

**University of Wales Trinity Saint David**

**Institute of Education & Humanities**



**Prifysgol Cymru**  
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Trinity Saint David

***Professional Portfolio 2***

***Advanced Teaching and Assessment in Higher Education***

***(UNHE7010)***

Andrew Noble - 1651201

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Generative AI Declaration

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

**MODULE CODE: UNHE 7010**

**ASSESSMENT COMPONENT: Portfolio**

**STUDENT NAME: Andrew Noble**

**STUDENT NUMBER: 1651201**

## Use of Generative AI in Assessment

|              |                                                                                                                                                                                                 |                                                                        |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| RESEARCH     | For this assessment, you can use Generative AI to support you in research, including searching for bibliography, using tools to summarise, compare and interrogate materials.                   | Yes <input checked="" type="checkbox"/><br>No <input type="checkbox"/> |
| 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 <input checked="" type="checkbox"/><br>No <input type="checkbox"/> |
| 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 <input checked="" type="checkbox"/><br>No <input type="checkbox"/> |
| WRITING      | For this assessment, you can use Generative AI to create text for submission.                                                                                                                   | Yes <input type="checkbox"/><br>No <input checked="" type="checkbox"/> |
| CREATIVE     | For this assessment, you can use Generative AI to create creative materials, such as images.                                                                                                    | Yes <input type="checkbox"/><br>No <input checked="" type="checkbox"/> |
| PROGRAMING   | For this assessment, you can use Generative AI to create and check code.                                                                                                                        | Yes <input type="checkbox"/><br>No <input checked="" type="checkbox"/> |
| NONE         | For this assessment, you are not allowed to use <b>any</b> type of Generative AI support. This includes research support, structure support, writing/proofreading support and creative support. | Yes <input checked="" type="checkbox"/><br>No <input type="checkbox"/> |

## AI Acknowledgement

I confirm that I have not presented any AI generated materials as my own work in this portfolio.

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

The details are provided below:

*I acknowledge the use of Microsoft 365 Copilot on 19/04/2026 to proofread my work for structure, grammar, and presentation using the following prompt:*

- 1. Assess the uploaded document for spelling, grammar and general presentation. Highlight areas that could be improved and make suggestions as to how they could be rephrased without changing the intent of the sentences.*

*I confirm that I have not presented any AI-generated content as my own original work. I further confirm that I have retained copies of my drafts, notes, and other materials created before and after the use of AI tools, which I am prepared to provide as evidence if required.*

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# 1.0 Teaching Intervention Cycle 1

## 1.1 Introduction

This section presents a critical assessment of a teaching and learning intervention implemented during the first delivery of a newly developed Level 7 module, Motorsport Dynamics Fundamentals. As a new postgraduate module, its initial delivery required careful design and evaluation of teaching strategies, learning resources and assessment alignment to support effective learning at master's level (Biggs, J., Tang, C., & Kennedy, 2022) (A1, K2).

The module was delivered to a mixed cohort, with a substantial proportion of international students, whose prior educational experiences and learning expectations differed from those typical within UK higher education. Early engagement with students highlighted the need for a diverse and inclusive teaching approach, recognising variations in learning styles, assessment literacy and conceptual preparedness. This presented a challenging task to develop content that would suitably support the requirements of the international cohort, without being detrimental to learning of the domestic students (de Vita, 2002) (V1, V2, K1).

In response, the module content and supporting materials were developed and adapted to promote clarity, structure and progressive conceptual understanding within a technically demanding subject area. It was recognised early that there could be issues that would arise from misunderstanding of some technical concepts and explanations due to language, meaning that it was important to ensure that the supporting materials developed would remove ambiguity and confusion as much as possible (Nguyen et al., 2014). Teaching approaches were informed by reflective practice and evidence-informed principles to maximise student engagement and opportunity for success during the first iteration of the module (A2, A5, V3, K3).

Assessment was delivered through a formal examination, an approach which can present challenges for international students due to unfamiliar formats and expectations. The intervention therefore aimed to support assessment preparedness through aligned teaching activities and explicit guidance, while maintaining appropriate academic standards (Miller, Bradbury and Wessels, 2007) (A3, V1, K5).

## 1.2 Initial Intended Delivery Approach

The initially intended teaching approach for Motorsport Dynamics Fundamentals was developed to ensure comprehensive coverage of the module curriculum while providing a structured and coherent introduction to advanced technical concepts at Level 7 that could be followed by students coming from different undergraduate backgrounds, lacking some of the key technical underlying knowledge. This may require an accelerated scaffolding style approach to the content (Ruiz-Jaramillo et al., 2015). Base content was designed to align closely with the approved module specification and learning outcomes, establishing a clear conceptual direction and development through which students could progressively build understanding (Kruiper et al., 2022) (A1, K2).

The content was originally structured around a traditional lecture-based delivery model, using PowerPoint-style presentations supported by in-class explanation, discussion and worked examples of key topic areas and concepts. This approach was selected as a pragmatic starting point for the first delivery of a new module, allowing efficient communication of complex theoretical material and ensuring consistency across sessions (A2, K2). However, it was recognised at the planning stage that a reliance on conventional lecture delivery alone would be insufficient to meet the broader aims of the proposed intervention or to fully support the diversity of learners within the cohort (Eaves, 2011)(V1, V2, K1).

While the lecture format provided a necessary foundation, the approach was deliberately framed as iterative and adaptable, rather than fixed. This type of flexible approach is highlighted in the work of Ryan and Tilbury (2013) as being good practice to react to the ever-changing nature of the HE sector. Student engagement, comprehension and confidence were intended to be monitored informally throughout delivery using questioning, observation of participation and responsiveness during sessions. This ongoing evaluation was intended to inform real-time adjustments to pacing, explanation and supporting material, resulting in an evidence-informed teaching practice (Ryan & Tilbury, 2013) (A5, V3, K3).

A key constraint identified at the outset was that the module was delivered over a single semester, limiting opportunities for extended evaluation and longitudinal adaptation of the

intervention. This compressed delivery period increased the challenge of embedding and refining new teaching strategies while the module was live, highlighting the importance of responsiveness and continuous reflection within each teaching cycle (A5, K3). Although in a different context, the research by (Human-Hendricks & Meier, 2020) does suggest that, although effective, a flexible approach to curriculum can lead to over ambitious change which results in a more confusing situation for the students. As a result, the intended approach emphasised flexibility and responsiveness within individual sessions rather than large-scale structural change mid-semester.

The inclusion of worked examples was identified as a critical component of the teaching strategy. Worked problems were intended to function as a formative assessment tool, allowing students to apply theoretical concepts to realistic engineering scenarios while providing opportunities for immediate clarification and feedback (A3, K1). Careful consideration was given to how these activities were facilitated, particularly in relation to cohort diversity. Recognising that some students—especially those from international backgrounds—may be uncomfortable responding publicly or may lack confidence in unfamiliar assessment conventions, the approach aimed to avoid practices that could unintentionally alienate or discourage participation. Additionally, whether these would be collaborative or individual tasks needs consideration, as it was found by (Retnowati et al., 2017) that collaborative worked examples can be biased by extremes of student ability and not give a true reflection of the general cohort understanding (V1, V2).

Overall, the initially intended approach balanced the practical need for structured, lecture-led delivery with an explicit recognition of its limitations. It was deliberately positioned as a starting point from which teaching practices, learning resources and in-class activities could evolve in response to student needs and engagement, supporting inclusive and effective learning within the constraints of a first module delivery (A1, A2, A5, V3).

### 1.3 Reflections on First 2 Delivered Sessions

Reflection following the first two teaching sessions provided an initial opportunity to evaluate the effectiveness of the intended teaching approach and to identify emerging challenges within the cohort. The first session was designed as an introductory and conceptually accessible entry point to the module, intentionally requiring no prior specialist knowledge. This approach aimed to support early engagement and confidence-building, particularly for those students new to the UK educational system (McDonald, 2014) (A2, V1, K1).

Student engagement during the first session was mixed. While some students engaged readily with the introductory material, overall participation levels were lower than anticipated. This was considered likely to be influenced by the cohort being newly formed, with students unfamiliar with one another and with the teaching environment, as well as with the lecturer. Such hesitancy is consistent with early-stage group dynamics and was therefore not interpreted as an indication of disengagement with the module content itself, as per Yorke (2016), who notes that newly formed groups generally display lower levels of engagement (V1, V2).

Overall, the introductory content appeared to be absorbed effectively by most students. However, early indications of language-related challenges emerged, particularly during verbal explanations and whole-group discussions. Some students struggled to follow extended spoken explanations, suggesting potential barriers to engagement when technical concepts were introduced verbally without sufficient visual or structured reinforcement (K1). At this early stage, it was considered possible that comprehension and confidence would improve organically as students acclimatised to terminology, teaching style and disciplinary expectations, although (McDonald, 2014) does point out that language issues can be significantly influential in success for international students, so should be carefully monitored. Consequently, no immediate changes were made to the delivery approach following the first session, allowing further evidence to emerge (A5, K3).

The second session introduced more technically complex material and required increased active engagement, including the use of worked examples. This session provided the first substantive opportunity to assess students' technical preparedness and problem-solving

ability in context (A3, K2). The cohort demonstrated a generally sound level of technical competence, with most students able to engage successfully with the examples provided. However, as anticipated, ability within the group was mixed, with some students progressing more quickly than others.

