

University of Wales Trinity Saint David



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Portfolio 2

Advanced Teaching and Assessment in Higher Education
(UNHE7010)

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1 AI Declaration

PG Cert tHE – The use of Generative Artificial Intelligence (AI)- Declaration.

MODULE CODE: UNHE 7009/7010*

(*delete as appropriate)

ASSESSMENT COMPONENT: Portfolio

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Use of Generative AI in Assessment

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However, I acknowledge that I have used or may have used the AI in the research , and proof reading of my portfolio

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2 Reflective report of teaching intervention cycle

2.1 Problem Identified

In reviewing module performance data, I identified that the second-year Control Systems module consistently demonstrates lower exam marks and reduced attendance compared to the Stress Materials module, which is assessed using a similar examination format. This disparity led me to reflect on how learners engage with different subject content and assessment structures, particularly in technically abstract areas such as control systems (PSF K1, K2). I recognise that variations in how students experience and understand complex theoretical material may influence both attendance patterns and attainment, prompting me to critically evaluate my current teaching approach and its effectiveness (PSF K3, V3).

2.1.1 Current approach

I currently deliver the Control Systems module through a structured sequence of eleven lectures, covering five core topics, with approximately two lectures dedicated to each topic, followed by a final revision session. Within each lecture, I incorporate interactive Vevox quizzes to promote engagement and check understanding in real time, making effective use of digital technologies to support learning and provide immediate formative feedback (PSF K4, A3). Given the mathematically intensive nature of the subject, I provide students with a comprehensive formula sheet for use in the final exam, allowing them to focus on application rather than memorisation. This approach is designed to support learning through clear structure and active participation (PSF A1, A2, K2), while recognising the challenges learners may face when engaging with complex mathematical content (PSF K1, V1).

2.1.2 Learners' problem with the current approach

I recognise that the current approach may present challenges for some learners, particularly when they are introduced to complex and abstract control systems concepts in a lecture-led format. Educational research suggests that high cognitive load associated with unfamiliar material can overwhelm working memory, limiting students' ability to process and retain new knowledge (Sweller, 1988a) (PSF K1, K2). I also observe that some students become overly reliant on provided materials, such as formula sheets, assuming understanding can be developed independently at a later stage. This aligns with findings by (MARTON & SÄLJÖ, 1976), where surface learning approaches lead to memorisation without deep conceptual understanding (PSF K3, V1).

2.1.2.1 Diverse approach to learning styles

Within this cohort, I note a high proportion of students actively engaging with institutional support services, indicating a significant presence of neurodivergent learners, including those with ADHD, autism, and specific learning differences. Research suggests that while these learners often demonstrate strong analytical and systems-thinking abilities, they may find traditional lecture-heavy approaches less accessible (Armstrong, 2012; Clouder et al., 2020). This highlights the importance of inclusive design, with frameworks such as Universal Design for Learning advocating multiple means of engagement and representation (*CAST Universal Design for Learning Guidelines*, n.d.). Recognising this diversity enables me to adapt my teaching to better support all learners (PSF V1, K1, A2, A4).

2.1.2.2 Over-reliance on current material without interaction

I recognise that students may become overly reliant on the structured resources I provide, including detailed lecture notes and a comprehensive formula sheet, which can unintentionally promote passive learning behaviours. Research suggests that access to well-developed materials can sometimes lead students to adopt surface approaches, assuming understanding can be achieved through review alone rather than active engagement (Biggs et al., 2011; *Understanding Student*

Learning (Routledge Revivals) - 1st Edition - No, n.d.)(PSF K1, K2). Additionally, although Vevox quizzes encourage participation, their anonymous nature can limit meaningful dialogue. Studies indicate that anonymity can reduce accountability and deeper interaction, thereby limiting opportunities for students to articulate and challenge their understanding (D. J. Nicol & Boyle, 2003)(PSF A2, K4, V1)

2.1.3 Keeping exam assessments

2.1.3.1 Accrediting body requirements & Engineering council requirements

In reviewing potential changes to assessment, I must also recognise the constraints imposed by accrediting bodies and the Engineering Council, which require robust, standardised, and objective methods of evaluating student competence. These frameworks emphasise the need for demonstrable individual attainment under controlled conditions, ensuring graduates meet defined professional standards and competencies. As a result, retaining an exam-based component remains essential within the module. This requires me to balance pedagogical innovation with regulatory compliance, ensuring that any intervention continues to validly assess core knowledge and problem-solving skills expected within the engineering profession (PSF K2, K3, V3).

2.1.3.2 AI consequences on engineering assessments

Maintaining exam-based assessment is also important in the current educational context, where increasing access to generative AI tools such as ChatGPT can lead some students to over-reliance on externally generated solutions rather than developing their own understanding. Research highlights concerns that unsupervised coursework may not always accurately reflect individual student capability, particularly when AI assistance is difficult to detect (Cotton et al., 2024; Kasneci et al., 2023). In contrast, controlled exam conditions provide a more authentic measure of independent knowledge and problem-solving ability, ensuring academic integrity while supporting valid assessment of learning outcomes (PSF K2, K3, V4).

2.1.4 Results from the current approach

2.1.4.1 Attendance and exam marks compared

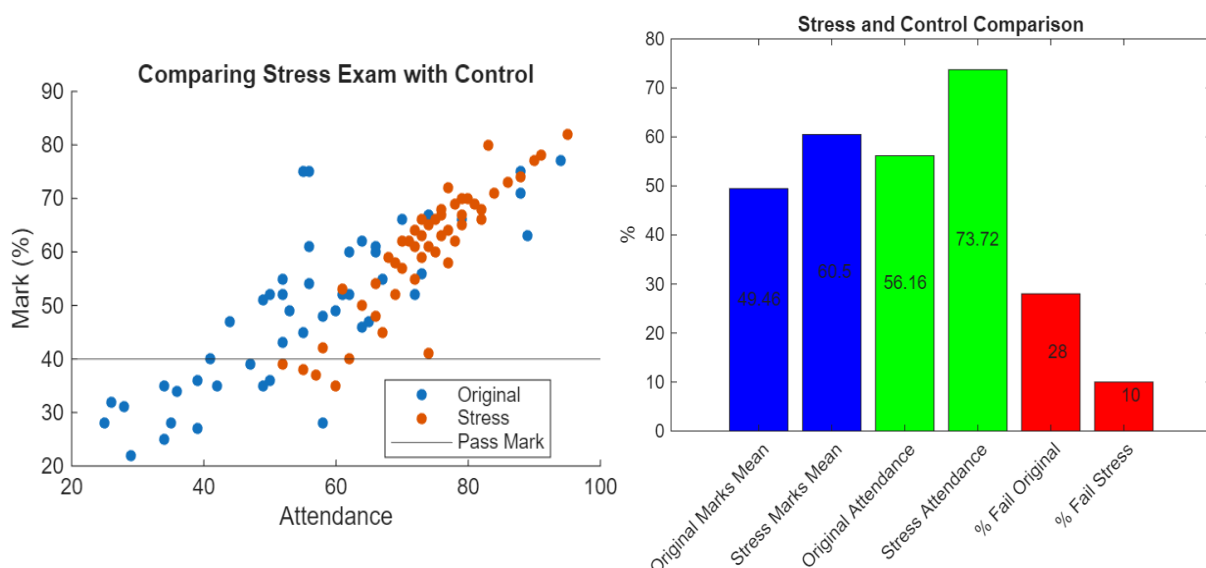


Figure 2-1 two modules compared before intervention

Comparison of Control Systems ("original") and Stress Analysis results for the same cohort. The left scatter plot shows the relationship between attendance and exam marks, highlighting a wider

spread and more failures in Control Systems. The right bar chart compares mean marks, attendance, and failure rates, showing higher engagement and performance in Stress Analysis compared to Control Systems.

2.1.5 Analysis of the current approach

In analysing the data, I interpret the difference in outcomes as being strongly linked to how students receive and process new technical information. The Control Systems module introduces largely unfamiliar and conceptually abstract material, whereas the Stress Analysis module builds more directly on knowledge developed in the previous year. The scatter plot reflects this, with Control Systems showing a wider spread of marks and more results below the pass threshold, suggesting that some students struggle to establish early understanding (PSF K1, K2).

The summary data reinforce this interpretation, with lower mean marks (49.5%) and attendance (56.16%) in Control Systems compared to higher engagement and attainment in Stress Analysis. This suggests that when students can connect new learning to prior knowledge, they are more confident, engaged, and successful. In contrast, entirely new material may increase cognitive load and reduce engagement, particularly for those needing more structured scaffolding (PSF K1, K3, V1).

