appropriate level, supported by visual material and structured explanations. The inclusion of industrial case studies and design data tables suggested a clear intention to prepare students for applied engineering contexts rather than purely theoretical engagement.

Teaching [A2: Teach and/or support learning through appropriate approaches and environments.] <i>i.e. Beginning class, introduction, continuity with other sessions, students' prior knowledge. Clarity of presentation. Pace. Attitude to the subject matter. Use of appropriate reinforcement. Ending the session – summary, future work etc. Technique and Aids: General apparatus – board, data projector, use of handouts. Was effective communication achieved? Was there good student–teacher rapport? Were the aims/outcomes achieved? Appropriateness of teaching/learning methods.</i>
Comments The session began with a clear introduction that framed additive manufacturing in the industrial context. The recap provided continuity and helped situate the topic within a broader manufacturing context. Delivery was clear and appropriately paced, with complex ideas broken down into manageable chunks. Jordan used a range of teaching approaches to maintain engagement, including questioning, discussion, and polling activities embedded within the lecture. These activities were well timed and supported students in actively processing the material rather than passively receiving it. It was good to see that props and visual examples were used effectively to reinforce understanding and to support different learning preferences, the students engaged well with this approach.
Effective Learning Environments [A4: support and guide learners /V1 Respect individual learners/diverse groups of learners] <i>i.e General class atmosphere, level of participation, attention, and interest. Student attitude and ability to carry out classwork. Were learning problems identified and overcome? Awareness of individual needs. Attitude to students.</i>
Comments The learning environment was positive and inclusive. Students appeared comfortable contributing responses and engaging in discussion, including when their understanding was still developing. Jordan responded constructively to partial or tentative answers, using them as opportunities to clarify concepts rather than correcting alone. There was clear awareness of the challenges students face when transitioning from traditional design approaches to additive thinking. This was addressed explicitly through worked examples and repeated emphasis on design rationale, which supported learner confidence and persistence when engaging with complex unfamiliar material.
Assessment [A3: Assess and give feedback for learning] <i>i.e Formative/summative assessment examples , Question and answer technique. Other evaluation procedures, class management, instructions to students.</i>

Comments Formative assessment was embedded throughout the session. Polling and verbal questioning were used to gauge student understanding and to inform subsequent explanation. Instructions for activities were clear, and expectations were communicated effectively. Feedback was immediate and explanatory, often linking student responses back to earlier material or real-world examples. The use of scenario-based questions (analysing failed prints or inappropriate build orientations) was particularly effective in encouraging students to apply design principles rather than recall information.
Core Knowledge • K1 How learners learn, generally and within specific subjects • K2 approaches to teaching and or/supporting learning appropriate for subjects and levels of study. • K3 Critical evaluation as a basis for effective practice. • K4 Appropriate use of digital technologies / resources. • K5 requirements for quality assurance, enhancement and implications for practice
Comments Jordan demonstrated a strong understanding of how students learn technical material at this level, particularly through the use of visual explanation, applied examples, and structured reinforcement. Digital tools were used appropriately to support engagement and learning, and the teaching materials reflected current industrial practice and contemporary design approaches within the additive manufacturing discipline.
Professional values • V1 Respect for individual learners /diverse groups of learners • V2 Promote engagement and learning and equity of opportunity for all to reach their potential. • V3 Use scholarship, research or professional learning, or other evidence informed approaches as the basis of effective practise. • V4 respond to the wider context in which higher education operates, recognising implications for practice. • V5 Collaborate with others to enhance practice.
Comments This was a well-planned session that effectively managed technical depth and accessibility. Student engagement was consistently high, and the teaching approach supported active learning and applied understanding. A potential area for further enhancement would be to include a reflection/consolidation point following the interactive activities, allowing students to articulate learning more directly before moving on. Also, some of the more complex concepts (for example anisotropy and residual stress) may benefit from more pre-session resources, such as short videos or guided reading. Overall, the session reflected thoughtful, student-focused practice and strong alignment between teaching approach, content, and the learning outcomes.

