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RESEARCH ARTICLE

Understanding, experiencing, and applying Agile project management techniques: A scaffolded higher education assessment framework

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Abstract

Through the tight integration of industry needs and Agile project management education, higher education institutions, and business organisations can help to foster a workforce that is prepared for the dynamic, iterative, and collaborative modern business. Industries are seeking professionals who not only understand Agile project management techniques but can also respond to customer needs, effectively collaborate, and communicate, and adapt to change through experience and application. The assessment of Agile project management in higher education should therefore include these critical skills to meet the job market's current requirements. This paper discusses a case study of a UK based university to show how students were exposed to industry expertise and experience, real-world challenges, and Agile project management tools and methodologies as a way of encouraging active engagement and equipping them for the dynamic workplace. A scaffolded assessment approach was taken to encourage engagement, deep learning, and skills development.

Keywords

agile project management; student engagement; scaffolding; agile pedagogy; soft systems methodology.

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1. Introduction

Organisations across different industries are adopting Agile principles to enhance flexibility, adaptability, and efficiency (e.g., Lekatsas, 2024). Agile methodologies like Scrum and Kanban tend to be the preferred frameworks for managing projects, especially in technology-driven companies. Roles such as Project Managers, Scrum Masters, and Product Owners often require a solid understanding of Agile. Today's employers value employees who can adapt to change, respond to evolving customer needs, thrive in fast-moving environments, and undertake iterative complex problem-solving (Harvard Business Review, 2019). As industries increasingly adopt Agile methodologies for project management (PM) and product development, possessing Agile skills can significantly boost a candidate's job prospects. Gartner (2023) notes that organisations report a skills gap when transitioning to Agile product development, with building skills the second most common action (after hiring) used to close the skills gap. Furthermore, the importance of higher education students learning skills for employment has long been positively advocated (e.g., McKinsey & Company, 2019). Indeed, employability skills have now become a key component of degree programmes (Cole & Tibby, 2013).

The linking of industry with teaching Agile can help to provide a tight connection between the academic environment and real-world business needs. Strong industry-academic partnerships by universities can help to support student growth, better prepare students for success in the job market and provide a strong and more solid foundation on which to continue to learn and grow professionally compared to some other approaches (Hoteit et al., 2023). This can help students to acquire practical skills that are directly applicable to their future careers and ensure that industries benefit from a workforce that can adapt to modern work methodologies. Moreover, the active engagement of undergraduate students is a complex challenge but one that holds the key to successful academic outcomes. Links with industry and academia can help to foster a sense of active engagement amongst students.

Student knowledge and understanding of Agile practices at the earlier stages of undergraduate study can be elementary. As Bloom (1956) mentions in his taxonomy, students develop skills based on their level of study (e.g., level 4 - first year undergraduate). Bloom's Taxonomy emphasizes higher-order thinking: analysis, evaluation, and creation. These levels foster independent learning, research capability, and innovation, essential for tackling complex, real-world problems beyond rote memorization. For example, enabling students to critically examine concepts, justify decisions with evidence, and synthesize ideas to produce original work.

With experiential and problem-based learning Agile project management skills can be developed through the course of a degree programme, in order to equip students and serve industry needs. Assessment in higher education provides the means for students to know themselves as future professionals (Nieminen & Yang, 2023). Freire (1984) argued that any pedagogy must enable students to analyse, theorise, and intellectually engage with the worlds that are relevant to the immediate worlds of the students. More recently, Rutherford et al. (2024) points out that there is a need for assessments to be meaningful, engaging, well-integrated into learning activities, and student-focused in order for them to effectively support learning.

This research uses scaffolding (Bruner, 1966) as a way of providing a temporary framework of supportive elements in Agile project management assessments to help students develop a higher level of understanding. The assessments aim to be engaging, integrated into the learning, and relate to the 'world' that is relevant to students in a professional context. Authentically emulating a given environment or challenge, makes them meaningful and transferable beyond the classroom environment. This can enable a deep learning experience for the student (Smith & Johnson, 2020) together with student engagement (Berry & Kowal, 2022).