2.1.6 Difference with the compared module

I recognise that the Stress Analysis module is fundamentally different in its structure and student experience, despite being delivered at the same academic level. Unlike Control Systems, Stress Analysis builds directly on first-year content, allowing for a scaffolded progression of knowledge where new concepts are introduced incrementally on an existing foundation (Bruner, 1960; Vygotsky, 1978). This reduces cognitive load and supports learner confidence when engaging with new material (PSF K1, K2, V1). Additionally, the module introduces fewer new topics, enabling more in-class time for applied problem-solving and practical activities. This aligns with experiential learning theory (Kolb, 2015), promoting deeper engagement and reinforcing understanding through active participation (PSF A2, A4, K2).

2.1.7 Conclusions of the current approach

From this analysis, I recognise that while my current structured lecture approach ensures full coverage of the required module content, it does not consistently promote the level of engagement needed for students to grasp complex and unfamiliar material confidently. The comparison with the Stress Analysis module highlights the importance of scaffolding, interaction, and applied learning opportunities in supporting understanding (PSF K1, K2). Within the constraints of delivering prescribed content, I therefore need to adapt my approach to create more opportunities for in-class discussion, peer interaction, and active learning. This will help shift students from passive reception to active engagement, supporting deeper learning while still meeting curriculum requirements (PSF A2, A4, V1, V3).

2.1.8 Cautions and assumptions with conclusions

I must be cautious in drawing firm conclusions, as this comparison is based on a single year of data from a relatively small cohort of approximately 50 students. Such a sample limits the statistical significance and generalisability of the findings, as smaller sample sizes reduce statistical power and increase the likelihood that observed differences are due to random variation rather than true effects (Cohen, 1992; Field & Field, 2017). Variations may also be influenced by cohort characteristics or external factors rather than the teaching approach alone (PSF K3, V3).

Therefore, while the trends suggest a need to increase in-class interaction and engagement, I treat these findings as indicative rather than definitive, using them to inform iterative, evidence-informed improvements to my practice (PSF A2, V3).

2.2 Interventions explored

2.2.1 Research possible interventions

I identified a range of evidence-informed interventions that can be adapted within my teaching context.

A key approach is active learning, where students move beyond passive listening to engage in problem-solving, discussion, and application during class. Freeman et al., (Freeman et al., 2014) demonstrates that active learning significantly improves student performance in STEM subjects, aligning with the need to support understanding of complex material (PSF A2, K2). Closely related is peer instruction, developed by (*Peer Instruction: A User's Manual* | Mazur Group, n.d.), where students discuss conceptual questions with each other, helping to expose misconceptions and deepen understanding through dialogue (PSF A2, V1).

Think–pair–share activities provide a structured way to encourage participation, particularly for less confident learners, by allowing individual reflection followed by peer discussion before sharing with the wider group (*Think, Pair, Share* | Center for Teaching and Learning, n.d.) (PSF A4, V1). Similarly, problem-based learning (PBL) engages students in solving real-world problems, promoting critical thinking and application of knowledge (Hmelo-Silver, 2004), which is particularly relevant in engineering contexts (PSF K2, A2).

The use of formative assessment and immediate feedback, such as quizzes or in-class polling, supports engagement by helping students monitor their understanding and stay actively involved (D. Nicol & MacFarlane-Dick, 2006). However, to maximise impact, these tools should be combined with discussion and explanation rather than used in isolation (PSF K4, A3).

Flipped classroom approaches offer another effective intervention, where students engage with lecture content before class, allowing in-class time to focus on application, discussion, and clarification (Bishop & Verleger, 2013). This can help address time constraints while increasing interaction (PSF A2, K2).

In addition, collaborative learning strategies, such as small group problem-solving or workshop-style sessions, have been shown to improve engagement and retention by fostering a sense of community and shared responsibility for learning (Johnson et al., 2014)(PSF V1, A4).

Finally, scaffolding techniques, including worked examples and guided practice, support learners when encountering new and complex material, gradually building independence and confidence (Wood et al., 1976) (PSF K1, K2).

Taken together, these interventions highlight the importance of shifting from a purely lecture-based model to a more interactive, student-centred approach. By integrating a combination of these strategies within the constraints of the module, I can better support engagement, understanding, and inclusivity across a diverse cohort (PSF A2, A4, V1, V3).

2.2.2 Research analysed

While a range of pedagogical interventions can enhance engagement, I recognise that any changes must operate within the fixed time constraints of the module and the requirement to deliver core content. Approaches such as flipped learning offer potential benefits; however, they risk creating a

two-tier cohort if some students do not engage with pre-class materials, leaving them disadvantaged during in-class activities (Bishop & Verleger, 2013). Therefore, interventions must balance flexibility with inclusivity, ensuring all students can participate meaningfully regardless of prior preparation (PSF A2, V1, K2).

2.2.3 Current module restrictions

The constraints of the current module and wider programme, including a large volume of prescribed content and limited prior scaffolding from earlier years, necessitate the provision of clear, structured notes to support student understanding. However, this content-heavy delivery reduces the available time for interactive elements such as practical or workshop-based sessions. As a result, opportunities for applied learning and deeper engagement are limited, reinforcing a more lecture-driven approach that prioritises content coverage over active participation (PSF K1, K2, A1, V1).

2.3 Chosen intervention

In reviewing both pedagogical research and practice in technically focused courses at other institutions, I identified that the Massachusetts Institute of Technology (MIT) often allows students to create their own exam “cheat sheets” rather than providing a standardised formula sheet. This approach aligns with constructivist principles, where learners actively construct knowledge through organisation and reflection (Biggs et al., 2011), and supports metacognitive development as described by D. Nicol & MacFarlane-Dick, (D. Nicol & MacFarlane-Dick, 2006). It also reflects the benefits of retrieval practice and meaningful processing (Roediger & Karpicke, 2006a), encouraging deeper engagement with content (PSF K1, K3, A2, V3).

2.3.1 Foster in-class interaction within a limited time

To increase engagement within existing time constraints, I propose integrating structured “cheat sheet” development workshops at intervals throughout the module. During these sessions, students would collaboratively build their own sheets in small groups, discussing and justifying what content to include. As each student brings a different level of understanding, this encourages peer explanation and knowledge sharing, supporting deeper learning through dialogue (PSF A2, V1). Groups would then feed back to the wider class, prompting short discussions on key concepts and priorities. This approach embeds active learning within lectures, promoting interaction, reinforcing understanding, and potentially improving attendance through increased student ownership (PSF A4, K2, V3).

2.4 Results of intervention

I implemented this intervention during the Autumn 2025 delivery of the Control Systems module, embedding structured “cheat sheet” workshop activities at key points throughout the teaching schedule. These sessions were integrated into existing lectures to ensure that core content coverage was maintained while creating opportunities for collaborative learning and in-class discussion. Students worked in groups to develop and refine their own materials, followed by short feedback discussions to consolidate understanding.

Following implementation, I collected attendance, engagement, and assessment data, which will be analysed to evaluate the impact of the intervention on student participation and performance (PSF A2, A4, K3, V3).

2.4.1 Attendance

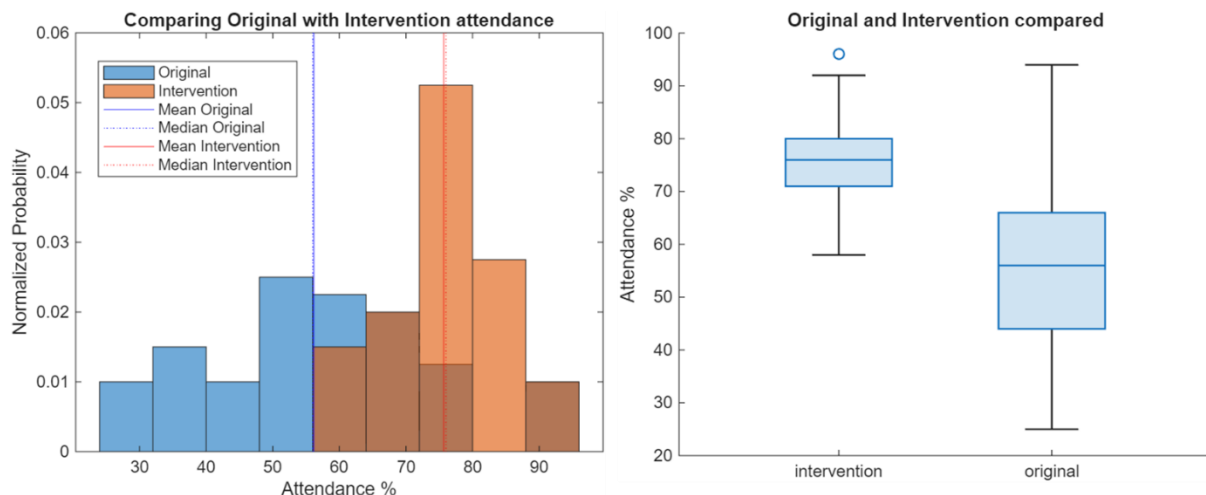


Figure 2-2 Attendance pre and post intervention

Comparison of attendance between the original Control Systems delivery and the cheat sheet intervention. The histogram (left) shows a clear shift towards higher attendance in the intervention cohort, with increased mean and median values. The boxplot (right) further highlights this improvement, demonstrating a higher median attendance and reduced variability, indicating more consistent student engagement following the intervention.