As the technical demands increased, it became more evident that a subset of international students had trouble following the progressive development of technical arguments. In several instances, misunderstandings appeared to arise from language-related interpretation rather than from conceptual difficulty. Addressing these issues required additional explanation and clarification, which resulted in a noticeable slowing of the session pace (A2, V1).

While this adaptive response supported those students who were struggling, it also highlighted a potential risk of disengagement for other students who were ready to progress more quickly. This prompted important questions to be asked about how to maintain an appropriate and inclusive pace for the whole cohort without marginalising any group of learners (V2). Research has shown that, among a varied ability group, it is easy for students at each end of the ability spectrum to become disenfranchised from the content if the pacing of delivery is not suitable (Lawrence, n.d.). As a result, careful consideration was identified as essential for future sessions, particularly around structuring explanations, supporting comprehension without excessive interruption, and sustaining engagement for students across a range of abilities (A1, A2, A5).

## 1.4 Planned Changes for Future Sessions

Reflection on the first two teaching sessions informed a set of planned amendments aimed at improving accessibility, pacing and engagement for a diverse postgraduate cohort. These amendments focused on two primary areas: verbal delivery during lectures and the provision of supporting learning materials alongside lecture slides, with the overall intention of improving student comprehension during the sessions and supporting their effective learning, without affecting academic standards (A2, V1, K2).

A key planned change concerned the spoken delivery of technical content, particularly in recognition of the needs of international students for whom English may not be a first language. This is an area that is mentioned by both McDonald (2014) and (Lawrence, n.d.) as

being an important consideration in student comprehension among English Second Language (ESL) learners. While the underlying concepts were generally well understood once clarified, it became apparent that the way explanations were delivered could act as a barrier to comprehension (K1). Future sessions were therefore planned to adopt a more deliberate and structured verbal approach, including clearer segmentation of explanations and more frequent signposting of key stages in technical reasoning (A2).

Specific consideration was also given to the terminology used during lectures. Certain technical terms and expressions common within UK or European engineering contexts were identified as potential sources of confusion (Sveučilišta Zadru, 2024). Where such terminology was unavoidable, the delivery plan included either the use of more internationally recognisable alternatives or the provision of expanded explanations explicitly linked to previously established principles (V1, K1, K2). In addition, a conscious effort was planned to avoid idiomatic language and colloquialisms when explaining key technical concepts, as these were recognised as potentially likely to hinder understanding rather than support engagement, as per (Sveučilišta Zadru, 2024) (V2).

Alongside changes to verbal delivery, a significant amendment involved the provision of supporting materials in advance of lectures. These materials were intended to summarise key concepts, equations and technical themes, allowing students to familiarise themselves with content prior to live delivery (A1, K4). This advance access was expected to reduce cognitive load during lectures and minimise the need for frequent interruptions to clarify foundational points, thereby helping to maintain a more consistent pace for the whole cohort (A2). The work conducted by Landys (2025) however, showed that using pre-released materials did not have a quantifiable impact of student attainment at the point of assessment, although qualitative surveys taken by the student body did suggest that these approaches were well received and considered useful. As such, the approach will be implemented and its usefulness monitored.

Providing materials in advance also created opportunities for students to identify areas of uncertainty independently and seek clarification through self-directed study or targeted questions. This was viewed as particularly beneficial for international students, who may prefer time to process technical explanations before engaging in discussion (McDonald,

2014) (V1, V2). However, it was recognised that pre-released materials could not replace the need for clarification during taught sessions.

As a result, careful monitoring was planned to ensure that these changes did not unintentionally discourage students from asking questions in class. Maintaining a supportive and inclusive learning environment remained a priority, with explicit encouragement for students to seek clarification during lectures where needed (A4, V1). Overall, the planned amendments aimed to balance clarity, pace and inclusivity, supporting effective learning across a mixed cohort while remaining responsive to ongoing reflection and evaluation of practice (A5, V3, K3). An example of the lesson plans that were generated for lectures from this point of the module can be found in the appendix.

## 1.5 Generation of Supporting Materials

The effectiveness of the planned intervention was dependent on the quality and clarity of the supporting materials released in advance of lectures. Careful consideration was therefore required to ensure that these materials were accessible, accurate and pedagogically aligned with the taught content, so that they supported learning rather than creating additional confusion (A1, K2, K4). MacDonald and Thompson (2005) discuss the importance and impact that both high quality and poorly structured content has on student understanding in HE, highlighting the importance of ensuring the quality of materials to be used. At master's level, where conceptual complexity is significant, poorly structured pre-reading risked widening attainment gaps rather than supporting inclusive practice (V1, V2).

A key challenge in developing these materials was the difficulty of anticipating how best to present information to students who do not respond optimally to traditional lecture-based explanations. As the module leader, it was not always straightforward to identify which representations, levels of detail or sequencing of ideas would best support a diverse cohort with varied educational and cultural backgrounds (K1). This made the generation of effective supporting resources a complex and iterative task, requiring reflection and adaptation rather than a single fixed solution (A5, V3).

Peer review of supporting materials was considered as a potential mechanism for quality assurance and pedagogic refinement. However, practical constraints relating to staff workload and availability limited the feasibility of this approach. Additionally, it was

recognised that colleagues reviewing the materials might encounter similar challenges in predicting what would be most effective for international and mixed-background cohorts, reducing the potential impact of this strategy (K3, K5).

In this context, the use of large language model (LLM) AI tools was explored as a supplementary means of supporting material development. The use of AI in many areas of the HE sector is currently an area of ongoing debate, however the potential positive impact the tools could have in this specific application meant they were worthy of consideration (Crompton et al., 2023). These tools offered the ability to draw on a broad range of pedagogic structures and explanatory strategies, which could inform alternative ways of summarising and sequencing content to support diverse learners (K4). AI-generated content summaries were used as a starting point for creating concise, structured pre-lecture materials intended to reduce cognitive load and support pre-session familiarisation (A1, A2).

However, the use of AI tools required careful critical oversight. It was essential that generated content did not alter the intended academic meaning, emphasis or tone of the original material, particularly given the technical and specialist nature of motorsport engineering (V3). The potential for an AI tool to unintentionally alter the context or intent of what is being conveyed is a very real risk, as discussed by Eager (2023). Niche and highly specific subject areas are known limitations of LLM-based tools, increasing the risk of inaccuracies or oversimplifications if outputs are accepted without suitable review (K3). As a result, all AI-assisted materials were thoroughly reviewed and revised to ensure technical accuracy and alignment with module learning outcomes (Perkins et al., 2024) (A5).

The quality and specificity of prompts provided to the AI tools was also identified as a critical factor influencing the usefulness of outputs. Research by (Kulkarni & P Tupsakhare, 2024) demonstrated an improvement from 85% response accuracy to 98% based on the quality of the prompt given to the AI system, albeit in a different context to the discussion here, but the importance is highlighted. As such, considerable attention was given to framing prompts clearly and precisely, ensuring that generated summaries reflected the intended scope and level of the material (K2, K4). Through this controlled and reflective use, AI functioned as a supportive tool rather than a substitute for pedagogic expertise, contributing to the development of inclusive and well-structured learning resources aligned with the needs of a diverse postgraduate cohort (V1, V2, A1).

## 1.6 Reflections at the Mid-Semester Point

Review mid-semester suggested that the adapted teaching approach was having a positive impact on student engagement and learning, providing cautious reassurance that the intervention was moving in an effective direction. As the semester progressed, levels of participation and confidence during taught sessions increased, particularly during periods of active engagement such as worked examples and guided problem-solving (A2, V2).

One of the most notable developments was the improvement in student performance during formative assessment activities. Students were increasingly able to complete worked examples successfully with less need for repeated clarification of concepts introduced earlier in the lecture. This indicated that students were developing a more secure understanding of foundational material and were better able to apply it in practice, suggesting an improvement in underlying conceptual understanding (A3, K1, K2).

While the need to pause lectures to clarify earlier points had not been eliminated entirely, the frequency of such interruptions appeared to have reduced as the semester progressed. However, no formal data were collected to quantify this change, limiting the ability to draw definitive conclusions about the scale of improvement (K3). The work of Smith (2008) makes clear the requirement to collect data pertaining to the effectiveness of teaching methods in order to effectively make informed decisions about future changes. This absence of systematic data collection was recognised as a limitation of the evaluation process and highlighted an area for potential enhancement in future iterations of the module (A5).

It also emerged through informal discussion that not all students were making regular use of the pre-released supporting materials. As a result, improvements in engagement and comprehension could not be attributed solely to this aspect of the intervention. It was therefore considered likely that changes to verbal delivery, including clearer structure, reduced use of idiomatic language and more explicit explanation of technical reasoning, had a more immediate and tangible impact on student understanding during live sessions (A2, V1, K1).

Given the difficulty in isolating which individual elements of the intervention were most influential, a decision was made to continue with the integrated approach for the remainder of the semester, rather than modifying elements in isolation. This decision reflected a

pragmatic and reflective stance, the intent being to maintain stability in approach and constancy for students while continuing to monitor the situation (Smith, 2008) (A5, V3).

Repeated exposure to worked examples also appeared to benefit those students who had initially struggled with technical content. With continued practice and structured guidance, these students were increasingly able to arrive at correct solutions, demonstrating the value of repeated, scaffolded application as a learning strategy (Kruiper et al., 2022) (A3, K1). This observation directly informed planning for the latter stages of the semester delivery and content, particularly in preparation for the examination.