For Observee

I was fortunate to study under Owen's guidance during my undergraduate studies and I greatly value the constructive feedback he has provided on my teaching practice (V3, V5). In particular, Owen's suggestion to introduce pre-session resources aligns closely with my ongoing approach to designing and planning learning activities (A1). While the key concepts were addressed within the taught session, providing short preparatory materials would allow learning to be scaffolded more effectively and help manage cognitive load during contact time, particularly when engaging with theoretically complex material (K1, K2).

In response to this feedback, I plan to develop a series of short podcasts to introduce core theoretical concepts in advance of sessions. This approach will enable me to make use of digital technologies to support learning (K4) and will better accommodate variation in prior knowledge, especially within foundation and Level 4 modules (A1, V1).

Overall, Owen's feedback has been very useful in identifying clear and practical ways to further enhance student learning. Engaging critically with this feedback has supported my ongoing development as a reflective practitioner, encouraging me to refine not only the content I teach, but also the timing and structure of support that enables students to synthesise complex technical material more effectively (K3, V3).

Observer Owen Williams.....

Date 26/03/26

Observee.....

Date 26/03/26

PGCert PARTICIPANTS

On completion of the peer observation reports for each module, compose a short reflective paragraph on your observation experiences for inclusion in your portfolio along with the observation sheets.

4 CPD Event Evaluation

4.1 Event 1- Teaching with MATLAB

Date: 08/12/2025

This CPD activity involved completion of the online “Teaching with MATLAB” training course, designed to support educators in integrating MATLAB tools, a scientific coding and programming software, into teaching and learning. The course focused on strategies for using MATLAB Live Scripts, developing interactive activities, and data-driven examples to promote active learning and conceptual understanding. This CPD was particularly relevant to my role as a lecturer in engineering, as I deliver modules requiring students to engage with modelling, simulation, and data analysis, including Quality and Business Improvement and Control Technology (A5, K4).

A key theme of the training was the use of MATLAB Live Scripts as an interactive teaching medium that combines executable code, narrative explanation, and visualisation within a single learning resource. Reflecting on my prior practice, I recognised that while MATLAB featured heavily in my teaching as a technical problem-solving tool, I had not fully utilised its potential to support active, exploratory learning. The course emphasised designing computational activities that foreground conceptual understanding rather than procedural coding skills, aligning with research highlighting the importance of active learning approaches in improving student engagement and attainment in STEM disciplines (Freeman *et al.*, 2014) (A1, K2, V3).

The training also highlighted to me how Live Scripts can be structured to scaffold learning through progressive ramping/graduation of complexity, allowing students to engage meaningfully with models before being exposed to more advanced technical detail. This resonated with my developing understanding of scaffolding as a pedagogical strategy, particularly in supporting students operating within their zone of proximal development (Vygotsky, 1978). I reflected on how traditional approaches to teaching control modelling and data analysis can impose high cognitive load, particularly for students with limited prior programming experience. By integrating narrative explanation and visual feedback alongside code, Live Scripts can reduce unnecessary cognitive load and enable students to focus on interpreting system behaviour and engineering meaning (Sweller, 2011) (A4, K3, V1).

As a direct outcome of this CPD, I developed new interactive Live Script materials for two modules. Within Quality and Business Improvement, Live Scripts were introduced to support

teaching of predictive maintenance, enabling students to explore condition monitoring datasets, apply simple predictive models, and visualise asset degradation trends. This reflects recommendations that authentic, data-driven tasks enhance student engagement (Prince and Felder, 2006). In Control Technology, Live Scripts were developed to allow students to manipulate system parameters and observe dynamic system responses in real time, supporting deeper understanding of control principles by linking abstract mathematical models to observable system behaviour (A2, A3, K1, K2).

This CPD activity has reinforced the importance of integrating digital tools in ways that are pedagogically sound rather than technologically driven. Research into computational notebooks as educational tools suggests that their combination of narrative, code, and output supports reflective and exploratory learning when designed appropriately (Saefan *et al.*, 2026). Looking forward, I plan to further develop these resources and evaluate their impact through student feedback and assessment performance. Engaging with the Teaching with MATLAB course has strengthened my confidence in designing interactive, inclusive learning materials that support student engagement, conceptual understanding, and graduate employability within engineering education (V4, V5).