This paper discusses ways in which students Agile project management understanding, experience and skills application can be strengthened through a scaffolded assessment framework. This research focuses on the perspective of a United Kingdom (UK) based case study through examples of two years of undergraduate university study and a work placement

year. It details the mutually beneficial industry and academic links together with the techniques used to scaffold assessments to enhance student engagement, deep learning, and skills development.

This study advances Agile pedagogy and scaffolded learning by showing how structured, multi-year assessments enhance engagement, deepen learning, and improve employability through authentic, industry-linked experiences, and progressive application of theoretical frameworks.

The remainder of the paper is organised as follows; section 2 discusses literature in relation to scaffolding, student engagement, group work, industry involvement, and Agile project management teaching and assessment techniques; section 3 focuses on the case study and assessment framework; section 4 shows the evaluations given by students of their learning experiences, and conclusions are drawn in the final section.

2. Background

2.1. Student engagement

Research into student engagement in higher education shows its importance for academic success and personal development. In particular the engagement of students in academic study has been found to have a positive relationship with employability skills (Towl & Senior, 2010) and higher-level earnings (Walker & Zhu, 2013). Specific studies (e.g., Mebert et al., 2020) have shown that student engagement can be fostered through real-world, collaborative projects improving student learning and enhancing a sense of empowerment.

Freeman et al. (2014) conducted a meta-analysis that found active learning improves both engagement and academic performance compared to traditional lecture-based instruction. This is because students are more involved in the learning process, requiring them to apply and analyse concepts. Trowler (2010) found that students who actively participate in class discussions, engage in peer learning, and interact with tutors are more likely to report higher engagement. Research by Umbach and Wawrzynski (2005) shows the significant impact that tutor behaviour can have on student engagement. They found that tutors who actively involve students in learning, provide timely feedback, and create a supportive learning environment can have a positive influence on student engagement. When tutors are approachable and encourage critical thinking, students are more likely to be engaged. Furthermore recent findings show agile environments require continual benefits and evaluation across iterative cycles (Delisle, 2025).

2.2. Classroom dynamics

Classroom dynamics that foster participation, like asking open-ended questions and encouraging group work, positively influence engagement levels. Group-based learning has long been successfully used for deep learning at all levels of education providing a way of enhancing communication skills, encouraging active participation, collaboration, knowledge-sharing, and developing social skills (e.g., Hurst et al., 2013; Scager et al., 2016). Additionally, group-based learning has been shown to assist with motivation (Gillies, 2003) and promote academic achievement (Gillies & Boyle, 2011). Recent research further shows that team work quality can be measured and predicted using well established behavioural indicators reinforcing the importance of collaborative learning (Behn & Silvius, 2025). Furthermore, being able to work efficiently with others is considered one of the critical skills demanded by employers once graduates begin work. Johnson et al. (2007) notes that higher education institutions are increasingly using collaborative learning groups in order to equip students with teamwork skills, which are highly valued in the professional world.

Lutchen (2024) highlights the value of university-industry partnerships in ensuring that students acquire job-ready skills, and the importance of an ongoing and sustainable partnership which can provide real-time input on the critical technological skills students will need in their careers. "Students with industry-linked educational experiences are more likely to transition smoothly into the workforce, making them highly attractive to employers" (NACE, 2020). Industry

collaborations with academic institutions provide fresh insights and perspectives enabling companies to generate innovative services, products, and processes (Bamford, 2024).

2.3. Scaffolding

Scaffolding, as an instructional strategy, originates from the work of Bruner (1966) and is closely aligned with Vygotsky's (1978) concept of the Zone of Proximal Development (ZPD). It refers to the temporary support provided by educators, peers, or tools that enables learners to perform tasks they would not be able to accomplish independently. As learners gain competence, this support is gradually withdrawn, promoting autonomy and mastery.