Given that this module is wholly assessed by a single summative examination, it was felt important to support the students as much as possible in their preparations. This was highlighted as an area that can prove critical to some students, especially those who struggle with examinations despite having a good understanding of the content by the work of French, Dickerson and Mulder (2023). It was shown that high-stakes end-point assessments like this can lead to lower attainment outcomes despite competency, meaning methods to prepare and acclimatise the students to the assessment type in advance can have significant impact. To support this, the generation of a large and varied bank of exam-style questions was identified as a priority. These questions were intended to provide extensive practice opportunities while maintaining conceptual variety. Care was taken to avoid excessive similarity between examples or alignment too closely with the final assessment, ensuring that students developed genuine conceptual understanding rather than procedural recall (Bennett, 2011) (A1, A3, V2, K5).

## 1.7 Student Outcomes

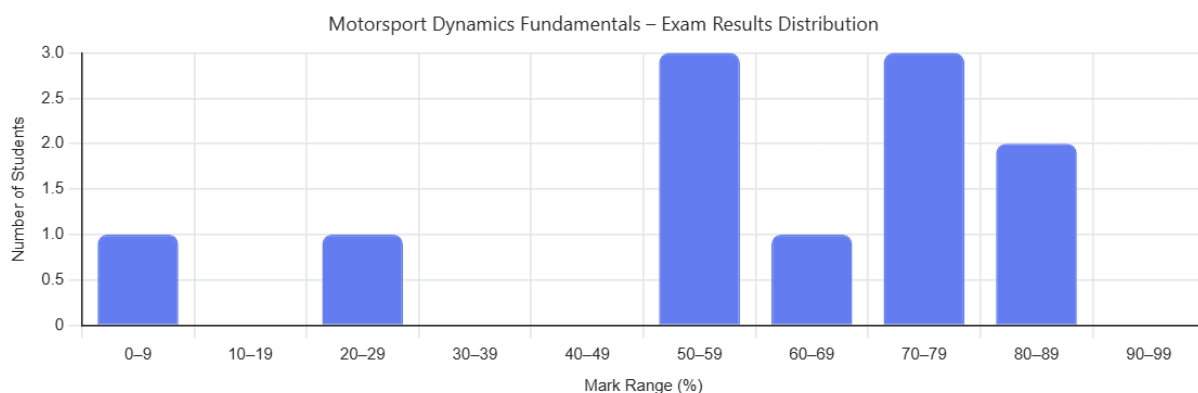
Following completion of the module assessment, student outcomes were reviewed to evaluate the effectiveness of the implemented teaching intervention. As Motorsport Dynamics Fundamentals was delivered for the first time, there were no historical data sets available for comparison, limiting the extent to which outcome trends could be analysed. It is anticipated that the effectiveness of this evaluation process will increase as further cohorts complete the module, enabling historical comparison in future years (A5, K5).

Informal discussions with students indicated that the module content was generally well received, with students reporting improved confidence in engaging with technically

challenging material. A recurring theme within these discussions was that additional time would have supported deeper absorption of complex concepts. However, this constraint reflects the reality of semesterised postgraduate delivery and reinforces the importance of efficient scaffolding and structured learning activities within limited teaching periods (Kruiper et al., 2022) (A1, A2, K2).

Student feedback was also captured through the module review survey, which returned an overall average score of 4.3 out of 5. Content quality was rated particularly highly at 4.5, with delivery scoring 4.1. These results suggest a positive student perception of both the module design and the adapted teaching approach (V2). However, it is important to note that response rates did not represent the entire cohort, and that cultural factors may influence the extent to which some international students feel comfortable offering critical feedback in formal institutional surveys. The research by (Torbas et al., 2020) make clear that, although useful tools, there are many factors that influence the effectiveness of student survey design and implementation, meaning that the outputs can be misleading. As such, these results should be interpreted as indicative rather than definitive (K3).

Assessment outcomes showed a wide spread of examination marks, reflecting the mixed academic backgrounds and abilities within the cohort. Encouragingly, only two students fell below the pass threshold, despite the small cohort size of eleven students. This suggests that the intervention supported most learners in meeting the academic standards of the module while maintaining appropriate challenge at Level 7 (A3, V1, K1). The below figure shows the distribution of marks that were attained from the examination.



Overall, student outcomes provide cautious but positive evidence that the adapted teaching approach contributed to effective learning within a diverse postgraduate cohort (A2, A5, V3).

## 1.8 Review of Intervention

The first-time delivery of Motorsport Dynamics Fundamentals inevitably limited the extent to which the true effectiveness of the intervention could be quantified, as no historical data is available for comparison. This constrained the ability to evaluate impact through comparative metrics, particularly in relation to assessment performance (A5, K5). As a result, conclusions drawn from this iteration should be understood as provisional and subject to refinement as further data is gathered in subsequent years of delivery (Smith, 2008).

Despite these limitations, qualitative student feedback suggested that amendments to both delivery style and supporting materials were perceived positively and supported learning within a diverse postgraduate cohort (V1, V2). Improvements in engagement and confidence during taught sessions indicated that changes to verbal delivery, particularly increased clarity and reduced reliance on idiomatic language, were effective in improving comprehension for international students (Sveučilišta Zadru, 2024) (A2, K1).

Quantitative analysis of examination outcomes provided some encouragement but limited interpretive value. While pass rates were high, the absence of data from a previous cohort made it difficult to determine whether these outcomes were directly attributable to the intervention or reflective of broader cohort characteristics (A3, K3). This reinforces the need for cautious interpretation and ongoing evaluative cycles until larger data sets can be collected, as noted by (Harrison et al., 2022).

Given the overall response, the same teaching approach will be adopted at the start of the next academic year, with planned review points embedded throughout delivery to support further adaptation and enhancement (A5, V3). The controlled use of AI tools proved valuable in supporting the generation of learning materials, if outputs were carefully reviewed to maintain technical accuracy and pedagogic intent (K4, K3).

Finally, the intervention highlighted the critical importance of language choice when teaching international cohorts, an insight that will continue to inform inclusive teaching practices going forward across other modules (V1, V2).

# PG Cert tHE Portfolio- Teaching Intervention Cycle – 3 – Andrew Noble

Title : An Intevention to Improve Workload for Block Taught Degree Apprenticship Learners

## The Background and Context

The teaching intervention was implemented within the Computer Aided Engineering module, delivered to Ordnance, Munitions and Explosives (OME) degree apprentices, all of whom are mature learners with significant professional experience. Degree apprenticeships require pedagogic approaches that recognise prior learning while supporting academic development alongside full-time employment (Boud and Solomon, 2001), aligning with inclusive practice and respect for diverse learner contexts (V1, V2). The module is delivered via a block-release format, consisting of two-week intensive teaching periods, which places increased emphasis on careful planning, pacing and alignment between teaching and assessment (A1, K2) (Davies, 2007). A further constraint is that the specialist CAE software is only available on university network computers, restricting access outside taught sessions and therefore shaping learning design decisions and support requirements (A2, K4) (Kirkwood and Price, 2014).

## The Issue / Problem

The module assessment is heavily computational, requiring sustained engagement with specialist software. Once students return to employment following block delivery, limited access to university systems creates challenges in managing assessment workload effectively (A1, K4) (JISC, 2020). When software-related issues arise, students have trouble obtaining timely and effective remote support, which can negatively affect confidence and attainment (A4, V1) (Nicol and Macfarlane-Dick, 2006). Consequently, a significant number of students applied for Differentiated Deadlines (DDs), creating additional pressure alongside assessments from parallel modules. With the previous cohort, this was close to 50% of students either had DD's or ECP's. This raised concerns around workload equity, assessment scheduling and the broader programme experience (V2, V4, K5), particularly given the work-based nature of degree apprenticeship provision (Boud and Solomon, 2001). The intent of this intervention is look at ways in which the delivery approach can be adapted to give learners a more equitable workload outside of the blocks and hopefully improve their experience.

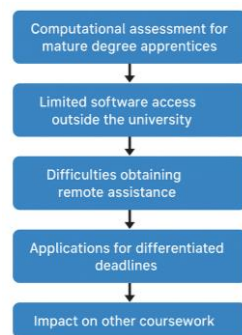


Figure 1: Problem Flow Chart

## The intervention

Prior to the intervention, I had designed the content to over-deliver theory relative to the assessment requirements. While I did this deliberately, being pedagogically sound for deep learning, it had the effect of reduced in-class time available for applied practice using constrained software resources (A1, K2). Research on constructive alignment emphasises that learning is most effective when teaching activities and assessment are directly aligned with intended outcomes (Biggs, 1996), contrary to my current approach. In addition, literature on block teaching highlights the importance of intensive, purposefully designed delivery to manage cognitive load and maximise application time (Davies, 2007). Drawing on this research, I decided to pursue a front-loaded approach. Essential theory was delivered intensively during week one, with non-essential content temporarily removed while maintaining learning outcomes. This created greater capacity during week two for applied learning, supported practice and academic guidance while students still had physical access to the software (A2, A4, K4). This approach aligns with evidence that applied learning and instructor availability are particularly important in time-compressed delivery modes (Race, 2015; Kirkwood and Price, 2014) and reflects evidence-informed enhancement of practice (V3).