4.1.1 References

- Freeman, S. et al. (2014) 'Active learning increases student performance in science, engineering, and mathematics', *Proceedings of the National Academy of Sciences*, 111(23), pp. 8410–8415. Available at: <https://doi.org/10.1073/pnas.1319030111>.
- Prince, M. and Felder, R. (2006) 'Inductive Teaching and Learning Methods: Definitions, Comparisons, and Research Bases', *Journal of Engineering Education*, 95, pp. 123–137. Available at: <https://doi.org/10.1002/j.2168-9830.2006.tb00884.x>.
- Saefan, J. et al. (2026) 'How Computational Notebooks Are Implemented in the Classroom: Challenges and Impacts—A Systematic Review'. Available at: <https://doi.org/10.21203/rs.3.rs-9124168/v1>.
- Sweller, J. (2011) 'CHAPTER TWO - Cognitive Load Theory', in J.P. Mestre and B.H. Ross (eds.) *Psychology of Learning and Motivation*. Academic Press, pp. 37–76. Available at: <https://doi.org/https://doi.org/10.1016/B978-0-12-387691-1.00002-8>.
- Vygotsky, L.S. (1978) *Development of Higher Psychological Processes*. Edited by M. Cole et al. Harvard University Press. Available at: <https://doi.org/10.2307/j.ctvjf9vz4>.

4.2 Event 2 - WISA Staff Development – AI and Being Human

Date: 16/04/2026

The WISA Staff Development Day focused on the theme of AI and Being Human, exploring the implications of artificial intelligence for graduate skills development, curriculum design, and the ethical responsibilities of higher education. The event provided a valuable opportunity to engage critically with how AI technologies intersect with human judgement, values, and professional identity within teaching and learning. This CPD was particularly relevant to my role, as I am increasingly required to design sessions that prepare students to work effectively alongside AI while maintaining appropriate professional and ethical standards (A5, V4).

The opening session, delivered by Professor of Practice Elliott Atkins, examined the role of AI in contemporary industrial practice, with a particular focus on its intersection with cyber security. The session highlighted that while technical competence in AI-enabled systems is increasingly important, the integration of AI into cyber-physical and data-driven systems introduces new vulnerabilities, security risks, and ethical challenges. As a result, employers continue to value distinctly human capabilities such as critical thinking, problem-framing, communication, and ethical judgement, particularly in assessing system trustworthiness and responding to security threats. (Babashahi et al., 2024).

Reflecting on my own teaching practice, this session reinforced the importance of positioning AI not as a replacement for human expertise, but as a tool that students must learn to interrogate, evaluate, and apply responsibly. The discussion prompted me to consider how cyber security awareness and ethical considerations can be embedded more explicitly within my modules alongside technical content, supporting students' development as reflective and responsible engineering professionals (A1, K1, V3).

The subsequent session led by Associate Professor Dr Nik Whitehead explored ethical considerations surrounding the use of AI in higher education, including algorithmic bias, transparency, data privacy, and the risks associated with over-reliance on automated systems. These discussions highlighted the need for clear ethical frameworks to guide both staff and student engagement with AI, reflecting concerns that uncritical adoption may reproduce inequity or obscure accountability (Williamson and Eynon, 2020; Foltynnek *et al.*, 2023). This prompted reflection on how my module design can ensure that students develop ethical awareness alongside technical competence when engaging with data-driven tools (V1, V4).

The afternoon session, Being Human in an AI World, and the associated breakout activity focused on curriculum design that promotes human intelligence, judgement, and values within an AI-enabled educational setting. Discussions with colleagues encouraged me to consider how learning outcomes and assessment design can prioritise reflection, decision-making, and professional judgement rather than purely procedural outputs. This aligns with research advocating assessment approaches that value higher-order cognitive skills and authentic problem-solving in contexts where AI is readily available (Murgatroyd, 2023) (A3, A4, K3).