In the context of higher education, scaffolding is particularly effective in supporting diverse learning styles and fostering deep learning (Salend, 2001; Murtagh & Webster, 2010) potentially leading to improved academic achievement. It allows educators to structure learning experiences that are both challenging and achievable, thereby enhancing student motivation and engagement. Kang et al. (2014) identified five types of scaffolding that significantly improve student reasoning and explanation quality: contextualized phenomena, rubrics, checklists, sentence frames, and explanatory models. Among these, contextualized phenomena real-world scenarios embedded in assessments had the most substantial impact.

Scaffolding is not limited to instructional delivery but extends to assessment design. Scaffolded assessments provide students with clear expectations, continuous feedback, and opportunities for reflection and revision. This approach aligns with Ambrose et al.'s (2010) principles of effective learning, which emphasize timely, targeted feedback and the importance of making learning goals explicit. Moreover, scaffolding can be enhanced through peer interaction, where students co-construct knowledge and support each other's learning (Howe, 2013).

In Agile project management education, scaffolding plays a critical role in bridging theoretical knowledge with practical application. The scaffolded assessment framework described in this study spanning understanding, experiencing, and applying demonstrates how structured support across academic years can lead to improved student engagement, deeper learning, and enhanced employability skills. By integrating industry challenges, iterative feedback, and collaborative learning, the framework enables Agile principles to be taught in a supportive way and prepares students for real-world project environments.

However, as Stanier (2015) notes, the effectiveness of scaffolding depends on its alignment with learner needs and the gradual fading of support. If scaffolds are removed prematurely or inconsistently, student performance and engagement may decline. Therefore, a consistent and well-communicated scaffolding strategy across modules and academic years is essential for sustained learning outcomes.

2.4. Agile in learning and teaching

Agile has been successfully integrated into higher education curriculums using a number of different techniques. For example, Lego4Scrum (Krivitsky, 2019) is an experiential learning activity that introduces Scrum practices using Lego blocks. Learners simulate a Scrum process by building a city out of Lego over several Sprints, experiencing the roles of Product Owner, Scrum Master, and Development Team. This has proved effective in helping students understand Agile principles and team collaboration. Emerging technologies such as meta verse environments offer additional avenues for immersive project management education (Ozsoy, 2025). The Planning Poker game has been used to teach students how to estimate work tasks in a collaborative way, helping students to break down user stories, estimate their complexity and collaboratively agree on task sizes (e.g., Buchem et al. (2023); Mahnic & Hovelja (2012)).

Combining online learning modules with in-person workshops focused on Agile certifications, such as ScrumMaster helps prepare students for industry-standard qualifications. A study at Purdue University (2021) shows that this led to significant improvement in Agile certification outcomes. The flipped classroom technique where students learn theory outside of class

through videos, readings, and exercises and then apply Agile practices like sprint planning, retrospectives, and collaboration activities in class has also been shown to be effective (Schwaber & Sutherland, 2020) and could result in more engaged students and deeper understanding of complex Agile concepts. Agile hackathons, time-constrained events where students use Agile methodologies to quickly prototype and develop solutions, has been shown to enhance student's ability to iterate quickly and deliver tangible results (Afshar et al., 2022).

Collaborating with industry partners has been effective in allowing students to work on real-world projects using Agile methodologies. "To encourage academia-industry collaboration, business schools must equip students with Agile thinking and inclusivity skills to align with workforce needs" (Haynes, 2024). A study by Boti et al. (2021) at the Hellenic Open University showed that the implementation of Agile methods can benefit project team members and help them develop both their transversal skills and team working characteristics. This paper will share the experiential accounts on the delivery of an Agile module and its structured assessments to second year undergraduate students.