## The process

Research on assessment literacy and student engagement with assessment highlights the value of early access to assessment information (Nicol and Macfarlane-Dick, 2006). Informed by this, I chose to release the assessment brief prior to the teaching block, enabling students to consider assessment aims and plan tasks in advance (A1, K5). I then planned the opening session of the block to involve a collective review of the assessment and allow me to gather qualitative input from students regarding relevance to their employment contexts, reinforcing principles of learner-centred and work-integrated learning (V1, V4) (Boud and Solomon, 2001). This feedback directly informed week-one delivery, allowing me to refine content to be highly applicable to the student's employment, without compromising learning outcomes. I then revised lecture plans, to ensure a structured, coherent progression, with week two allocated to student-led independent working supported by on-site academic guidance. Research indicates that autonomy, when scaffolded appropriately, supports self-regulation and engagement (Zimmerman, 2002), aligning with effective teaching practice (A2, A4, V2).

## The impact

Following implementation of the intervention, student attainment showed a modest improvement compared with the previous cohort, with a slight increase in average marks while overall variation remained similar. Encouragingly, only one DD was requested and no ECPs were applied for, suggesting improved workload manageability (V2, K5). While it is difficult to attribute these outcomes directly to the intervention due to cohort differences and limited data, qualitative student feedback was positive, with students noting greater control over their study time and software use (A4, V1). Given these early indications, the approach will be continued next year to enable further data collection and evaluation of impact (A5, V3).

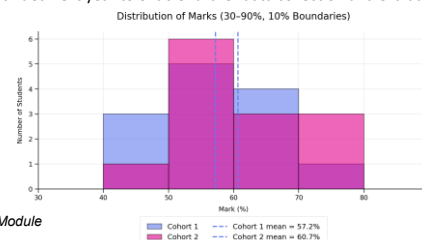


Figure 2: Marks Distributions for CAE Module

## Learning for practice

This intervention reinforced the value of research-informed, context-sensitive curriculum design, particularly within block-delivered, work-based programmes. Incremental adjustment, based on educational research proved more effective than broad redesign, enabling closer alignment between assessment, applied learning time and learner context (A5, V3) (Biggs, 1996; Davies, 2007). The process strengthened my understanding of how formative support and access constraints interact to influence student experience (A4, K4) and increased my confidence in adapting provision while remaining responsive to learners and wider sector pressures (V1, V4) (Advance HE, 2023).

## Professional standards

This work is aligned with the UKPSF23 framework at Descriptor 2, evidencing effective and inclusive teaching practice across all Dimensions (Advance HE, 2023). The intervention demonstrates A1–A4 through structured course design, applied teaching approaches, assessment alignment and targeted learner support, and A5 through sustained reflective enhancement of practice. It draws on Core Knowledge K1–K4 to inform delivery within a block-teaching and digitally constrained context, and K5 through consideration of assessment equity and quality processes. The work is underpinned by the Professional Values, particularly V1–V3 in respect of learner diversity and evidence-informed practice, with V4 and V5 shown through responsiveness to the wider HE and degree-apprenticeship context and collaboration with programme teams.

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## 2.0 Teaching Observation Reflection 1

***Copies of lesson observation forms can be found in the appendix.***

This lesson observation provided a valuable opportunity to reflect critically on my teaching practice, particularly in relation to the development, delivery and structuring of learning activities. It was encouraging that the lecture resources were identified as a clear strength, being described as clear, detailed and closely aligned to the taught material. The positive feedback reinforces ongoing efforts made over the course of the academic year to improve the quality, clarity and relevance of learning materials, an approach influenced by literature and existing practice by my peers in the department (MacDonald & Thompson, 2005) (A1, K2, V5).

The observation also highlighted strong subject knowledge and confidence in responding to student questions, demonstrating the ability to support student learning in real time (A2, K1). This was particularly important in the context of software-supported teaching, where student queries are often diverse and require flexible explanation. The explicit recognition of the module's relevance to students' future employment was also positive, indicating that teaching practice successfully linked theoretical content and applied skills to real-world engineering contexts, supporting student motivation and engagement (V2, V4).

While these strengths were affirming, the observation also provided constructive action points. In particular, the structuring of in-session software-based problem-solving activities was identified as an area for further development. Although students were given time to work independently within the session, the tasks could have been broken down into smaller, discrete activities that build progressively towards a larger objective. This approach would better support differentiation within a mixed-ability cohort and enable clearer monitoring of student progress during the session (A2, A3, V1).

Adopting a more segmented task structure would also facilitate more effective formative assessment, allowing frequent checks of understanding and timely intervention where misconceptions emerge (A3, K3). This is particularly relevant in mixed delivery sessions, where balancing explanation, independent work and support requires careful planning to ensure sustained engagement for all students (K2). The feedback therefore highlights the

need to explore best practice in blended and active learning design, particularly relating to pacing, scaffolding and task sequencing (A5, V3).

Moving forward, I intend to review pedagogic literature and practical case studies relating to mixed-mode and software-supported teaching sessions to inform improvements to session design. This will support more structured task progression, clearer checkpoints for feedback and improved visibility of student learning within sessions. Overall, the observation confirmed areas of effective practice while clearly identifying actionable steps for enhancement, supporting ongoing professional development aligned with inclusive, evidence-informed teaching practice (A5, V3).

## 3.0 Teaching Observation Reflection 2

Feedback from this lesson observation provided constructive confirmation that recent efforts to enhance lecture notes and handouts have had a positive impact on the student experience. The observation noted that resources were clear, well-structured and supportive of learning, reinforcing the value of the focused development work undertaken throughout the year to improve the clarity and accessibility of my teaching materials (A1, K2). This is particularly important in technically complex modules, where clear written resources help students consolidate understanding both during and after taught sessions (V1).

The observation also highlighted strengths in the verbal delivery of the session, with tone and approach described as engaging and accessible. Creating an inclusive and supportive atmosphere is especially important when working with mixed-ability and diverse cohorts, as it encourages student participation and reduces anxiety around asking questions or attempting unfamiliar tasks (A2, V2, K1). This feedback affirms that my balance between explanation, demonstration and interaction was largely effective and is an approach that I should continue with in future delivery.

The use of worked examples embedded within the session was identified as a positive feature and recognised as a meaningful form of formative assessment. These activities enabled students to apply newly introduced concepts and test their understanding in a supported environment (A3, K3). However, the reflection also highlighted that my current approach to managing these activities does not always allow sufficient oversight of engagement and progress across the entire cohort. This limitation reduces my ability to identify learners who may be struggling or disengaging during the session and is an area of my practice that I should work towards improving (V1).

The observation further identified the need for clearer linking between previously covered material and upcoming topics, particularly at the start and end of the lecture. Improving signposting will help students situate new knowledge within the broader module narrative, supporting coherence and cumulative learning (A1, K2). This will be a focus of future session planning.

Finally, while the decision to end the lecture early and allow students time to work independently on their assignment was intended to promote application and consolidation of knowledge, the observation highlighted that this phase could benefit from greater structure and monitoring. Replacing unstructured independent work with guided formative tasks would retain the intended benefit while improving oversight of student progress and engagement (A3, A4).

Overall, this reflection has clarified specific, actionable areas for development, particularly relating to formative assessment design and session structure. Addressing these will support more inclusive, effective and evidence-informed teaching practice moving forward (A5, V3).

## 4.0 Teaching Observation Reflection 3

Feedback from this lesson observation was reassuring in relation to my delivery style and overall session structure, suggesting that the approach adopted is effective and should be largely continued. In particular, the observation noted strong use of practical, industry-relevant learning activities, which aligns well with the needs and motivations of an apprentice cohort and supports authentic, applied learning experiences (A2, K2, V4). The development of strong rapport and respectful interactions with students was also identified as a strength, contributing to a positive and supportive learning environment (A4, V1).

Responsiveness to student needs and workload was another positive aspect of the session. This reflects an awareness of the competing demands placed on mature apprentices, many of whom are balancing academic study with professional commitments. Being sensitive to these pressures is essential in promoting sustained engagement and participation, and supports equitable learning opportunities (V2, V4).

Despite these strengths, the observation identified areas for improvement at the lecture design stage, particularly around the clarity of session introductions and outlines. It was noted that the purpose of the session and how individual activities contributed to learning outcomes were not communicated as clearly as they could have been. Providing a more explicit overview at the start of sessions will enable students to better understand what they are working towards and how activities fit within the wider module context (A1, K2). Clear signposting is especially important for mature learners, who often value transparency and structure in their learning (K1).

The observation also raised important reflections on student engagement during the session. Limited note-taking and mixed engagement at certain points suggested that some students may have been listening passively rather than actively processing information. Given that the cohort consisted entirely of mature apprentices, this behaviour may reflect different learning preferences and prior educational experiences compared to traditional undergraduate students. Adapting teaching strategies to better suit this learner group—such as explicitly encouraging note-taking, pausing for reflection, or integrating short written prompts—will be an area for development (A2, V1, K1).

Addressing cohort-wide listening and instruction-following challenges will be a particular focus moving forward. Strategies such as breaking instructions into smaller steps, reinforcing key points visually, and checking understanding before progressing could help maintain engagement and clarity (A3, A4). These approaches would also support more effective formative monitoring of student understanding during sessions (K3).

Overall, this observation validated key aspects of my teaching practice while identifying clear, actionable areas for enhancement. The reflection reinforces the importance of tailoring teaching approaches to specific learner groups and demonstrates a commitment to ongoing reflective development and inclusive practice (A5, V3).