2.4.1.1 Analysis of attendance

The attendance data shows a clear and meaningful improvement following the implementation of the cheat sheet intervention. In the histogram, the intervention cohort is visibly shifted to the right, indicating that a greater proportion of students achieved higher attendance percentages compared to the original delivery. Both the mean and median attendance have increased, suggesting not only improved overall engagement but also a more typical student attending more regularly.

The boxplot reinforces this trend. The median attendance for the intervention group is substantially higher than that of the original cohort, indicating that the “average” student engaged more consistently. Additionally, the interquartile range for the intervention appears narrower, suggesting reduced variability and a more uniform level of attendance across the cohort. In contrast, the original cohort shows a wider spread, with a lower lower-quartile, highlighting that a significant portion of students were attending infrequently.

There is also a noticeable reduction in very low attendance values within the intervention group, implying that the intervention may have been particularly effective in re-engaging previously disengaged students. This aligns with the intended design of the intervention, which introduced regular, interactive elements into lectures, encouraging students to attend in order to contribute to and benefit from collaborative cheat sheet development.

From a pedagogical perspective, this suggests that embedding structured, participatory activities within lectures can positively influence student motivation and attendance (PSF A2, A4, K1). The regular opportunity to contribute, discuss, and refine their own materials likely increased students’ sense of ownership and relevance, supporting sustained engagement throughout the module (PSF V1, V3).

However, while the improvement is clear, I remain cautious in attributing causality solely to the intervention. As with earlier analysis, this represents a single cohort and may be influenced by external factors. Nonetheless, the consistency of the upward shift across both visualisations provides

strong indicative evidence that the intervention contributed positively to student attendance and engagement.

2.4.1.2 Caveats of attendance analysis

While the attendance data suggests a clear improvement following the intervention, I must acknowledge a significant confounding factor. During the same period, the university introduced a new attendance and engagement policy, whereby students demonstrating low engagement were subject to repeated contact and potential withdrawal from the programme. This process is likely to remove the lowest-attending students from the dataset, artificially increasing average attendance and reducing variability.

As a result, the observed improvements may be partially influenced by this institutional policy rather than the intervention alone. This limits the ability to attribute causality with confidence and reinforces the need for cautious, critical interpretation of the data.

2.4.2 Module marks

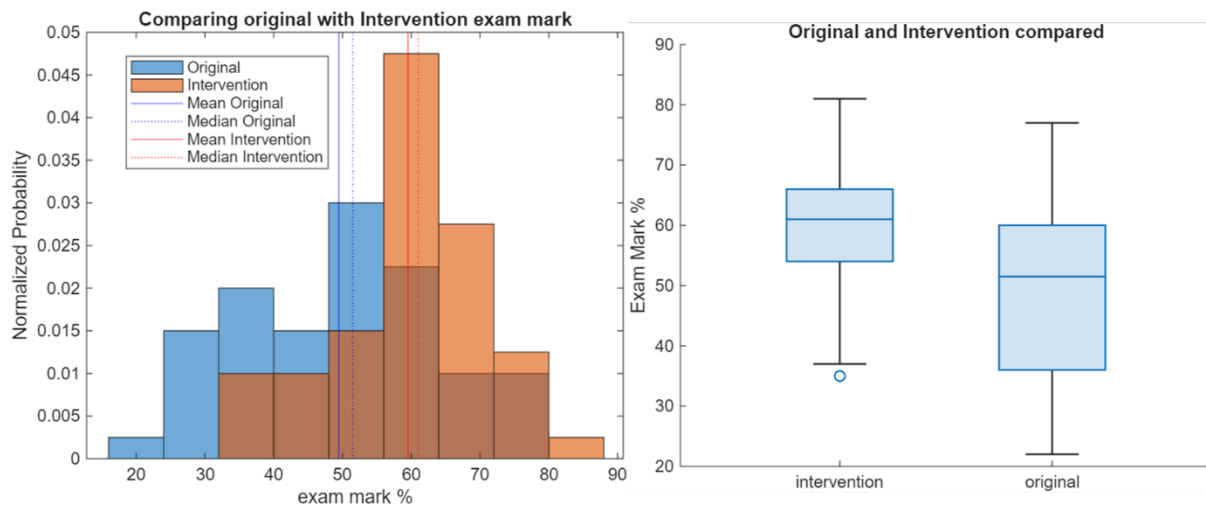


Figure 2-3 Marks pre and post intervention

Comparison of exam mark distributions between the original Control Systems delivery and the cheat sheet intervention. The histogram (left) shows a shift towards higher marks in the intervention cohort, with increased mean and median values. The boxplot (right) further illustrates this improvement, highlighting a higher median mark and a more concentrated distribution, indicating enhanced overall student performance following the intervention.

2.4.2.1 Analysis of marks post-intervention

The exam mark data indicates a positive shift in student performance following the cheat sheet intervention. In the histogram, the intervention cohort distribution is clearly shifted to the right compared to the original, demonstrating that a greater proportion of students achieved higher marks. Both the mean and median have increased, suggesting an overall improvement in attainment across the cohort rather than gains limited to a small subset of students.

The boxplot supports this interpretation. The median mark for the intervention group is notably higher, indicating improved typical performance. Additionally, the interquartile range appears more concentrated, suggesting greater consistency in outcomes. In contrast, the original cohort shows a wider spread of marks, including a larger proportion of lower scores and a more pronounced lower tail, with some students performing significantly below the median.

There is also evidence of a reduction in very low marks in the intervention cohort, implying that the intervention may have supported weaker or less confident students in developing a more secure understanding of the material. This aligns with the intended design of the cheat sheet activity, which encouraged active engagement, peer discussion, and deeper processing of key concepts.

From a pedagogical perspective, these results suggest that requiring students to construct their own reference materials, combined with collaborative discussion, supports improved understanding and application of knowledge (PSF K1, K2, A2). The intervention appears to have promoted more consistent engagement with core concepts, contributing to improved performance across the cohort (PSF A4, V1, V3).

However, as with the attendance analysis, I remain cautious in attributing these improvements solely to the intervention. External factors, cohort variation, and concurrent institutional changes may also have influenced outcomes. Nonetheless, the consistent upward shift in both central tendency and distribution provides strong indicative evidence that the intervention had a positive impact on student attainment.

2.4.3 Week by week attendance

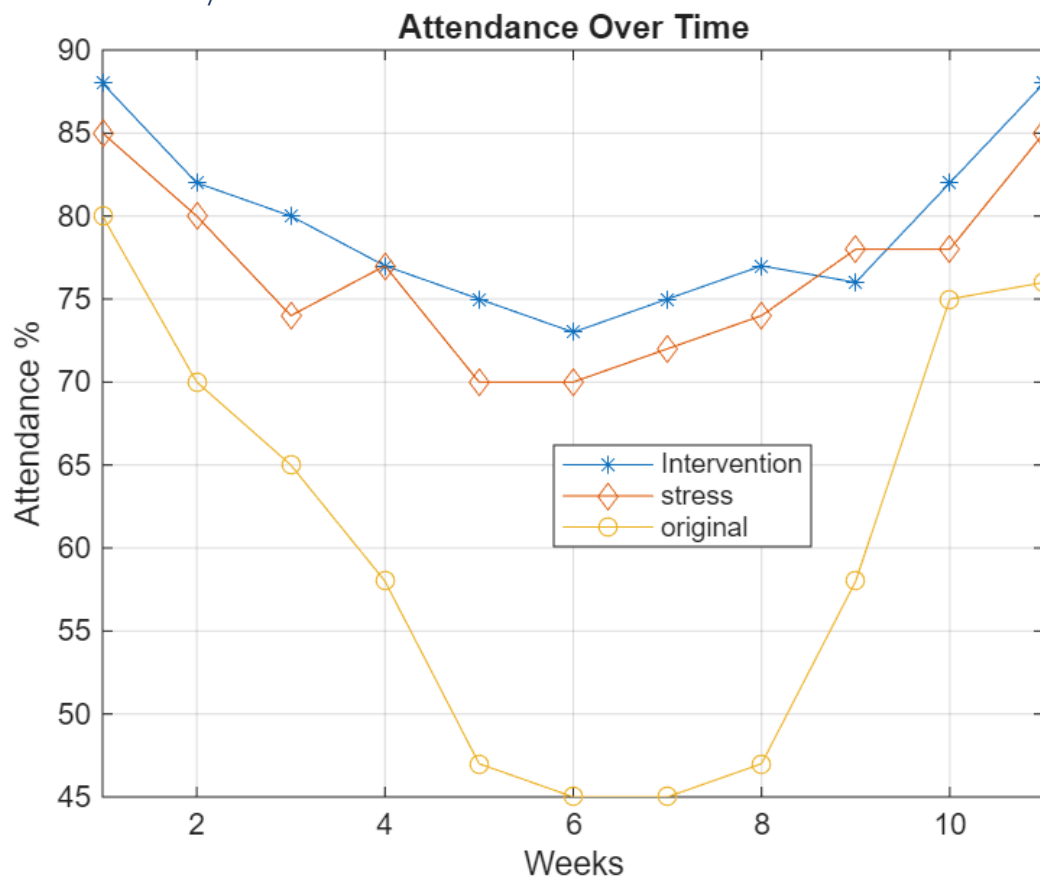


Figure 2-4 attendance over weeks

Week-by-week attendance comparison across the semester for the original Control Systems module (pre-intervention), the Stress Analysis module, and the Control Systems module following the cheat sheet intervention. The intervention cohort shows consistently higher and more stable attendance over time, with a reduced mid-semester decline compared to the original module and closer alignment with the more consistent attendance pattern observed in Stress Analysis.