2.5. Agile beyond software: Broader applications across industries and higher education

Although Agile project management (APM) originated in the software development sector, its core principles of flexibility, iterative progress, customer collaboration, and responsiveness to change have proven valuable across a wide range of industries. As organisations face increasingly dynamic and complex environments, Agile has emerged as a viable alternative to traditional project management approaches in sectors such as manufacturing, construction, telecommunications, and education.

A systematic literature review by Noleto et al. (2023) identified three primary ways Agile is being adapted outside of IT: (1) planning-focused applications, (2) use within support areas of organisations, and (3) selective adoption of Agile practices without full structural change. For instance, in manufacturing, Agile is often applied during the design and planning stages to enhance flexibility and responsiveness before production begins. In construction, Agile has been used in contract management and procurement processes to improve adaptability and stakeholder communication.

These adaptations are not about replicating Agile in its purest form but about tailoring its principles to fit the unique constraints and workflows of different industries. This hybridisation allows organisations to benefit from Agile's strengths such as rapid feedback loops, stakeholder engagement, and iterative development without overhauling their entire operational structure (Noleto et al., 2023).

The appeal of Agile in non-software contexts lies in its ability to address common project challenges, such as scope creep, misaligned stakeholder expectations, and the need for innovation under uncertainty. For example, Agile-stage-gate hybrids have been used in product development to combine the structured decision-making of stage-gate models with the flexibility of Agile practices, resulting in faster time-to-market and improved product quality (Noleto et al., 2023). As Agile continues to evolve, its cross-sector adoption reinforces its versatility as a project management philosophy rather than a rigid methodology. This broader application aligns with higher education institutions goals which aim to equip students with transferable, industry-relevant skills that extend beyond the boundaries of software development.

The integration of Agile project management (APM) into higher education (HE) reflects a broader shift in pedagogical approaches that aim to align academic learning with the dynamic needs of the modern workforce. As HE institutions face increasing pressure to produce work-ready graduates, Agile offers a framework that supports experiential, student-centred, and industry-relevant learning. Agile principles such as iterative development, responsiveness to change, collaboration, and continuous feedback resonate with contemporary educational theories including constructivism, experiential learning, and active learning. These principles support the development of critical employability skills such as adaptability, communication, teamwork, and problem-solving. In this way, Agile is not only a project management methodology but also a pedagogical paradigm that fosters deep learning and student engagement.

Despite its benefits, integrating Agile into HE presents challenges. These include the need for staff development, curriculum redesign, and assessment innovation (Fitsilis et al., 2023; Dazeley et al., 2024). Woods and Hulshult (2025) highlight that students may face difficulties stemming from the unpredictability of real client interactions and their unfamiliarity with Agile, which can lead to resistance. Such challenges mirror real world project environment where misalignment between tools and stakeholder needs can hinder progress (Rankinen, 2025). A study by Pombo and Cunha (2025) that examined the effectiveness of teaching Scrum principles found that some students improved communication and teamwork skills whilst challenges included steep learning curves, uneven engagement, and tech limitations. Institutions must therefore invest in change management and provide adequate support to ensure successful implementation (Ionescu & Bolcas, 2018).

As HE continues to evolve in response to technological, economic, and societal changes, Agile is likely to play an increasingly prominent role. Emerging trends such as hybrid learning, micro-credentials, and interdisciplinary project-based learning create favourable conditions for Agile methodologies. Furthermore, the growing use of AI and digital tools in education can enhance Agile practices, enabling more personalised and data-informed learning experiences. Recent studies highlight how data driven insights can further enhance organizational agility by mitigating risks and disruptions (Barhmi & Laghzaoui, 2025).

In summary, Agile project management offers a powerful framework for reimagining teaching, learning, and assessment in higher education. Its broader adoption can help institutions better prepare students for the complexities of the modern workplace while fostering a more engaging and responsive educational environment.