## 5.0 CPD Event Reflection 1

**CPD Session: Flipped Learning Training**

**Venue: Online**

**Date: June 2025**

Participation in this CPD event provided a structured overview of Flipped Learning as a pedagogic approach in which students are introduced to new material before scheduled teaching sessions, allowing in-class time to be repurposed for problem-solving, discussion and deeper conceptual engagement. As outlined by Lee, Lim and Kim (2016), flipped learning inverts traditional delivery approaches and positions the lecturer as mainly supporting higher-level learning activities rather than primarily transmitting content (K1, K2).

A central theme of the CPD was the way flipped learning encourages greater student ownership of learning, requiring engagement with preparatory materials prior to taught sessions. This strongly resonated with challenges observed in current cohorts, where students demonstrate a tendency to rely heavily on post-lecture resources, often leading to reduced engagement during live delivery. By shifting initial knowledge acquisition outside the classroom, flipped learning has the potential to promote more active participation and purposeful use of contact time (A2, V2). However, the work of Brewer and Movahedazarhouli (2018) does show that there can be issues arising from this approach which can lead to poor student attainment if the pre-requisite work has not been completed.

The approach also gives opportunities for formative assessment during sessions, enabling lecturers to monitor understanding and address misconceptions in real time. This aligns well with the need for ongoing assessment of engagement and comprehension, particularly within technically demanding Level 7 modules (Bennett, 2011) (A3, K3). Elements of flipped learning were already trialled within Teaching Intervention 1 through the release of preparatory materials prior to teaching, demonstrating that aspects of the approach are achievable within the existing teaching context, although this was on a limited scale implementation (A1, A2).

The CPD event also highlighted potential risks. There is a possibility that underperforming students may disengage if pre-class expectations are not met, particularly where independent learning skills are under-developed (Brewer & Movahedazarhouli, 2018) (V1). In addition, the time required for in-class activities and formative checks must be balanced carefully against syllabus coverage, especially in content-heavy modules (K2). There is also a risk that some students may perceive reduced lecture-style delivery as offering lower “value for money” (V4).

Discussions with academic colleagues following the event raised legitimate concerns regarding student workload. The cumulative effect of preparatory tasks across multiple modules could lead to overload if not managed at programme level. This emphasised the importance of collaborative dialogue with the department to ensure workload management for the students (V5, A5).

Finally, implementation of flipped learning must be considered within the institutional and quality assurance context, particularly in relation to definitions of contact hours and independent study. Further guidance from quality teams would be necessary to ensure alignment with regulatory expectations and transparent communication to students (K5, V4).

Overall, this CPD event strengthened understanding of flipped learning as a potentially viable approach that, when carefully implemented and collaboratively managed, can enhance engagement and support deeper learning. The research of (Frame et al., 2015) did find positive benefits to students when implementing this type of approach lending credibility to its viability (V3, V4, V5).

## 6.0 CPD Event Reflection 2

**CPD Session: How to use Fusion Classrooms**

**Venue: Online**

**Date: September 2025**

Engagement with the Autodesk “How to Use Fusion Classrooms” video series provided valuable insight into how cloud-based platforms can be integrated into teaching practice to enhance learning, assessment and curriculum coherence. Fusion Classrooms is designed to streamline the organisation of teaching materials, student workspaces and feedback within Autodesk Fusion, enabling lecturers to manage cohorts more effectively during the delivery of Computer Aided Design (CAD) modules.

A key strength of Fusion Classrooms highlighted within the series is its ability to support structured learning environments where students have access to curated files, examples and clearly defined individual workspaces. Implementation of these tools going forward will help align to inclusive learning principles, providing clarity and consistency for diverse student cohorts while reducing confusion around file management and submission processes (A1, V1, K4). The ability for staff to view version history and student progress also supports formative monitoring and timely feedback (Nicol & MacFarlane-Dick, 2006) (A3, K3). The platform also allows for consistent marking schemes for assessments to be embedded. This will allow for the removal of ambiguity within the marking process, which is highlighted by (Yorke et al., 2000) as a potentially difficult area to control. As an educator, this type of structured tool would allow for true consistency across a cohort, which would be fairer to all learners.

Collaboration emerged as a critical component of successful implementation. Effective use of Fusion Classrooms requires coordination across module teams, shared guidance on file structures and assessment workflows, and alignment in delivery approaches where modules may be shared by more than one lecturer (Abegglen et al., 2023). Discussion with colleagues has already begun to explore consistent practices across modules, highlighting the role of collaboration in enhancing student experience (V5).

Being responsible for running weekly support sessions that cover the CAD topic, it is essential that a full understanding of the possible implementation of this platform is held prior to its roll out. This ensures that guidance provided to students is coherent, accurate and aligned with module learning outcomes, supporting effective guidance to students and confidence development (A4, K2)

Not being directly involved in the delivery of the modules where it is to be incorporated creates challenges that will require continued discussions with the module teams, however, will be essential to ensure consistency for the students between the delivered lectures and the support sessions offered (V5, A5).

Finally, the CPD reinforced the role of digital platforms within the broader departmental strategy. Fusion Classrooms supports blended and flexible learning approaches that align to digital literacy agendas and industry requirements. Ensuring that its use is well-communicated and justified will be essential in maintaining student trust and meeting quality assurance expectations (V4, K5).

## 7.0 CPD Event Reflection 3

### **CPD Session: AI In Higher Education**

**Venue: Swansea**

**Date: April 2026**

This CPD event focused on the growing role of artificial intelligence (AI) within higher education and its implications for teaching, assessment and student learning. The session provided an overview of current AI tools, particularly large language models, and explored both their potential pedagogic benefits and the associated risks for academic integrity and quality assurance (K4, K5).

A key insight from the event was the way AI tools can support learning design and teaching practice, particularly in relation to content structuring, summarisation and accessibility. When used critically, AI has the potential to reduce cognitive load for students and to support diverse learning needs by offering alternative explanations and formats (Neumann et al., 2023) (K1, V1). This aligns with inclusive teaching principles, particularly for international students or those unfamiliar with disciplinary conventions (V2). As such, it would seem to be unfair to attempt to completely discourage students from engaging with these tools, it is more important to attempt to manage their use of them so it is not detrimental to their true knowledge, something that will be difficult to achieve, but attempted in future teaching approaches.

The CPD also emphasised that AI should be framed as a supportive enhancement. This strongly resonated with prior detailed practice, particularly in the use of AI tools during Teaching Intervention 1 to assist in the generation of supplementary learning materials. The event reinforced the importance of maintaining academic intent, tone and disciplinary accuracy when engaging with AI-generated content, especially within niche technical subjects where errors may be less immediately obvious (Kulkarni & P Tupsakhare, 2024) (V3, K3).

Collaborative discussion with colleagues during the CPD raised valuable perspectives on consistency of approach across programmes, workload implications and the need for shared guidance. These discussions highlighted the importance of working collectively with teaching

teams, quality colleagues and academic leadership to develop coherent, transparent AI-related practices that support both staff and students (V5, A5).

Finally, the CPD situated AI firmly within the wider higher education context, recognising institutional, regulatory and societal pressures to both embrace innovation and safeguard academic standards (V4). The session highlighted the need for continued professional development as AI tools evolve, ensuring that teaching practice remains responsive to changes in this evolving area (Eager et al., 2023) (A5, V3). The learning from the session will inform my direction in future content development, as well as consideration to assessment design as a means of moderating student use of AI.

## 8.0 Practitioner Development Reflection

The learning and reflective process undertaken over the duration of this course has been highly valuable in shaping my teaching practice and identifying targeted areas for development aimed at improving the overall student learning experience. Engaging systematically with reflection has enabled me to move beyond instinctive or habitual teaching approaches and instead adopt a more deliberate, evidence-informed stance, allowing adjustments to be grounded in pedagogic reasoning rather than assumption (A5, V3, K3).

A significant benefit of the course has been the strong emphasis placed on reflective practice, which encouraged structured evaluation of both strengths and limitations within my teaching. Through this process, I have been able to identify specific areas where my practice could be enhanced and to draw on a wider range of pedagogic approaches to address these areas. This reflective engagement has reinforced the importance of continuing professional development as an ongoing, iterative process rather than a discrete activity (A5, V3).

The inclusion of peer review has been particularly impactful. Observing the practices of more experienced colleagues provided valuable insight into how effective teaching approaches have been developed and refined over time. Equally valuable was receiving constructive feedback on my own practice, which offered alternative perspectives that would not have been accessible through self-reflection alone. This process strongly highlights the importance of collaboration in enhancing teaching quality and professional growth (V5, A5).

A recurring theme identified during the first module was the need to improve lecture structure, content clarity and accessibility for students. This represented a key developmental focus during the second year of practice. In response, I invested considerable effort into redesigning lecture content, improving sequencing, and developing additional supporting materials. Initial evidence from lesson observations and evaluation of teaching interventions suggests that these changes have had a positive impact on student engagement and comprehension. Feedback indicates that the revised approach to lecture

construction and the increased availability of structured resources have been well received by students, reinforcing this as an area of continuing development (A1, A2, K2, V1).

A deliberate decision was taken to implement incremental changes, making small, manageable adjustments and monitoring their impact over time rather than introducing wide-ranging changes simultaneously. This approach supported more effective evaluation of what was working and why and reduced the risk of unintended negative consequences. In reflection, this measured strategy aligns well with evidence-informed enhancement of practice and will continue to guide future pedagogic development (A5, K3).