2.4.4 Analysis of weekly attendance trends

The weekly attendance patterns follow a typical structure, with higher attendance at the beginning of the semester and again approaching the exam period, reflecting students' initial motivation and later assessment focus. The mid-semester dip observed across modules is common in higher education, often linked to competing deadlines and reduced perceived urgency (PSF K1). However, the original Control Systems module shows a significantly deeper decline, indicating historically lower engagement. It is also important to note that the Stress Analysis data predates the university's attendance policy, suggesting that Control Systems was comparatively poorly attended even before institutional intervention (PSF K3, V3).

2.4.5 Conclusions

Overall, the intervention appears to have had a positive impact on both student engagement and attainment within the Control Systems module. The introduction of structured, collaborative cheat sheet activities created opportunities for active learning and peer discussion within existing time constraints, helping to shift students from passive receipt of information to more meaningful engagement (PSF A2, A4, V1). Attendance data shows a more consistent pattern across the semester, while assessment outcomes indicate an improvement in overall performance.

However, I remain mindful that these findings are indicative rather than conclusive, given cohort size and external influences such as institutional policy changes. Nevertheless, the intervention demonstrates how small, evidence-informed adjustments can enhance engagement while maintaining curriculum requirements (PSF K3, V3).

2.5 Pedagogical implications

This intervention highlights several important pedagogical implications for teaching complex, technical subjects. Embedding collaborative "cheat sheet" development within lectures supports active learning, which has been shown to significantly improve student performance and engagement in STEM disciplines (Freeman et al., 2014) (PSF A2, K2). By requiring students to select and organise key information, the activity promotes metacognition and self-regulated learning, aligning with D. Nicol & MacFarlane-Dick, (2006) principles of effective feedback and learner autonomy (PSF K3, A4).

The group-based nature of the task also reflects social constructivist theory, where knowledge is co-constructed through dialogue and peer interaction (VYGOTSKY, 2019), supporting deeper conceptual understanding (PSF V1). Furthermore, the intervention demonstrates that even within content-heavy modules, integrating small, structured interactive elements can enhance engagement without compromising coverage. This reinforces the value of evidence-informed, inclusive teaching practices in improving both participation and attainment (PSF V3, K1).

2.6 Reflections of intervention

2.6.1 Teaching team adoption

Following the positive impact observed in this intervention, the approach is now being shared with colleagues across the programme and is planned for implementation in the next academic year. Through informal discussions and programme-level meetings, I have outlined both the rationale and outcomes, highlighting improvements in engagement and attainment. Colleagues teaching similarly structured, content-heavy modules have recognised its potential to enhance in-class interaction without compromising coverage. This collaborative adoption reflects a commitment to enhancing practice through shared, evidence-informed approaches (PSF V3, V5).

By embedding this strategy more widely, there is potential to create a more consistent and engaging student experience across modules, supporting diverse learners and promoting active participation (PSF A2, V1).

2.7 Module feedback

The internal student survey results for 2025 show a significant increase in satisfaction, rising from 3.2 to 4.8 out of 5 for module content and delivery. This improvement is particularly notable given that the core content of the module remained unchanged, with the primary difference being the introduction of in-class cheat sheet workshop activities. This supports research indicating that student satisfaction is strongly influenced by teaching approach and engagement rather than content alone (Biggs et al., 2011; Kember & Leung, 2005)(PSF K2, A2). The increase suggests that students valued interaction and active participation, reinforcing the importance of student-centred, inclusive teaching practices (Chickering et al., n.d.; Freeman et al., 2014) (PSF V1, A4, V3).

2.8 Further work

To continue monitoring and enhancing student engagement, I plan to build on this intervention through a combination of evaluation and additional pedagogical strategies. I will track attendance, attainment, and progression data across multiple cohorts to establish longer-term trends and improve the reliability of findings (PSF K3, V3). I also intend to gather more detailed qualitative feedback through mid-module surveys and focus groups to better understand student experiences (PSF A4).

In terms of further development, I will explore introducing low-stakes formative quizzes alongside the cheat sheet activities to reinforce retrieval practice (Roediger & Karpicke, 2006b)(PSF A2). Incorporating elements of peer instruction (*Peer Instruction: A User's Manual* | Mazur Group, n.d.) and short problem-based workshop tasks could further deepen engagement. Additionally, I will consider using learning analytics to identify disengaged students earlier and provide targeted support (PSF A4, K4). Finally, collaborating with colleagues to share practice and compare outcomes across modules will help refine and embed effective, evidence-informed approaches (PSF V3, V5).

2.8.1 Feynman technique

As a further enhancement, I plan to incorporate an additional revision session based on the Feynman Technique, where students are required to explain key concepts in simple terms as if teaching a peer. This approach encourages deep processing, as learners must identify gaps in their understanding and reorganise knowledge clearly (Feynman Richard, 1985). By working in pairs or small groups, students can articulate ideas, challenge misconceptions, and refine explanations collaboratively. This aligns with active learning and metacognitive development, supporting stronger conceptual understanding and retention (PSF K1, K3, A2, V1).



PG Cert tHE Portfolio- Teaching Intervention Cycle -3

Title : An intervention to improve/address x issue

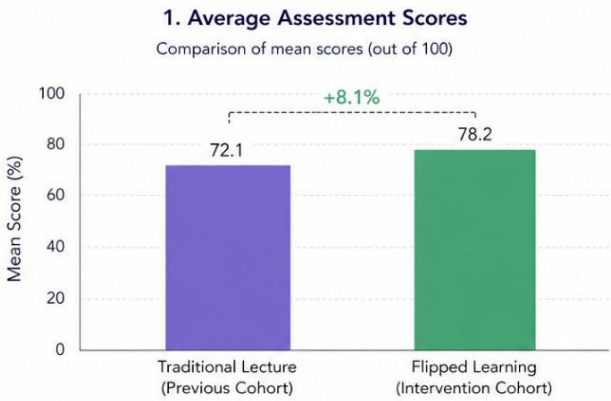
Summary

Flipped learning has emerged as a student-centred pedagogical approach designed to enhance engagement and deepen understanding in higher education. This teaching intervention evaluated the impact of a flipped classroom model within a lecture-based module. Traditionally delivered through didactic lectures, the module was redesigned so that foundational content was accessed prior to class via recorded lectures and guided readings, while in-class time focused on active learning. The intervention aimed to improve student participation, conceptual understanding, and overall academic performance. Previous research suggests that flipped learning can promote higher-order thinking and learner autonomy (Bishop & Verleger, 2013; O’Flaherty & Phillips, 2015), providing a strong rationale for this study.

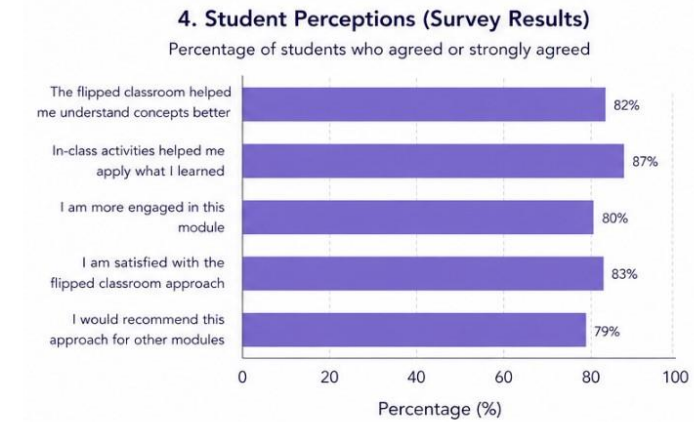
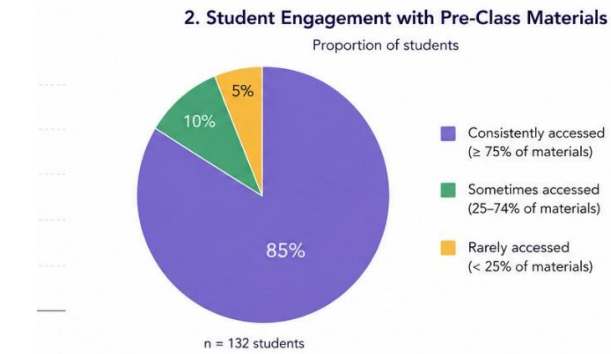
Methods

The intervention was implemented over one academic term with a cohort of postgraduate students. Pre-class materials included short video lectures, reading tasks, and formative quizzes delivered through a virtual learning environment. In-class sessions were structured around problem -solving activities, peer discussion, and application-based exercises facilitated by the lecturer. Data collection involved a mixed -methods approach: (1) quantitative analysis of assessment scores compared with a previous cohort taught via traditional lectures, and (2) qualitative data gathered through student questionnaires and focus groups. Engagement metrics (e.g., video access rates, quiz completion) were also tracked. The design aligns with established flipped learning frameworks emphasising active, collaborative learning environments (Abeysekera & Dawson, 2015).