Overall, this CPD event has strengthened my critical engagement with how AI is positioned within my teaching, ensuring that its use supports rather than diminishes learning and professional identity. Going forward, I intend to contribute actively to curriculum review discussions and to embed structured opportunities for students to reflect on the ethical, human, and cyber security dimensions of AI use within engineering practice (V4, V5).

4.2.1 References

Babashahi, L. et al. (2024) 'AI in the Workplace: A Systematic Review of Skill Transformation in the Industry', *Administrative Sciences*, 14(6). Available at: <https://doi.org/10.3390/admsci14060127>.

Foltynek, T. et al. (2023) 'ENAI Recommendations on the ethical use of Artificial Intelligence in Education', *International Journal for Educational Integrity*, 19(1), p. 12. Available at: <https://doi.org/10.1007/s40979-023-00133-4>.

Murgatroyd, S. (2023) 'Rethinking teaching in the age of Artificial Intelligence', *Paraguayan Journal of Distance Learning (REPED)*, 4, pp. 4–10. Available at: <https://doi.org/10.56152/reped2023-vol4num2-art1>.

Williamson, B. and Eynon, R. (2020) 'Historical threads, missing links, and future directions in AI in education', *Learning, Media and Technology*, 45, pp. 1–13. Available at: <https://doi.org/10.1080/17439884.2020.1798995>.

4.3 Event 3- Discrete Event Simulation

Date: 11/02/2026

I was fortunate to attend a one-to-one mentoring session led by a colleague, Chris Wyatt, a Senior Lecturer in the School of Engineering with many years of industrial experience in the manufacturing sector. The session focused on the pedagogical use of bespoke discrete event simulation software (Aliquis). The session was structured around discussion, demonstration, and problem-solving, with a specific emphasis on addressing persistent challenges associated with teaching manufacturing process optimisation. This tutoring was particularly valuable in facilitating targeted exploration of how complex and abstract manufacturing theories can be made more visible, accessible, and meaningful for students through the use of simulation tools (A5, K1, K4).

The session began with a discussion of common student difficulties encountered when teaching manufacturing systems, particularly topics such as Kanban control, flow optimisation, and understanding system variability. I reflected on how students often struggle to conceptualise these ideas when they are presented through static diagrams or abstract mathematical equations alone. In response, Chris demonstrated how Aliquis can be used to model manufacturing systems dynamically, allowing learners to observe the real-time effects of decisions on material flow, resource utilisation, and system performance. Seeing Kanban mechanisms represented as discrete events within a simulated environment highlighted how visualisation can support conceptual understanding (Badurdeen *et al.*, 2010) (A1, K2).

Rather than focusing solely on operational modelling, the session progressed to exploring how simulation can support higher-level analytical thinking. Chris demonstrated how stochastic variation can be introduced into system parameters, enabling the use of Monte Carlo simulation to examine uncertainty, risk, and performance variation. This prompted me to reflect on the limitations of my existing teaching approach, which tends to treat optimisation as deterministic and linear. Observing how simulation outputs change across multiple runs reinforced the value of simulation as a tool for encouraging critical evaluation of assumptions and system behaviour (de Jong and van Joolingen, 1998) (A2, K3, V3).

A particularly useful aspect of the session was the discussion of Aliquis as a platform for introducing digital twin concepts. By linking simulated models to real or representative manufacturing data, the software can be used to demonstrate how digital twins support

monitoring, prediction, and optimisation within contemporary industrial settings. This improved my understanding of simulation not merely as a teaching aid, but as a bridge between theoretical models and modern industrial practice. The mentoring approach allowed me to explore how such technologies can be introduced progressively, without overwhelming students, while maintaining strong alignment with graduate skills requirements and industry expectations (K1, V4).

As an outcome of this CPD activity, I plan to incorporate simulation-based demonstrations into modules focused on manufacturing systems and quality improvement. These will be used selectively to support teaching on Kanban systems, process optimisation, and variability, and to introduce students to the principles underpinning Monte Carlo simulation and digital twins. Importantly, these activities will be used to promote discussion, analysis, and reflection, rather than as prescriptive technical exercises alone (A3, A4).