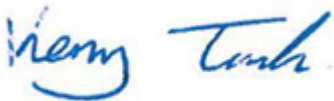
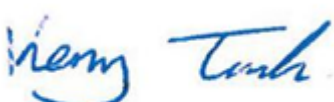
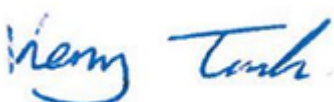
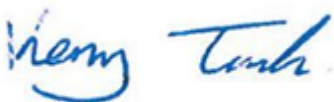
Naturally, areas for improvement remain. Teaching practice must continually adapt to remain relevant within a rapidly evolving higher education landscape. One challenge identified is the increasing influence of artificial intelligence tools on learning, teaching and assessment. This raises important considerations around assessment authenticity, fairness and ensuring learners are appropriately evaluated on their own understanding (V4, K5). Formative assessment has emerged as a key mechanism to support this, and while I have begun embedding more formative activity into my teaching, lesson observations consistently indicate that this area requires further development to be truly effective (A3, K3).

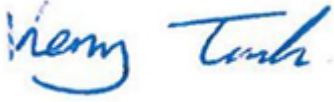
In response, my immediate development plans focus on exploring best practice in formative assessment design, particularly within live teaching contexts. Developing more structured and frequent formative checkpoints will improve visibility of cohort-wide understanding and support timely intervention where needed (A3, A4).

Finally, this course has reinforced the importance of ongoing CPD in pedagogy, not solely within technical subject specialisms. Gaining exposure to a wider range of teaching approaches has strengthened my ability to respond flexibly to learner needs and sector-level change. Given the likelihood that AI will continue to influence delivery and assessment practices across higher education, maintaining currency in pedagogic and sector developments will remain an essential professional responsibility going forward (V3, V4, A5).

## 9.0 Teaching Hours Log

|                                |                           |
|--------------------------------|---------------------------|
| <b>Candidate: Andrew Noble</b> | <b>Campus: Swansea IQ</b> |
|--------------------------------|---------------------------|

| <b>Date</b>        | <b>Session Details</b>                                                                               | <b>No of Hours</b> | <b>Practice Advisor's Signature</b>                                                   |
|--------------------|------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------------------------|
| 30/9/25 – 9/12/25  | Weekly delivered lecture<br>Tuesday 09:00-11:00.<br><br>ACHA6010 – Structural & Fluid Analysis.      | 22                 |    |
| 1/10/25 – 10/12/25 | Weekly delivered lecture<br>Wednesday 13:00-15:00.<br><br>ACHA7030 – Structural Component Analysis   | 22                 |    |
| 2/10/25 – 11/12/25 | Weekly delivered lecture<br>Thursday 11:00-13:00.<br><br>ACHA7022 – Motorsport Dynamics Fundamentals | 22                 |  |
| 28/1/26 – 25/3/26  | Weekly delivered lecture<br>Wednesday 11:00-13:00.<br><br>ACHA6006 – Contemporary Powertrain         | 18                 |  |
| 29/1/26 – 26/3/26  | Weekly delivered lecture<br>Thursday 11:00-13:00<br><br>ACHA7026 – Race Engineering & Simulation     | 18                 |  |

|             |                       |                         |                                                                                     |
|-------------|-----------------------|-------------------------|-------------------------------------------------------------------------------------|
| Hours = 102 | Hours Carried Over= 0 | Total<br>Hours =<br>102 |  |
|-------------|-----------------------|-------------------------|-------------------------------------------------------------------------------------|

Participant's signature.....Andrew Noble.....

Practice Advisor's signature ...  .....

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## 11.0 Appendix

### 11.1 Lesson Observation 1 Form



| Details of the Observation                                                                                                                                                                                                                                                                                                             |                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| Observee                                                                                                                                                                                                                                                                                                                               | Andrew Noble                                             |
| Practice Advisor / Expert peer observer                                                                                                                                                                                                                                                                                                | Gregory Owen                                             |
| Date of the Observation                                                                                                                                                                                                                                                                                                                | 16/03/26                                                 |
| Campus / Location                                                                                                                                                                                                                                                                                                                      | IQ                                                       |
| Date, Time, Duration                                                                                                                                                                                                                                                                                                                   | 9am – 11am                                               |
| Subject Speciality                                                                                                                                                                                                                                                                                                                     | Computational Simulation Introduction.<br>12 DA students |
| Type of activity                                                                                                                                                                                                                                                                                                                       | IT lesson                                                |
| <b>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.</b> |                                                          |

|                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Teaching/Support preparation [A1: Design and plan learning activities/programmes</b><br><i>i.e. Preparation, selection and organisation of content. Choice of teaching/learning methods.</i> |
| <b>Comments</b>                                                                                                                                                                                 |

- Powerpoint was used. The slides were very clear and appropriate to a diverse range of learners.
- Slides showed appropriate content, they were detailed without too much text. The slides were enhanced with good visual diagrams/graphs etc and accompanied with the lecturer talking around the slides, certainly not reading off them.
- A worksheet was provided and an example given where the lecturer gave the students a detailed solution using additional software.
- The multiple pieces of software used were clear, relevant and well organised. This session gave students a good example of how these pieces of software could be used collectively to achieve desired goals. The advantages and limitations of each piece of software was addressed which gave students the ability to assess its suitability to given engineering environments.
- The VLE is used appropriately and populated with additional resources.

**Teaching [A2: Teach and/or support learning through appropriate approaches and environments.]**

*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**

- Students entered class on-time and immediately logged on and prepared for the session.

- Students were all engaged and on-task
- A clear plan was presented to the students regarding a very brief recap of what was previously taught and also what to expect for this week of teaching. This ensure that the students expectations were managed appropriately.
- A very clear introduction/guidance for the upcoming assessment was relayed to the students which included checking the students understanding of what was expected of them.
- All software which is to be used during this and upcoming sessions were discussed during the introduction which included 'how to access' for both on and off campus.
- The lecturer asked questions of the class during the introduction to ascertain their experience in this subject area. This allows for greater differentiation according tpo the needs of individuals throughout this series of sessions.
- As mentioned above, the lecturer provided very clear slides which aided the discussion and teaching style. This gave a very clear indication that the lecturer understands this material extremely well and is confident in its delivery.
- The level of the teaching here is very appropriate. These are block-taught apprenticeship students who are all in full-time employment. The pace, tone and candour of the lecture was ideal for these students.
- The lecturer used examples which were pertinent to the employment of the students, giving relevance and familiarity to the students. This aided engagement of all students.
- As an observer, there were clearly students who understood the subject area very well however after one hour, some students started having individual conversations and were not on task. Consider using smaller, discrete tasks which will keep the students engaged and active during the lesson. Smaller tasks would also help you gauge the understanding of each individual and help differentiation of material and lesson structure for future sessions.
- The lecturer was able to confidently answer any questions raised by the students and comprehensively build on the answer to describe it in a manner which was accessible to all.

**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 atmosphere within the class is professional and conducive to a productive learning environment.
- Students were all listening and engaged with three students particularly vocal ( in a work related manner)
- An obvious area of improvement based on the last point would be to ask directed questions to individuals to ensure that all students were engaged however here, this is not the case. Given the age and ‘feel’ of this class in addition to the small numbers, it is easy to see that all students are engaged and given the fact that an established relationship between lecturer and students has not been developed yet, asking individuals questions at this early stage (in the start of the lecture) could be awkward.

**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 students005C.*

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Comments</b></p> <ul style="list-style-type: none"> <li>• An area of consideration is checking the learning with individuals. A potential option in this type of lesson would be to have a larger number of smaller, discrete exercises for the students to work through. This would give the lecturer an opportunity to engage with individuals and assess their learning</li> <li>•</li> </ul>                                                                                                                                                                                      |
| <p><b>Core Knowledge</b></p> <ul style="list-style-type: none"> <li>• K1 How learners learn, generally and within specific subjects</li> <li>• K2 approaches to teaching and or/supporting learning appropriate for subjects and levels of study.</li> <li>• K3 Critical evaluation as a basis for effective practice.</li> <li>• K4 Appropriate use of digital technologies / resources.</li> <li>• K5 requirements for quality assurance, enhancement and implications for practice</li> </ul>                                                                                            |
| <p><b>Comments</b></p> <ul style="list-style-type: none"> <li>• K1, K2, K4</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p><b>Professional values</b></p> <ul style="list-style-type: none"> <li>• V1 Respect for individual learners /diverse groups of learners</li> <li>• V2 Promote engagement and learning and equity of opportunity for all to reach their potential.</li> <li>• V3 Use scholarship, research or professional learning, or other evidence informed approaches as the basis of effective practise.</li> <li>• V4 respond to the wider context in which higher education operates, recognising implications for practice.</li> <li>• V5 Collaborate with others to enhance practice.</li> </ul> |
| <p><b>Comments</b></p> <ul style="list-style-type: none"> <li>• V3, V4</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Examples of good practice:**

- Resources were very clear, detailed and relevant to the taught material.
- Subject knowledge was excellent. The lecturer confidently delivered this material and could easily answer any and all questions asked.
- Relevance to the employment of the DA students

**Action points:**

- Use of smaller, discrete tasks to enable the students to 'have a go'. These tasks could be built upon each other to a larger task. This would aid the lecturer in a number of areas such as engagement, formative assessment, differentiation.