Results



Students in the flipped learning cohort demonstrated improved academic performance, with average assessment scores increasing by approximately 8% compared to the previous year. Engagement data indicated high levels of pre-class preparation, with over 85% of students consistently accessing online materials. Qualitative feedback highlighted increased confidence, better understanding of key concepts, and greater satisfaction with the interactive format. However, some students reported initial difficulty adapting to the increased responsibility for pre-class learning. These findings are consistent with existing literature, which identifies both the benefits and transitional challenges of flipped learning approaches (Freeman et al., 2014; Tune et al., 2013).



Conclusion

The flipped learning intervention was effective in enhancing student engagement and academic performance within a lecture-based module. By shifting passive content delivery the classroom and prioritising active learning during contact time, students were better able to apply knowledge and develop critical thinking skills. While initial resistance and adjustment challenges were noted, these diminished over time as students became familiar with the approach. The findings support the continued integration of flipped learning in higher education, particularly in contexts where deeper learning and student participation are desired. Future work should explore long-term impacts and strategies to support student transition into this learning model.

References

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Tune, J. D., Sturek, M., & Basile, D. P. (2013). Flipped classroom model improves graduate student performance in cardiovascular, respiratory, and renal physiology. *https://Doi.Org/10.1152/Advan.00091.2013*, 37(4), 316–320. <https://doi.org/10.1152/ADVAN.00091.2013>

4 Observation 1

4.1 PGCert tHE OBSERVATION FORM -PSF 2023



PGCert tHE- OBSERVATION FORM -PSF 2023

Details of the Observation	
Observee	Ryan James
Practice Advisor / Expert peer observer	Dr Owen Williams
Date of the Observation	20/10/2025
Campus / Location	Waterfront Campus, IQ102
Date, Time, Duration	3-5 2hours
Subject Speciality	ACHA7007 Energy Storage and Control Systems
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. 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 lecture was structured to progress from fundamental electrical principles to applied battery technology, providing a logical sequence for learners. Content selection effectively linked theory to real-world applications (e.g. lithium-ion batteries and EV systems), supporting relevance. A wide breadth of material was covered, though the scope may have been ambitious for a single session and could impact depth of understanding. Delivery was primarily lecture-based, with limited use of interactive or student-centred learning methods. Key terminology and concepts were introduced, but clearer segmentation and signposting would enhance accessibility for learners.

Teaching [A2: Teach and/or support learning.] <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 core electrical principles, supporting continuity with prior learning, though links to previous sessions could have been made more explicit. The presentation was generally clear, but the pace was occasionally fast due to the breadth of material covered. The lecturer demonstrated strong subject knowledge and enthusiasm, which supported engagement. Limited reinforcement strategies (e.g. questioning or recap checks) were observed during delivery. Use of slides via projector was effective, though some slides were dense and may have reduced clarity. The session would benefit from a clearer summary and signposting of future learning at the end. Communication was effective overall, but opportunities to build stronger student–teacher interaction were limited. Aims were broadly achieved, though depth of understanding may vary due to the pace and volume of content.
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 class atmosphere was focused and academically driven, though largely lecturer-led with limited active student participation. Students appeared attentive, but the volume and pace of content may have impacted engagement and the ability to fully process material. Limited evidence of differentiation or targeted support for individual learning needs was observed during the session.

Assessment [A3: Assess and give learners feedback for learning]

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

Comments

Relevant real-world examples (e.g. battery performance and pack calculations) provided informal opportunities for formative assessment and checking understanding.

Clear explanations of concepts and terminology supported students in self-assessing their understanding during the session.

Core Knowledge

- K1 - how learners learn, generally and within specific subjects
- K2 - approaches to teaching and/or supporting learning, appropriate for subjects and level of study
- K3 - critical evaluation as a basis for effective practice
- K4 - appropriate use of digital and/or other technologies, and resources for learning
- K5 - requirements for quality assurance and enhancement, and their implications for practice

Comments

The session demonstrated a structured approach to learning, progressing from fundamental principles to applied battery systems. Teaching methods were appropriate for technical content, though largely lecture-based. Real-world examples supported relevance, while digital slides aided delivery despite occasional density. Content aligned with industry expectations, though greater opportunities for critical thinking and adaptation to varying learner needs would enhance overall effectiveness.

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? All other evidence informed approaches as a basis of effective practice.
- V4 Respond to the wider context in which higher education operates, recognising implications for practice.
- V5 Collaborate with others to enhance practice.

Comments

The lecture showed respect for learners through clear explanations and relevant industry context, though opportunities to address diverse needs were limited. Engagement was supported through real-world applications. Content reflected professional knowledge, aligning with industry practice.

The broader context was evident in EV relevance, though collaboration and inclusive strategies could be further developed.

Examples of good practice:

Clear progression from fundamental electrical principles to real-world battery applications.

Strong use of industry-relevant examples (e.g. EV batteries, pack design) to contextualise learning.

Demonstrated strong subject knowledge and confidence in delivery.

Action points:

Reduce content volume or adjust pacing to improve depth of understanding.

Incorporate more interactive elements (e.g. questioning, short tasks) to increase engagement.

For Observee

Write a short statement to address area of activity [A5]. Describe how this observation will enhance your practice

I will use this observation to better manage content volume and pacing, ensuring students can engage more deeply with key concepts. I plan to introduce more interactive elements and checks for understanding. Through continued professional development, I will explore strategies for simplifying complex material and supporting diverse learners more effectively while maintaining strong links to industry practice.

Observer Dr O. Williams.....

Date 20/10/2025

Overservee R.James.....

Date 20/10/2025

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.

4.2 Observation 1 reflection

The structure of the session was designed to progress from fundamental electrical principles into applied battery technology, aligning with effective planning of learning activities (PSF A1). This supported the learning objectives by building on prior knowledge (K1), though the breadth of

content impacted depth. Refining the scope would improve alignment between objectives and achievable outcomes, as constructive alignment is key to effective teaching (Biggs et al., 2011).

Teaching strategies were appropriate for delivering technical content (PSF A2), particularly through real-world applications such as EV battery systems, supporting engagement (V2). However, the reliance on lecture-based delivery limited opportunities for active learning. Research suggests that incorporating active learning improves student outcomes (Freeman et al., 2014), indicating a clear area for development to support diverse learners (V1, A4).

Resources such as presentation slides supported the explanation of complex material (K4), though some were content-heavy. Simplifying these would improve clarity and reduce cognitive overload (Sweller, 1988). Questioning techniques were limited, reducing opportunities for formative assessment (A3) and monitoring understanding. Developing targeted questioning would enhance engagement and inclusivity.

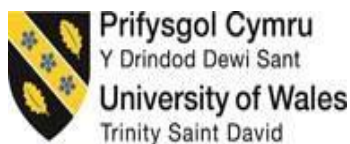
The pace of the lesson was fast due to the volume of material, which may have limited accessibility for some learners (V1). Adjusting pacing and prioritising key concepts would better support learning. Use of praise and encouragement was minimal, reflecting the lecture format; introducing interaction would create opportunities for feedback (A3).

Monitoring understanding was largely implicit. Incorporating formative checks would strengthen support and guidance (A4). Learning outcomes were broadly achieved, though depth varied. Enthusiasm and subject expertise were strong, reflecting professional knowledge (V3).

The session would benefit from a clearer plenary to consolidate learning and link to future study (A1). This reflection will inform continued professional development (A5), particularly in enhancing interactivity and inclusivity.

5 Observation 2

5.1 PGCert tHE OBSERVATION FORM -PSF 2023



PGCert tHE- OBSERVATION FORM -PSF 2023

Details of the Observation	
Observee	Ryan James
Practice Advisor / Expert peer observer	Dr Owen Williams
Date of the Observation	25/02/2026
Campus / Location	Waterfront Campus, IQ102
Date, Time, Duration	11-1 2hours
Subject Speciality	ACHA4031 Vehicle Electronics
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. 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 well-organised, moving progressively from basic principles to calculations and applications. Content selection was appropriate for an introductory level, with key equations supported by worked examples. Use of analogies (e.g. gas pressure system) supported conceptual understanding. Teaching methods were mainly didactic, with opportunities to incorporate more active learning strategies. Some slides were content-heavy, suggesting that pacing and chunking of information could be improved.