2.6. Placement learning experience

Research into the experiences of students on traditional work based placements is extensive. A study by Juznic and Pymm (2011) suggests that students returning to university from their placement year agreed that their time on placement has led to a positive experience. However, the findings also supported the fact that it tends to be the more capable and diligent students who go on placements. Students with work placement experience, consistently obtained better academic marks than those who had not. The study confirms other findings that an extended work placement enhances the prospect of a good degree and graduate employment. Other research (Bennett et al, 2008) suggests employers continue to regard formal work placements favorably, and that they point out their usefulness for developing several critical employability skills. These include developing interpersonal and leadership skills, tolerance of others, and skills relating to conflict resolution and negotiation. The benefits that students can gain from work placement include increased employability and better academic achievements (Ceschin et al., 2017).

A study by Brookes and Youngson (2016) found that completing a work placement is associated with improved academic performance in the final year of study. Placement students are also more likely to secure appropriate graduate-level work and higher starting salaries upon completion of their degree in comparison to non-placement students. Demonstrating the impact of a work placement by academics could help students to make informed decisions on whether to undertake one, potentially increasing participation rates. Studies (e.g., Smith et al., 2019) also suggest that the placement experience is a better predictor of a variety of employability outcomes than either structure of the placement experience or the duration of the placement.

The experiences of the students in a study by Smith et al. (2007) show that reflection appears to showcase the technical skills learnt during their placement experience. The reflection of the placement experience makes the journey more authentic. Being in a work placement environment allows for the refinement of prioritization skills and personal transferable skills (Poulter & Smith, 2006). However, placements do have some disadvantages including the competitive nature of obtaining placements. In summary, research has found that the placement experience and development of transferable skills is relevant for the final year of study and graduate employment. The advantage of having a placement outweighs the

disadvantages. To encourage students to obtain a placement, academics need to share these benefits and communicate them to the students.

2.7. Consultancy SSM application

Soft Systems Methodology (SSM) can be used to understand complex ambiguous problems in the classroom. Research has shown that SSM and interdisciplinary approaches have not been readily adopted by academia or business schools (Cezarino et al., 2016). The SSM pedagogical approach can cross disciplines from systems thinking to business management. This paper will share the practical accounts on the delivery of the methodology. A final year taught module will be used to understand PM and SSM and the scaffolded aspects of the assessment will be discussed. Checkland and Scholes (1999) states that any intervention should consider the views of all stakeholders and the solution must come from the people involved in the problem situation. Being empathetic to the stakeholders in the problem situation enriches the SSM approach further.

SSM, has been developed by Peter Checkland in the 1970s (Checkland & Poulter, 2006). It is designed to address complex, poorly defined problems, especially in social settings (Nair, 2015). Unlike hard systems methodologies, which rely on quantitative data and assume systems operate in predictable ways, Soft Systems Methodology (SSM) acknowledges the complexity and uncertainty inherent in human systems (Wilson, 2001). Recognizing the significance of meaning in social interactions is crucial, as it influences how individuals communicate, build relationships, and make decisions (Armstrong, 2019).

Preliminary insights from teaching SSM suggest that adopting an empathetic Agile project management approach helps participants grasp both the methodology and the complexity of the situation more effectively than relying solely on theory. Agile practices support deeper understanding, while collaborative group work further strengthens this and enables practical application within the project context.

2.8. Summary

This literature review shows that several different techniques have been successful for teaching Project Management. The first being Agile project management techniques. This is followed up by actual hands on project management during student's placement experience. The third being stakeholder project management through the use of SSM. They tightly link industry and academia in Project Management which has been shown to have a positive effect on student engagement and provide students with critical industry skills. Using groupwork can also help to foster student engagement and enhance valuable industry competencies. The case study that follows combines a number of such techniques for the teaching of a second year undergraduate Agile Project Management module followed by a placement module, then a final year consultancy module using SSM project management.

3. Design and development of scaffolded assessment framework

The framework used for assessment scaffolding was three-fold (Fig. 1). The three core aspects – understanding, experience and application were taken from Bloom's taxonomy (1956) and aimed to increase students subject area knowledge and understanding together with engagement, and skills development as they progressed through undergraduate study.