**For Observee**

**Write a short statement to address Area of activity [A5] .Decribe how this observation will enhance your practice.**

***It is pleasing that the resources developed for the lecture have been seen as a positive area. The development and implementation of lecture resources is an area that I have been working to improve over this year, although there is still room to make improvements.***

***The structure of the lecture, especially relating to how I manage the time where students work on a problem using the software is something that I will have to spend time reviewing. Looking into best practices for this type of mixed delivery session will hopefully give me insight on how to better structure the tasks to allow better monitoring of student progress.***

*ATO ~*

**Observer .....**

**Date 16/03/26**

**Observee .....Andrew Noble .....**

**Date 16/03/26**

**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.**

## 11.2 Lesson Observation 2 Form



| Details of the Observation                                                                                                                                                                                                                                                                                                                    |                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Observee                                                                                                                                                                                                                                                                                                                                      | Andrew Noble                      |
| Practice Advisor / Expert peer observer                                                                                                                                                                                                                                                                                                       | Tim Tudor                         |
| Date of the Observation                                                                                                                                                                                                                                                                                                                       | 04/02/26                          |
| Campus / Location                                                                                                                                                                                                                                                                                                                             | IQ – Swansea                      |
| Date, Time, Duration                                                                                                                                                                                                                                                                                                                          | 04/02/26 11:00-13:00              |
| Subject Speciality                                                                                                                                                                                                                                                                                                                            | Contemporary Powertrain – Level 6 |
| Type of activity                                                                                                                                                                                                                                                                                                                              | Lecture Delivery                  |
| <p><b>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.</b></p> |                                   |

|                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Teaching/Support preparation [A1: Design and plan learning activities/programmes]</b></p> <p><i>i.e. Preparation, selection and organisation of content. Choice of teaching/learning methods.</i></p> |
| <p><b>Comments</b></p> <ul style="list-style-type: none"> <li>Content mainly delivered through PPT and verbal delivery</li> </ul>                                                                           |

- Worked examples used during session to reinforce mathematical elements, good practice
- Structure of lecture is sensible, follows logical flow and builds on each stage of content
- Handouts with formulae were given out at start of lecture, good practice.

**Teaching [A2: Teach and/or support learning through appropriate approaches and environments.]**

*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**

- Could have had a clearer introduction to link this lecture to previous lectures in the module
- Short recap for a few slides at the start of the lecture, but brief and covered very quickly. Could have been more detailed for students who may have missed a previous session to better understand context.
- Verbal delivery is confident and expands beyond the information on the slides
- Some information was conveyed verbally, but would not be clear to a student from only the PPT. Not good for those who may have missed the session and later review the notes.
- Lecturer conveyed a very good topic understanding and confidence in the material being delivered, with explanations of concepts showing good contextual knowledge.
- Students were generally well engaged throughout, although participation in worked examples was not as strong
- Good rapport with cohort was shown, delivery and interactions between lecturer and students was informal and casual, but still professional.
- No real summary of what was covered, or how this would link to future stages of the module

**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**

- Some students were actively engaged with worked examples, others were doing them but not contributing, some were not doing them at all. Consider how to improve engagement in this area.
- There were a couple of occasions where questions were asked, lecturer did a good job of explaining the concept in a different manner and relating it to the relevant areas of the assessment. This was verbal though, so nothing in the notes to cover similar misunderstandings when reviewing later.
- Examples and explanations were given in different ways to suit students on different streams in the cohort, made it more accessible to them, good.
- Lecturer appeared to monitor the understanding of the cohort well during explanations of complex areas, circling back where it seemed needed without being asked, good.
- Clearer means of monitoring understanding of entire cohort could be put in, worked examples are a good start, but with partial engagement only useful to a point.

### **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 students005C.*

### **Comments**

- Formative assessment embedded with worked examples during session
- More scope for general Q&A on topics with cohort, may be a good way of better monitoring understanding
- Methods for analytical aspects of lecture were well described, process was detailed clearly, supported by examples
- Difficult to gauge understanding from entire group due to large cohort (35 students present)

### **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 – varied approach appeared to consider different learning styles, handouts and examples also helped in this area
- K2 – Combination of good quality PPT notes, verbal delivery and handouts combined to give a very appropriate lecture delivery with good supporting materials
- K3 – Monitoring of class progress and adaption of lecture delivery was noted, although could be a more formalised process during the session
- K4 – Good use of digital tools with lecture slides, animations, making appropriate use of the interactive boards in room
- K5 – Difficult to assess during session. Some indication of this in similar way to K3.

**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 – Lecture delivery and content showed good appreciation for different learning styles
- V2 - Worked examples tried to get students engaged, opportunity was there, not all fully engaged though
- V3 – Difficult to assess during observation.
- V4 – Difficult to assess during observation
- V5 – Some of the verbal delivery drew on content and themes from other modules, demonstrating knowledge of and collaboration with other staff to build cohesion between modules.

**Examples of good practice:**

- Clear and well-structured notes coupled with handouts
- Verbal delivery of lecture, and tone set throughout was engaging and accessible for students, created good atmosphere
- Worked examples were embedded and useful as formative assessment

**Action points:**

- Clearer linking between previously covered and upcoming topics and start and end of lecture
- Adaption of approach with worked examples to better monitor engagement and understanding of full cohort
- Lecture ended early, students were instructed to use additional time to work on implementing the learning from the session to their assignment work, but more control and monitoring of this could be done.

**For Observee**

**Write a short statement to address Area of activity [A5] .Decribe how this observation will enhance your practice.**

***The positive reception of the lecture notes and handouts is pleasing and reinforces to me that the development work that I had been pursuing during the year has been worthwhile and having a positive impact on the student experience. The worked examples as a means of formative assessment, whilst noted as being a positive clearly require some additional work on my part to ensure that I maintain better oversight of student progress and can more effectively monitor this. This is an area I will need to work more extensively on in the future.***

***This could also help with the another of the action points, in that releasing the students to implement the knowledge and work towards building their assessment could be replaced with a more structured means of formative assessment that still supports that, but allows me to better monitor their progress.***

**Observer .....Tim Tudor.....**

**Date 04/2/26**

**Observee .....Andrew Noble.....**

**Date 04.02.2026**

**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.**

## 11.3 Lesson Observation 3 Form



| Details of the Observation                                                                                                                                                                                                                                                                                                                    |                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Observee                                                                                                                                                                                                                                                                                                                                      | Andrew Noble                                                           |
| Practice Advisor / Expert peer observer                                                                                                                                                                                                                                                                                                       | Dr Kerry Tudor                                                         |
| Date of the Observation                                                                                                                                                                                                                                                                                                                       | 17 <sup>th</sup> March 2026                                            |
| Campus / Location                                                                                                                                                                                                                                                                                                                             | IQ Building, Waterfront Campus                                         |
| Date, Time, Duration                                                                                                                                                                                                                                                                                                                          | 17 <sup>th</sup> March 2026. 9am for 2 hours                           |
| Subject Speciality                                                                                                                                                                                                                                                                                                                            | Computational Methods                                                  |
| Type of activity                                                                                                                                                                                                                                                                                                                              | Lecture in a computer room with approximate 12 students in attendance. |
| <p><b>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.</b></p> |                                                                        |

|                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Teaching/Support preparation [A1: Design and plan learning activities/programmes</b></p> <p><i>i.e. Preparation, selection and organisation of content. Choice of teaching/learning methods.</i></p> |
| <p><b>Comments</b></p>                                                                                                                                                                                     |

*This module is delivered intensively over a two-week period, as the students are released from work specifically for this block of study. PowerPoint slides were used throughout the session.*

*The introduction could have been improved by providing a clearer overview of the session plan at the outset, including how it linked to the previous day's lecture. This would have helped students situate the content and understand its continuity within the module.*

*Later in the session, the lecturer explained the topics that would be covered in future sessions and engaged students in a discussion about their areas of interest. This was a positive approach, helping to ensure that upcoming content is relevant and tailored to the needs of the group.*

*The session consisted of approximately 45–60 minutes of lecture delivery, followed by 30-40 minutes for students to familiarise themselves with the software required for their coursework. A basic simulation setup was provided, including a pre-defined geometry, so that students could focus on learning the new software features rather than spending time on design. This was good practice, as it allowed students to concentrate on the skills they needed to develop without becoming distracted by tasks they may already be comfortable with.*

**Teaching [A2: Teach and/or support learning through appropriate approaches and environments.]**

*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 lecturer demonstrated a clear awareness of the competing demands on the students' time and took into account their previous experience. They made effective use of students' own backgrounds,*

*drawing on the complexities of their particular areas of study to make the subject matter more relatable and meaningful.*

*Relevant software and industry standards were clearly identified and explained. The slides offered an appropriate balance of images and text, and the lecturer expanded on these points confidently and clearly. The pace of the lecture was well judged, allowing students time to absorb key concepts without feeling rushed.*

*The lecturer also worked through a practical example in the software, demonstrating step-by-step how to complete the task. Importantly, they showed how simulations can fail and explained the meaning of different error messages. This was highly beneficial for students, as such issues are likely to arise in their own work. The lecturer provided helpful tips and clear guidance on how to troubleshoot common errors, supporting students in developing both confidence and practical problem-solving skills.*

**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 students appeared to be listening and generally engaged; however, they were not taking notes, nor did they appear to have the lecture materials open. Despite this, they felt confident enough to ask questions during the presentation. The lecturer responded thoroughly and helpfully, often linking their answers back to the coursework the students had already been set.*