Teaching [A2: Teach and/or support learning.]

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.

Comments

The session opened with a clear introduction to key concepts, building appropriately on prior knowledge of charge and voltage.

Explanations were clear and structured, supporting student understanding of fundamental principles.

The pace was appropriate for most of the session, allowing time for examples to be followed.

Positive attitude toward the subject was evident, with supportive explanations and use of analogies.

Some reinforcement was provided through worked examples, though additional questioning could strengthen learning.

Effective use of the data projector supported delivery, though some slides contained a high volume of information.

The session included logical progression but would benefit from a more explicit closing summary.

Communication was clear, though opportunities for interaction and rapport-building could be further developed.

Learning outcomes were largely achieved, supported by structured content and examples.

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

A positive and supportive learning environment was evident, with clear explanations helping to maintain student interest.

Students were able to follow the material, particularly during worked examples, though participation remained mostly passive.

Some awareness of learner needs was demonstrated through the use of analogies, but more active checking of understanding would strengthen support.

Assessment [A3: Assess and give learners feedback for learning]

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

Comments

Worked examples were effectively used to reinforce learning and allowed students to apply key formulas in a structured way.

The logical progression of content supported ongoing informal assessment of student understanding throughout the session.

Core Knowledge

- K1 - how learners learn, generally and within specific subjects
- K2 - approaches to teaching and/or supporting learning, appropriate for subjects and level of study
- K3 - critical evaluation as a basis for effective practice
- K4 - appropriate use of digital and/or other technologies, and resources for learning
- K5 - requirements for quality assurance and enhancement, and their implications for practice

Comments

The teaching approach reflected a clear understanding of how learners build foundational knowledge, with well-structured progression and effective use of analogies and examples. Delivery methods were appropriate and accessible, supported by clear visual resources. Opportunities for application were present, though deeper critical engagement was limited. The session aligned well with curriculum standards and demonstrated a consistent, methodical teaching approach.

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? All other evidence informed approaches as a basis of effective practice.
- 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 promoted an inclusive and supportive environment through clear structure and accessible explanations. Engagement was encouraged using analogies and examples suited to varied learners. Teaching reflected established subject knowledge and good practice. The wider educational

context was met through foundational delivery, though collaboration and more varied engagement strategies could enhance inclusivity.

Examples of good practice:

Well-structured delivery with clear step-by-step development of concepts.

Effective use of analogies to support understanding of abstract ideas.

Inclusion of worked examples to reinforce key calculations.

Action points:

Introduce more opportunities for student participation and active learning.

Simplify or break down content-heavy slides to improve clarity and pacing

For Observee

Write a short statement to address area of activity [A5]. Describe how this observation will enhance your practice

I will build on the structured approach used in this session by increasing opportunities for student participation and active learning. I aim to refine my use of questioning and formative assessment to enhance engagement. Through professional development, I will focus on improving inclusive teaching strategies and ensuring content is accessible while maintaining clarity and progression.

Observer Dr O.Williams.....

Date 25/02/2026

Overservee R.James.....

Date 25/02/2026

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.

5.2 Observation 2 reflection

The session was well structured, with a clear progression from basic principles to applications, demonstrating effective planning (PSF A1). This aligned well with how learners develop

understanding (K1) and supported achievement of learning objectives. Structuring content in manageable stages supports knowledge retention (Bruner, 1960).

Teaching strategies were appropriate and effective (PSF A2), particularly the use of analogies and worked examples, which supported engagement and accessibility (V2, V1). Analogies are known to enhance conceptual understanding in technical subjects (Glynn, 2008). However, the session remained largely didactic. Introducing more active learning opportunities would further enhance effectiveness and inclusivity (A4), as student-centred approaches improve engagement (Prince, 2004).

Resources, including slides and diagrams, were used effectively to support understanding (K4). Some slides were content-heavy, suggesting a need for refinement to improve clarity. Questioning techniques could be further developed to support formative assessment (A3) and encourage participation.

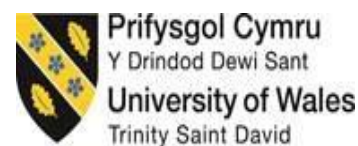
The pace of the lesson was appropriate, allowing students time to process information. This supported a positive learning environment (V1). Use of praise and encouragement was limited but could be enhanced through increased interaction and feedback (A3).

Monitoring of understanding was supported through worked examples, though more explicit checks would strengthen this (A4). Learning objectives were achieved effectively due to the structured delivery.

Enthusiasm and subject knowledge were evident, reflecting an evidence-informed approach to teaching (V3). A clearer plenary would further support consolidation and continuity with future sessions (A1). Ongoing development (A5) will focus on increasing interactivity and inclusive practice.

6 Observation 3

6.1 PGCert tHE OBSERVATION FORM -PSF 2023



PGCert tHE- OBSERVATION FORM -PSF 2023

Details of the Observation	
Observee	Ryan James
Practice Advisor / Expert peer observer	Dr Owen Williams
Date of the Observation	19/12/2025
Campus / Location	Waterfront Campus, IQ102
Date, Time, Duration	1-4 3 hours
Subject Speciality	ACMA5001 Control and Automation
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. 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 lecture was logically structured, linking mechanical and electrical system models to support interdisciplinary understanding. Content was appropriately challenging, including mathematical modelling and system response analysis. Worked examples were included to demonstrate application of theory. Delivery relied heavily on explanation of complex mathematical concepts, with limited scaffolding for step-by-step learning. Greater use of visual aids and formative activities would support student engagement and comprehension.

Teaching [A2: Teach and/or support learning.]

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.

Comments

The session built on prior mathematical and systems knowledge, though this could have been more explicitly referenced at the start.

Presentation of complex material was generally clear, but some concepts may require further breakdown for accessibility.

The pace was relatively fast given the complexity of the topic, which may challenge some learners.

The lecturer conveyed strong subject expertise and maintained a focused, academic tone.

Reinforcement was provided through examples, though more step-by-step guidance would enhance understanding.

Slides and diagrams were used appropriately, but additional visual aids could further support comprehension.

The session would benefit from a clearer summary and consolidation of key concepts at the end.

Communication was effective, though largely one-directional with limited student interaction.

Learning outcomes were partially achieved, with some students potentially requiring additional support due to the level of difficulty.

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 environment was focused and appropriate for higher-level study, though interaction levels were low.

Student attention was maintained, but the complexity of the material may have challenged some learners' ability to fully engage.

Limited adaptation to individual learner needs was evident, with opportunities to identify and address learning difficulties not fully utilised.

Assessment [A3: Assess and give learners feedback for learning]

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

Comments

Inclusion of example problems enabled students to engage with the application of theoretical concepts.

Clear mathematical demonstrations provided opportunities for learners to follow processes and evaluate their own understanding.

Core Knowledge

- K1 - how learners learn, generally and within specific subjects
- K2 - approaches to teaching and/or supporting learning, appropriate for subjects and level of study
- K3 - critical evaluation as a basis for effective practice
- K4 - appropriate use of digital and/or other technologies, and resources for learning
- K5 - requirements for quality assurance and enhancement, and their implications for practice

Comments

The session built effectively on prior knowledge, introducing complex mathematical concepts with appropriate academic rigour. Teaching methods suited the subject level, supported by examples and visual aids. However, additional scaffolding would benefit learners of varying abilities. While analytical application was evident, opportunities for critical reflection were limited. The content demonstrated strong alignment with higher-level academic and professional standards.

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? All other evidence informed approaches as a basis of effective practice.
- V4 Respond to the wider context in which higher education operates, recognising implications for practice.
- V5 Collaborate with others to enhance practice.

Comments

The lecture reflected strong subject expertise and alignment with academic standards, though less evidence of adaptation for diverse learners. Engagement was maintained through focused delivery, but interaction was limited. Content demonstrated scholarly underpinning. Consideration of the

broader educational context was evident, though increased collaboration and inclusive approaches would strengthen overall practice.

Examples of good practice:

Logical linkage between mechanical and electrical systems to support understanding.
 Appropriate level of academic challenge with strong mathematical content.
 Use of examples to demonstrate application of theory.

Action points:

Provide more scaffolding and step-by-step explanations for complex concepts.
 Increase use of visual aids and interactive activities to support engagement.

For Observee

Write a short statement to address area of activity [A5]. Describe how this observation will enhance your practice

I will use this feedback to improve the scaffolding of complex mathematical concepts and adjust pacing to support varied learner abilities. I intend to incorporate more visual aids and guided problem-solving activities. Through ongoing professional development, I will strengthen my approach to inclusive teaching and explore methods to better support student understanding of advanced material.

Observer Dr O.Williams.....

Date 19/12/2025

Overservee R.James.....

Date 19/12/2025

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.