This session has highlighted the value of mentoring and practitioner expertise in developing teaching practice. It has prompted me towards making better use of industrial simulation tools to support student understanding of complex systems and has contributed meaningfully to my ongoing development as a reflective and adaptive engineering educator (V4, V5).

4.3.1 References

Badurdeen, Fazleena et al. (2010) "Teaching Lean Manufacturing With Simulations and Games: A Survey and Future Directions," *Simulation & Gaming*, 41(4), pp. 465–486. Available at: <https://doi.org/10.1177/1046878109334331>.

de Jong, T. and van Joolingen, W. (1998) "Scientific Discovery Learning With Computer Simulations of Conceptual Domains," *Review of Educational Research*, 68. Available at: <https://doi.org/10.3102/00346543068002179>.

5 Assessment of Professional Development

During the course of the PG Cert tHE programme, my understanding of teaching in higher education has become more deliberate, analytical, and reflective (V3). I have moved away from viewing teaching primarily as the transmission of subject knowledge and instead recognise it as a complex, contextual practice that requires continuous evaluation of how learning activities, assessment design, and learning environments affect students differently (A1, A3, K2, K3). This shift has led me to consider more carefully issues of inclusivity, engagement, and student diversity in my day-to-day teaching practice (V1, V2).

At the outset of the programme, I felt confident in my subject expertise and in my ability to explain complex technical and analytical material clearly (K1). However, engagement with structured reflection, peer observation feedback, and literature on teaching and learning has prompted me to critically examine aspects of my practice that I had previously taken for granted (A5, K5, V3). In particular, I became more aware that approaches I perceived as engaging did not necessarily support learning equitably for all students (V1, V2). A key moment in this process was challenging my assumption that learner silence signified disengagement (K2). I now recognise how factors such as confidence, prior educational experiences, and group dynamics shape participation, and that visible contribution does not always equate to engagement or understanding (K2, V1).

As the programme progressed, I began to place greater emphasis on intentional session design rather than relying on instinctive delivery (A1, K2). This involved thinking more carefully about session structure, sequencing of activities, and the integration of formative feedback (A3, K2, K3). Reflective practice has encouraged me to reduce tutor-led delivery and adopt approaches that allow students to articulate their thinking, test understanding, and learn more collaboratively (A2, A4, V1). Importantly, this has not been linear (V3). Instead, it has involved incremental and sustainable changes, alongside an understanding that these adjustments often introduce new challenges rather than immediate solutions (V3).

A significant element of my professional development has been learning to reflect not only on what students produce, but on how they engage with learning tasks and with one another (A4, K2). I have become increasingly aware of my role in shaping classroom dynamics, particularly through how I respond to uncertainty, partial understanding, and incorrect answers (A2, V1). This has required me to reflect critically on my tendency to intervene too quickly and to consider when allowing space for struggle and discussion better supports student agency and

confidence (A4, V1, V3). While this shift has been challenging, it has reinforced the value of reflective practice as a means of learning rather than self-validation (A5, V3).

Looking ahead, I recognise that my development as an early-career academic is ongoing (V3). Key areas for further development include strengthening how learning is consolidated and made explicit following collaborative or discussion-based activities (A4, K2), and further developing pre-session learning resources to support students with diverse prior knowledge and manage cognitive load more effectively (A1, K4, V1). Additionally, as digital and AI-enabled tools become increasingly embedded in higher education, I aim to continue developing critical, ethical, and pedagogically sound approaches to their use, particularly through assessment design that promotes reasoning, judgement, and application (A3, K4, V4).

The PG Cert tHE programme has provided me with a structured framework for questioning, reviewing and improving my practice (A5, K5). I now approach teaching as a process of continuous improvement, informed by evidence, reflection, and an acceptance that uncertainty and adaptation are fundamental to professional development (V3).