Understanding was developed in year 2 of undergraduate study through a module that focused on Agile concepts and involved building a prototype for a real-world challenge. Experience was gained in the third year of study through a work placement year and associated assessment and application of learning was achieved through a module that focused on a fundraising challenge. The final-year module assessment is based on peer review and an independent reflection. This form of assessment is supported by previous learning journeys from the second year and the placement year. Having

experienced scaffolded learning, teaching and assessment in previous years students are more amenable to the same approach to assessment in the final year. Understanding agile PM perspectives in year 2 and experiencing them in the real world in the placement year allows students to apply this learning in the final year. This then naturally feeds into engaging with PM needs in employment post University. This learning journey over the three years has led to students' attainment being much better than before the scaffolded approach.

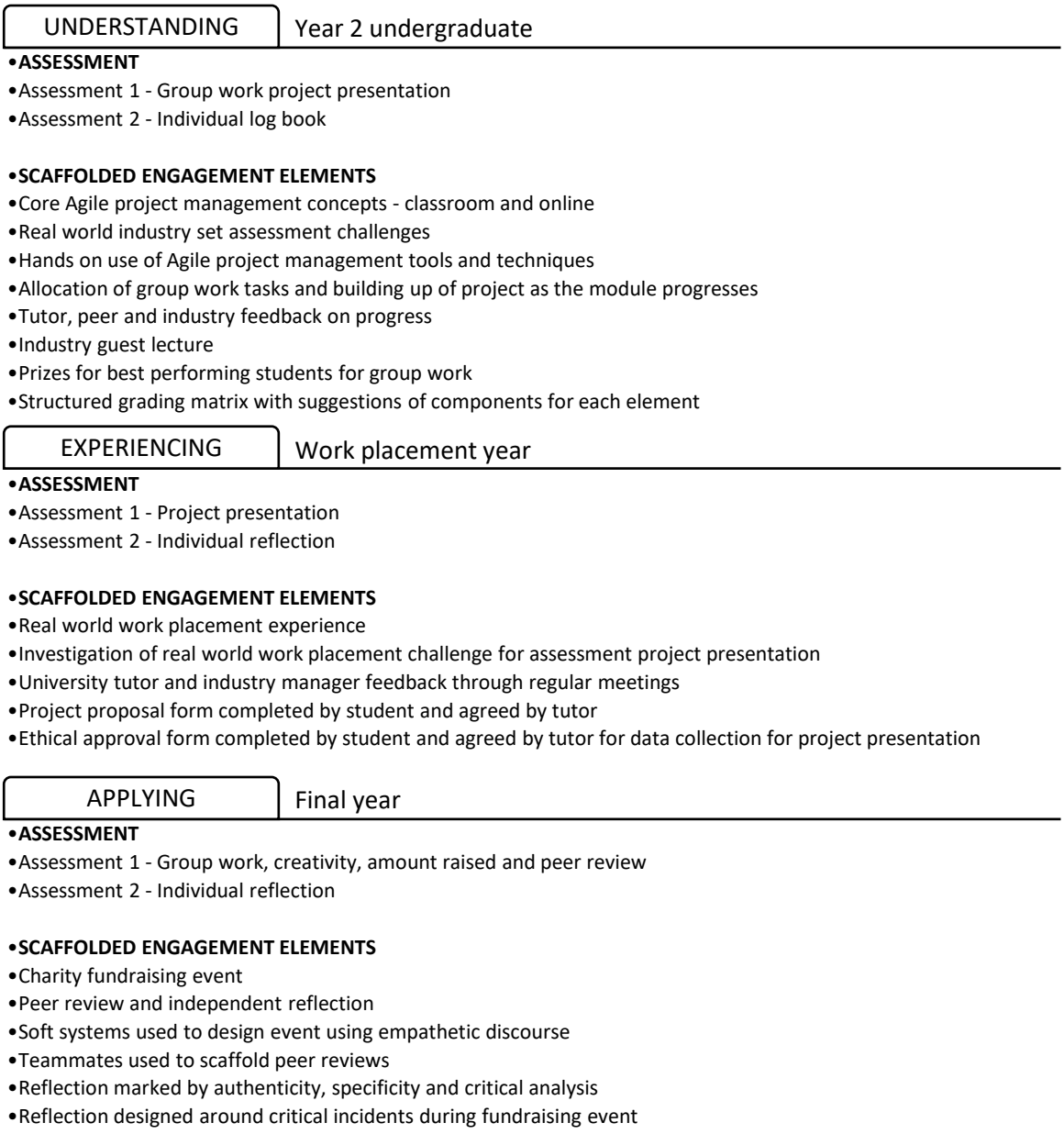

Fig. 1. Scaffolded assessment framework for Agile project management engagement

The Case Study section in this paper explores each of the three elements of the framework for engaging students in Agile project management. The scaffolded approach to the design and delivery of the modules helped engage the students with the theory and practical perspective. The scaffolded approach to teaching, learning and assessment is conducive to deep learning and can lead to improved academic achievement. Consideration does however need to be given to how and why particular modes of assessment are used to assess student achievement (Murtagh & Webster, 2010). Feedback from students prior to the scaffolded approach suggested that they were not engaging with the theory of Agile project management and Soft Systems and relating it back to their learning journey. The links between theory and project management in real-world scenarios needed to be clarified and linked to the module learning outcomes. Once students can see the relevance of the theory, they are more likely to incorporate it into their learning journey.

There does need to be a balance between the scaffolded approach and the independent learning of the student. Scaffolding should support the student but not replace the independent learning journey. This balance will be based on experiential teaching and learning and student attainment in formative and summative assessment. The support should help students engage with the module content and still promote independent thought and analysis. This will allow students to apply their learning to the real world where the scaffolded approach will not be apparent.