6.2 Observation 3 reflection

The session structure effectively linked prior knowledge to new concepts, demonstrating appropriate planning (PSF A1). The progression from mechanical to electrical systems supported learning objectives and interdisciplinary understanding (K1). However, the complexity of content required greater scaffolding. Providing structured support is essential for learning complex material (VYGOTSKY, 2019).

Teaching strategies were appropriate for the academic level (PSF A2), with a focus on mathematical modelling and examples. However, additional step-by-step guidance would improve accessibility for diverse learners (V1, A4). Incorporating more interactive elements would also enhance engagement (V2), as active learning has been shown to improve performance in STEM subjects (Freeman et al., 2014).

Resources such as diagrams and equations supported delivery (K4), though additional visual aids could further enhance understanding. Questioning techniques were limited, reducing opportunities for formative assessment and feedback (A3).

The pace was relatively fast given the complexity of the material, which may have challenged some learners. Adjusting pacing would improve inclusivity (V1). Use of praise and encouragement was minimal, reflecting the lecture format, but could be improved through increased interaction.

Monitoring understanding was largely implicit; incorporating structured checks would strengthen learner support (A4). Learning outcomes were partially achieved, with some learners requiring additional support.

Strong subject knowledge and enthusiasm were evident, reflecting scholarly practice (V3). A clearer plenary would support consolidation and progression (A1). This reflection will inform ongoing professional development (A5), particularly in scaffolding complex material and enhancing inclusive teaching strategies.

7 CPD Reflection 1

7.1 Content

The MATLAB Course Designer resource outlines a structured platform for creating interactive, self-paced learning experiences within MATLAB. It enables educators to design courses that integrate instructional content, coding exercises, automated feedback, and assessment within a single environment. A key feature is the ability to scaffold learning through progressive tasks, allowing students to move from foundational knowledge to applied problem-solving (PSF: K1, K2).

The platform supports principles of active learning by embedding practice directly into the learning process, rather than separating theory and application. Immediate feedback mechanisms align with formative assessment practices (Black & Wiliam, 1998), enabling learners to identify and address misconceptions in real time. Additionally, the modular structure reflects constructive alignment (Biggs et al., 2011), where learning activities and assessments are closely aligned with intended outcomes (PSF: K4, A1).

The use of digital tools to support flexible, self-paced learning also reflects contemporary approaches to blended and technology-enhanced learning (Laurillard, 2013), ensuring accessibility and adaptability for diverse learners (PSF: V1, V2).

7.2 Use as a lecturer

This CPD is particularly relevant as I prepare to deliver a new MATLAB module. The platform provides an opportunity to rethink how I structure learning, moving beyond traditional lecture-based delivery towards a more interactive and student-centred approach (PSF: A2, K3).

I plan to use MATLAB Course Designer to create guided learning pathways, where students engage with short instructional inputs followed by hands-on coding tasks. This will allow me to embed scaffolded learning, supporting students as they develop both conceptual understanding and practical skills. Automated feedback will also help reduce reliance on lecturer-led explanations, enabling me to focus more on facilitating deeper learning during contact time (PSF: A4, A5).

In relation to previous reflections on pacing, this approach allows for differentiated progression, where students can work at an appropriate pace rather than being constrained by whole-class delivery. I can also use analytics from the platform to identify common areas of difficulty and adapt my teaching accordingly, supporting a more responsive and evidence-informed approach (PSF: K5, A3).

7.3 Use for the learner

For learners, MATLAB Course Designer offers a more engaging and interactive learning experience compared to passive lectures. The integration of coding exercises within the learning environment encourages learning by doing, which is particularly important in technical subjects such as programming (Kolb et al., 2014) (PSF: K3, V2).

Immediate feedback supports iterative learning, allowing students to experiment, make mistakes, and refine their understanding without delay. This promotes self-regulated learning (Zimmerman, 2002), as students can monitor their progress and take ownership of their development.

The self-paced nature of the platform also enhances inclusivity, enabling students with different levels of prior experience to progress at their own speed. This aligns with the principle of supporting diverse learner needs and creating equitable learning opportunities (PSF: V1, V3).

7.4 Overall reflection

This CPD has been valuable in preparing me for teaching a new MATLAB module, encouraging me to adopt a more technology-enhanced, student-centred approach. It has highlighted the potential of digital platforms to support active learning, improve pacing, and provide timely feedback (PSF: K4, A5).

Moving forward, I will integrate MATLAB Course Designer into my module design, using it to structure learning activities and assessments in a way that promotes engagement and understanding. I will also evaluate its effectiveness through student feedback and performance data, ensuring continuous improvement in my teaching practice.

Overall, this reflection demonstrates my commitment to developing innovative teaching approaches aligned with PSF 2023, supporting both my professional growth and enhanced student learning outcomes (PSF: V3, A5).

8 CPD Reflection 2

This was the following YouTube lecture selected due to observation feedback

Peer Instruction for Active Learning - Eric Mazur ((2) *Peer Instruction for Active Learning - Eric Mazur - YouTube*, n.d.)

8.1 Content

This CPD focused on Eric Mazur's Peer Instruction model for active learning. Mazur reflects on his early reliance on traditional lectures and high student ratings, before realising that performance on procedural exam questions did not necessarily demonstrate conceptual understanding. This challenged the assumption that effective teaching is proven by student satisfaction or examination success alone (PSF: K2, K5).

A key message is that students may memorise "recipes" without understanding underlying principles. Mazur's use of conceptual questions, voting, peer discussion and re-voting demonstrates the value of active engagement and formative assessment (PSF: A2, A3). This aligns with Black & Wiliam, (1998) work on assessment for learning and (Freeman et al., 2014) evidence that active learning improves student outcomes. The session also connects with the "curse of knowledge", where expert teachers may forget the difficulties faced by novice learners (Pinker, 2014), reinforcing the need to design learning from the student perspective (PSF: V1, K3).

8.2 Use as a lecturer

As a lecturer, this CPD encourages me to move further away from content-heavy delivery and towards facilitation of learning. Mazur's model shows that explanation alone is not always sufficient; students need opportunities to think, commit to an answer, discuss reasoning, and reconstruct understanding through dialogue (PSF: A1, A2).

In response to feedback from the previous lesson observation on pacing, Peer Instruction offers a practical strategy. Rather than trying to cover too much content at speed, I can build in short conceptual questions and peer discussion points to check understanding before moving on. This would help me regulate pacing based on learner responses rather than relying only on my planned timings (PSF: A5, K4).

This also supports constructive alignment, as teaching activities can be linked directly to intended learning outcomes and assessment demands (Biggs et al., 2011). I would use pre-reading or short preparatory resources before class, allowing contact time to focus on sense-making, application and discussion.

8.3 Use for the learner

For learners, Peer Instruction fosters deeper engagement by making them active participants rather than passive recipients of information. They are required to think, explain and justify their understanding to peers. This can improve confidence, participation and conceptual understanding (PSF: V2, V3).

Mazur's example shows that peers may explain concepts in more accessible language because they have recently encountered the same difficulties. This supports VYGOTSKY (2019) The social constructivist view that learning develops through interaction with others. It also promotes metacognition, as learners compare their reasoning with others and identify gaps in understanding (Zimmerman, 2002).

For diverse learners, this approach can make teaching more inclusive by creating multiple opportunities to engage with ideas, rather than relying solely on listening and note-taking (PSF: V1, K3).

8.4 Overall reflection

This CPD has influenced how I understand effective teaching. It reinforces that learning is not simply about delivering information, but about creating conditions for students to make meaning. Mazur's reflection challenges me to evaluate whether students truly understand concepts, rather than assuming that silence, good feedback or task completion equals learning.

In future sessions, I will incorporate peer discussion, conceptual questioning and formative checks to improve pacing and engagement. This will help me respond more effectively to learners' needs and continue developing my practice through evidence-informed reflection (PSF: A5, V3).

9 CPD Reflection 3

This was the following YouTube lecture selected due to observation feedback

“Pacing Guide: What is it?” ((2) *Pacing Guide: What Is It?* - YouTube, n.d.)

9.1 Content

The session focused on developing a shared understanding of pacing guides within a whole-school approach to curriculum planning, particularly as part of the Common Formative Assessment (CFA) process within Professional Learning Communities (PLCs). A key theme was “levelling set” language and expectations to ensure consistency across staff, highlighting the importance of a shared pedagogical framework (PSF: K2, V3).

The distinction between a scope and sequence and a pacing guide was particularly valuable. While the scope and sequence provide broad curriculum coverage, pacing guides are teacher-developed, granular, and responsive tools that map what is taught, when, and for how long, focusing explicitly on state standards. This aligns with the concept of a “guaranteed and viable curriculum” (Marzano, 2003), ensuring all learners have equitable access to core content (PSF: K1, V2).