6 Evidence of 100 Hours Teaching at HE Level

Post Graduate Certificate in Teaching in Higher Education (PG Cert tHE) Evidence of teaching hours log

Candidate: Jordan R. Jenkins	Campus: Swansea IQ
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Date	Session Details	No of Hours	Practice Advisor's Signature
01-Oct-25	Manufacturing Design & Technology (ACMA5002)	2	G Owen
02-Oct-25	Robotics and Automation in Operations (ACHA7029)	2	G Owen
08-Oct-25	Manufacturing Design & Technology (ACMA5002)	2	G Owen
09-Oct-25	Robotics and Automation in Operations (ACHA7029)	2	G Owen
15-Oct-25	Manufacturing Design & Technology (ACMA5002)	2	G Owen
16-Oct-25	Robotics and Automation in Operations (ACHA7029)	2	G Owen
22-Oct-25	Manufacturing Design & Technology (ACMA5002)	2	G Owen
23-Oct-25	Robotics and Automation in Operations (ACHA7029)	2	G Owen
29-Oct-25	Manufacturing Design & Technology (ACMA5002)	2	G Owen
30-Oct-25	Robotics and Automation in Operations (ACHA7029)	2	G Owen
05-Nov-25	Manufacturing Design & Technology (ACMA5002)	2	G Owen
06-Nov-25	Robotics and Automation in Operations (ACHA7029)	2	G Owen
12-Nov-25	Manufacturing Design & Technology (ACMA5002)	2	G Owen
13-Nov-25	Robotics and Automation in Operations (ACHA7029)	2	G Owen
20-Nov-25	Robotics and Automation in Operations (ACHA7029)	2	G Owen
27-Nov-25	Robotics and Automation in Operations (ACHA7029)	2	G Owen
03-Dec-25	Manufacturing Design & Technology (ACMA5002)	2	G Owen
04-Dec-25	Robotics and Automation in Operations (ACHA7029)	2	G Owen
05-Dec-25	Quality & Business Improvement (ACMA4004)	3	G Owen
10-Dec-25	Manufacturing Design & Technology (ACMA5002)	2	G Owen
11-Dec-25	Robotics and Automation in Operations (ACHA7029)	2	G Owen
12-Dec-25	Quality & Business Improvement (ACMA4004)	3	G Owen
07-Jan-26	Manufacturing Design & Technology (ACMA5002)	2	G Owen
08-Jan-26	Robotics and Automation in Operations (ACHA7029)	2	G Owen
09-Jan-26	Quality & Business Improvement (ACMA4004)	3	G Owen
15-Jan-26	Robotics and Automation in Operations (ACHA7029)	2	G Owen
16-Jan-26	Quality & Business Improvement (ACMA4004)	3	G Owen
22-Jan-26	Robotics and Automation in Operations (ACHA7029)	2	G Owen
23-Jan-26	Quality & Business Improvement (ACMA4004)	3	G Owen
28-Jan-26	Manufacturing Design & Technology (ACMA5002)	2	G Owen
29-Jan-26	Robotics and Automation in Operations (ACHA7029)	2	G Owen
30-Jan-26	Quality & Business Improvement (ACMA4004)	3	G Owen
04-Feb-26	Manufacturing Design & Technology (ACMA5002)	2	G Owen
06-Feb-26	Quality & Business Improvement (ACMA4004)	3	G Owen
11-Feb-26	Manufacturing Design & Technology (ACMA5002)	2	G Owen
13-Feb-26	Quality & Business Improvement (ACMA4004)	3	G Owen
18-Feb-26	Manufacturing Design & Technology (ACMA5002)	2	G Owen

20-Feb-26	Quality & Business Improvement (ACMA4004)	3	G Owen
25-Feb-26	Manufacturing Design & Technology (ACMA5002)	2	G Owen
27-Feb-26	Quality & Business Improvement (ACMA4004)	3	G Owen
04-Mar-26	Manufacturing Design & Technology (ACMA5002)	2	G Owen
06-Mar-26	Quality & Business Improvement (ACMA4004)	3	G Owen
11-Mar-26	Manufacturing Design & Technology (ACMA5002)	2	G Owen
13-Mar-26	Quality & Business Improvement (ACMA4004)	3	G Owen
			Total Hours = 100

Participant's signature: *J.R. Jenkins*

Practice Advisor's signature: *A.T. Owen*