*Overall, the students showed a positive attitude toward the class, though there were limited opportunities for active participation until they began working with the software. Once this practical element began, it became clear that some students had not fully listened to the earlier instructions. Several asked their peers how to log into the software or what they were supposed to be doing, despite the lecturer having clearly explained the steps. The lecturer also had to repeat instructions to multiple students. This issue has reportedly been observed by other members of staff*

*with this cohort, suggesting it may reflect a broader cohort-wide approach that might require consideration.*

*There was, however, a strong sense of mutual respect between the lecturer and the students. The lecturer was also mindful of the students' demanding schedule for the remainder of the day and allowed the session to finish slightly early, giving them time for a short break before their next lecture. This was appreciated by the students and received positively.*

### **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 students005C.*

### **Comments**

*The students felt that the assignment brief was quite open and requested further clarification. In response, the lecturer provided examples of work completed by previous cohorts, illustrating the wide range of possible approaches and helping students better understand the expectations.*

*During the practical session, the lecturer engaged with students at their level, working through problems alongside them. He asked them to describe the steps they had taken and explain the reasoning behind their decisions, before offering clear guidance on where alternative approaches would have been more effective.*

*He provided constructive feedback throughout and was consistently approachable and supportive, ensuring students felt comfortable seeking help.*

### **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 approaches acknowledged that learners build understanding by connecting new material to prior knowledge, through active engagement, and by receiving targeted scaffolding.*

*K2 - The teaching methods were well matched to the subject's applied and technical nature, enabling students to learn through demonstration, modelling, and authentic tasks.*

*K3 - The lecturer's responses to student needs, willingness to adapt, and recognition of areas for improvement demonstrate critical evaluation informing teaching practice.*

*K4 - Digital tools were used purposefully and effectively, supporting both subject-specific and transferable digital skills.*

*K5 - The lecturer showed an understanding of quality assurance through clear expectations, alignment with industry standards, and attention to student experience and consistency across modules.*

## 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 - The actions reflect a student-centred approach that values learners as individuals and recognises the diversity of their experiences, workloads, and preferences.*

*V2 - The lecturer created multiple points of entry into the learning, reduced unnecessary barriers, and ensured that every student had the opportunity to engage and succeed.*

*V3 - The teaching is rooted in disciplinary expertise, professional standards, and evidence gained from previous practice, enhancing the relevance and reliability of the learning experience.*

*V4 - The lecturer's decisions reflect a strong awareness of external pressures (work-based learners, heavy schedules), disciplinary expectations, and institutional considerations, ensuring teaching remains relevant and supportive.*

*V5 - Professional dialogue, shared cohort insights, and collective approaches to addressing student needs show that the lecturer works with colleagues to refine and strengthen practice.*

**Examples of good practice:**

- *Effective use of practical, industry relevant learning*
- *Strong rapport and respectful student interaction*
- *Responsiveness to student needs and workload*

**Action points:**

- *Provide clearer introduction and session outline*
- *Encourage active note-taking and use of learning resources*
- *Develop strategies to address cohort-wide listening and instruction-following issues*

**For Observee**

**Write a short statement to address Area of activity [A5] .Decribe how this observation will enhance your practice.**

***The comments relating to the delivery style and general structure of the lecture are positive and would lead me to believe that this style of approach be continued in my practice. There are however areas that can be improved at the lecture design stage. For example, it was noted that session introduction and outline was not well conveyed, which would allow students a better understanding of what they are working towards.***

***Another area to consider is how the students engage during the session. The lack of note taking was apparent amongst the group, as was an, at times, mixed engagement during parts of the session. Being a group made up entirely of mature apprentices, they do respond in a different manner to typical undergrad students. Ensuring my approach is***

***tailored in future to best suit and fully engage this type of student will be an area to work towards improving.***

Observer ...  .....

**Date** 17/03/2026

Observee .....Andrew Noble .....

**Date** 17/03/26

### **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.**

## 11.4 Motorsport Dynamics Fundamentals Lesson Plan Example

### Lesson Plan: Load Transfer in Vehicle Dynamics

**Module:** Motorsport Dynamics Fundamentals

**Lecture:** 3 - Load Transfer

**Session length:** ~105 minutes

**Session type:** Lecture + guided worked examples

**Prerequisites:** Newtonian mechanics, moments, basic vehicle layout terminology

### Learning Outcomes

By the end of the session, students should be able to:

- Distinguish clearly between load transfer and weight transfer
- Calculate static tyre loads from mass distribution
- Apply rigid-body load transfer equations for lateral and longitudinal cases
- Compute tyre and axle loads under acceleration/braking/cornering
- Explain the limitations of rigid models
- Identify and calculate the contributions of unsprung mass, sprung mass via suspension links, and sprung mass via springs/dampers
- Compare rigid and advanced load-transfer methods and interpret handling implications

### Session Breakdown

#### 1. Introduction & Conceptual Framing (10 minutes)

**Slides:** 1–2

#### Key points:

- Outline session structure and emphasis on calculation practice
- Clarify load transfer vs weight transfer
- Stress that load transfer exists even in perfectly rigid vehicles

#### Teaching approach:

- Short discussion prompt:  
*“Can tyre loads change without the CoG moving?”*
- Establish terminology consistency for later calculations

## 2. Static Tyre Loads (15 minutes)

Slides: 3

**Analytical focus:**

- Static equilibrium
- Converting mass  $\rightarrow$  load

**Content:**

- Measuring static corner weights
- Conversion using  $W = mg$
- Equal vs unequal distributions

**Worked Example:**

- Corner weight = 350 kg
- Students calculate:
  - Per-wheel load in Newtons
  - Effect of symmetric CoG placement

**Student activity (5 mins):**

- Independent calculation with altered corner mass
- Quick peer-check

## 3. Lateral Load Transfer – Rigid Body Model (20 minutes)

Slides: 4–6

**Analytical focus:**

- Moment balance
- Importance of correct acceleration units

**Derivation walkthrough:**

- Explain moment caused by lateral acceleration:

$$\text{Moment} = mah$$

- Introduce track width as moment arm

- Derive:

$$\Delta L = \frac{mah}{T}$$

**Worked Example (10–12 mins):**

- Use known mass, CoG height, and track
- Emphasise:
  - Converting  $G \rightarrow m/s^2$
  - Identifying load transfer component
- Explicitly show inside vs outside tyre load calculation

**4. Lateral Load Transfer – Full Example (15 minutes)**

**Slides: 7**

**Student-led worked example (scaffolded):**

- Porsche-style example from slides
- Students calculate:
  - Static corner loads
  - Total lateral load transfer
  - Final inside/outside tyre loads

**Teaching approach:**

- Pause after each step
- Ask students to justify *where* load transfer appears in the equation
- Highlight physical interpretation, not just arithmetic

**5. Longitudinal Load Transfer (15 minutes)**

**Slides: 8–10**

**Analytical focus:**

- Braking and acceleration
- Wheelbase replacing track width

**Key equation:**

$$\Delta L = \frac{mah}{W}$$

**Worked Example (guided):**

- Braking case with front-biased mass distribution
- Students calculate:
  - Static axle loads
  - Load transfer magnitude
  - Final front axle load under braking

**Concept link:**

- Why this directly affects braking performance and ABS tuning

**6. Model Assumptions & Limitations (5 minutes)**

**Slides:** 11

**Discussion focus:**

- “Perfectly rigid vehicle” assumption
- Neglected effects:
  - Suspension compliance
  - Sprung vs unsprung mass separation

**Transition points:**

- Why engineers still start with rigid models
- When accuracy begins to matter

**7. Developing Load Transfer Models (5 minutes)**

**Slides:** 12–13

**Conceptual overview:**

- Breakdown of total load transfer into three components:
  1. Unsprung mass
  2. Sprung mass via suspension arms
  3. Sprung mass via springs/dampers

**8. Unsprung Mass Load Transfer (10 minutes)**

**Slides:** 14–15

**Analytical focus:**

$$LT_{us} = \frac{m_{us} a h_{us}}{t}$$

**Worked Example (short):**

- Given unsprung mass and CoG height
- Students calculate magnitude and compare to rigid-body result

**Key emphasis:**

- Why this is usually small
- Why it happens almost instantaneously

## **9. Sprung Mass Load Transfer – Suspension Arms vs Springs (10 minutes)**

**Slides:** 16–23

**Conceptual explanation:**

- Difference between:
  - Load path through suspension geometry (roll centre)
  - Load path through compliant elements (springs, dampers, ARBs)

**Analytical focus:**

- Identification of moment arm:

$$(h_{cg} - h_{rc})$$

- Relationship to roll stiffness and roll angle

## **10. Combined Load Transfer Model & Comparison (10 minutes)**

**Slides:** 24–29

**Analytical synthesis:**

$$LT = LT_{us} + LT_{ss} + LT_{sr}$$

**Comparison exercise (guided):**

- Walk through slide comparison step-by-step

- Highlight:
  - Numerical difference vs rigid model
  - Why results are still relatively close

**Interpretation focus:**

- Engineering trade-off between simplicity and accuracy
- Why tuning load transfer distribution matters more than total value

**Optional Extension**

- Modify suspension roll stiffness and predict handling change
- Compare front vs rear load transfer distribution
- Short reflective question: *“Why does reducing roll not always improve grip?”*