The emphasis on teacher collaboration in creating pacing guides reflects the work of Richard DuFour, where PLCs focus on collective responsibility for student learning. The transcript reinforced that the process of co-construction—rather than the document itself—is critical, as it deepens teacher understanding of curriculum and assessment (PSF: A4, K4). Furthermore, the integration of pacing guides with formative assessment aligns with Black and Wiliam’s (1998) work on assessment for learning, where data is used diagnostically to inform instruction rather than summatively.

9.2 Use as a lecturer

This CPD activity directly relates to recent lesson observation feedback I received regarding pacing, prompting critical reflection on my teaching practice. I recognise parallels between the session’s focus and my own tendency to prioritise content coverage over structured progression. The session reinforced that effective pacing is not about speed, but about intentional sequencing and responsiveness to learners (PSF: A2, V1).

I plan to adopt a more structured approach by mapping learning outcomes across sessions, ensuring each teaching period has a clear purpose aligned with programme standards. Embedding formative checkpoints—such as questioning or short activities—will allow me to monitor understanding and adjust pacing dynamically, reflecting adaptive expertise (Hatano & Inagaki, 1986). This also aligns with constructive alignment (Biggs, 1996), ensuring teaching activities, pacing, and assessment are coherently linked (PSF: K2, A1).

Importantly, the emphasis on flexibility within structure resonates strongly. Like the pacing guide model, I will allow room to revisit challenging concepts where necessary, rather than rigidly adhering to pre-planned timings. This reflects (Schon & DeSanctis, 1986) reflective practitioner model, where teaching decisions are continuously evaluated and adapted in practice (PSF: A5).

9.3 Use for the learner

For learners, improved pacing has significant implications for engagement, equity, and attainment. A clearly structured yet flexible approach ensures that all students have sufficient time to grasp key concepts, supporting inclusivity and reducing cognitive overload (Sweller, 1988b)(PSF: K3, V1).

The transcript’s focus on ensuring all learners access the same core standards aligns with the principle of a guaranteed curriculum, promoting fairness and consistency across cohorts.

Additionally, embedding formative assessment within pacing allows learners to receive timely feedback, supporting self-regulated learning (Zimmerman, 2002) and improving outcomes (PSF: V2, A3).

Collaborative approaches to curriculum design also benefit learners indirectly, as teachers develop a deeper, shared understanding of how best to sequence and deliver content.

9.4 Overall reflection

This CPD activity has been particularly impactful in light of feedback from my lesson observation regarding pacing. It has shifted my understanding from viewing pacing as a time-management issue to recognising it as a pedagogical strategy linked to curriculum design, assessment, and student need (PSF: K2, V1).

Moving forward, I will implement more deliberate planning around sequencing and timing, incorporate formative assessment to guide pacing decisions, and remain flexible in response to learner progress. I will also seek peer feedback to evaluate the effectiveness of these changes.

Overall, this reflection supports my ongoing development as an educator, demonstrating engagement with professional learning and alignment with PSF 2023 values and practices (PSF: A5).

10 Personal reflection through the programme

10.1 How analysing modules improved awareness

Completing the PGCertHE has helped me look more critically at how my engineering modules are designed, delivered and assessed. I have become more aware of how learning outcomes, assessment tasks and classroom activities need to align clearly, rather than existing as separate parts of the module. This links to designing and planning learning activities (PSF A1), teaching and supporting learning (PSF A2), and using critical evaluation to improve practice (PSF K3). The PSF dimensions also highlight the importance of enhancing practice through continuing professional development (A5).

10.2 Considering learning styles with interventions

The PGCertHE encouraged me to consider the different ways students engage with technical content. In engineering, some students respond well to diagrams, worked examples and demonstrations, while others benefit from discussion, problem-solving and practical application. I have therefore started to think more carefully about varied interventions, including short activities, peer discussion and scaffolded tasks. This supports respect for individual learners and diverse groups of learners (PSF V1), while promoting engagement and equity of opportunity (PSF V2).

10.3 Keeping up with changes in the classroom

10.3.1 Evolving engineering

Engineering education is constantly changing, particularly as industry expectations develop around sustainability, digital skills, automation and interdisciplinary working. My teaching needs to reflect this wider context, ensuring students are prepared not only to pass assessments but also to apply knowledge professionally. This connects strongly with responding to the wider context in which higher education operates (PSF V4), and applying knowledge of the subject and how students learn within it (PSF K1).

10.3.2 AI impact

AI has made me reflect on how students access information, complete tasks and demonstrate understanding. Rather than viewing AI only as a risk, I now see it as something that should be discussed openly and used responsibly. It can support learning through formative feedback, explanation and revision, but assessment design must still test authentic understanding. This relates to the appropriate use of digital technologies and resources for learning (PSF K4), as well as using evidence-informed approaches to improve practice (PSF V3).

10.4 Further work to continually improve

10.4.1 Maintaining CPD completion

The PGCertHE has reinforced the importance of continuing professional development as an ongoing responsibility rather than a one-off requirement. I intend to keep engaging with workshops, literature, institutional guidance and reflective practice. This directly supports enhancing practice through CPD (PSF A5) and using scholarship and professional learning as a basis for effective teaching (PSF V3).

10.4.2 Continue peer review of teaching

Peer review has been particularly valuable because it provides another perspective on my teaching habits. Feedback from colleagues has helped me notice strengths and areas for refinement that I may not have recognised independently. Continuing this process will support collaboration with

others to enhance practice (PSF V5), while strengthening assessment, feedback and support for learning (PSF A3 and A4).

10.4.2.1 Focus on tempo and pace

I have become more aware of the need to manage tempo and pace during sessions. Engineering content can be dense, so it is important to avoid overloading students. I plan to build in pauses, checks for understanding and opportunities to revisit threshold concepts. This supports effective teaching approaches (PSF K2) and teaching through appropriate learning environments (PSF A2).

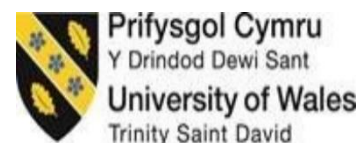
10.4.2.2 Focus on active learning

A key area for development is increasing active learning. I want students to do more than listen; they should apply, test, question and explain engineering concepts. Using problem-based tasks, short calculations, simulations and peer instruction will help students take greater ownership of learning. This supports engagement in learning (PSF V2), assessment and feedback for learning (PSF A3), and effective support for learners (PSF A4).

11 Evidence of Teaching hours

11.1 Post Graduate Certificate in Teaching in Higher Education (PG Cert tHE)

Evidence of teaching hours log

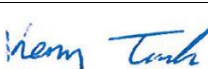
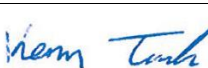
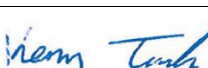
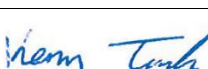
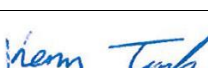
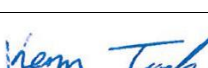
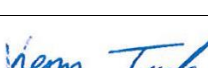
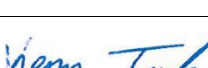


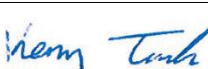
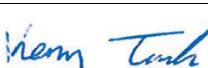
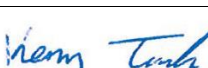
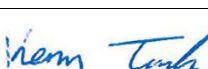
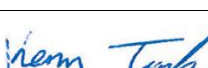
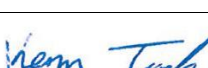
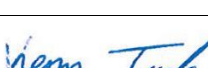
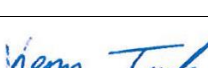
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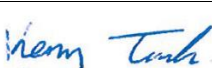
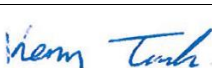
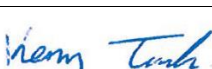
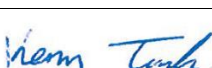
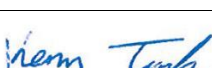
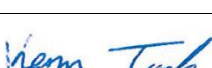
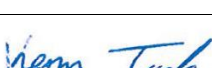
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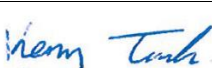
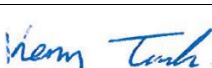
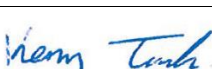
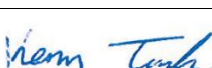
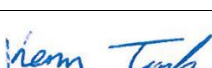
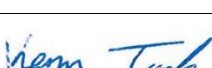
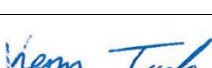
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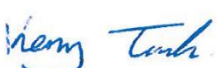
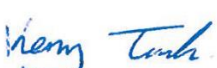
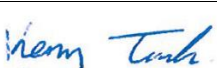
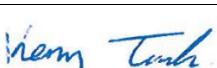
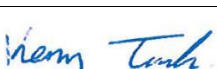
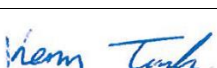
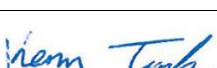
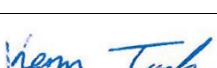
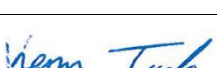
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Student's signature...



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Practice Advisor's signature

Henry Tunk

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12 References

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