Scaffolds may be described as strong, where they provide a large amount of guidance and support for the learner, where the support is less (Stanier, 2015). This study suggests that the scaffolding approach provided good support for the initial exploration of the material but there were issues around the removal of scaffolds. This was due to the mismatch between the student and tutor expectations of the scaffolds. If scaffolds linked to assessment are removed then the experience of students also drops, and attainment is less. The scaffolded approach therefore needs to be consistent across modules and between academic years. This paper demonstrates this scaffolded PM approach works across three years of academic study.

4. Case study

This case study focuses on learning, teaching and assessment at the triple accredited (AACSB, AMBA and EQUIS) Aston University Business School in the United Kingdom. Aston University Business School is one of the UK's leading business schools and has been a pioneer in embedding industry connections and the work placement programme within undergraduate study. All undergraduate courses have a mandatory work placement element and industry links throughout module diets. It also provides support for small and medium enterprises and staff pioneer innovative teaching methods to make the student learning experience rewarding, engaging, and enable students to experience real-life business through projects. The next three sub-sections will outline more details about the modules at each level of study.

4.1. Understanding – Agile module

The Agile module is a second-year (level 5) undergraduate module and is mandatory in the Business Computing and IT degree course. Students on some other courses, such as Business Analytics and Business and Management, can also optionally select to study the module. It is studied over 11 weeks. The module learning outcomes include analysing information systems from both user experience and information needs perspectives; developing and communicating solutions through iterative, collaborative problem-solving in Agile teams, and applying Agile project management techniques to plan, manage, and deliver projects.

The Agile teaching curriculum was fundamentally designed in collaboration with industry professionals so that it reflected the latest practices, tools, and challenges that organisations face. The industry experts had previously studied for their MBA at Aston, had many years of experience in the field and set up a small business through the Aston Help to Grow scheme (a 12-week program that helps senior managers of small and medium-sized businesses improve their performance, resilience, and long-term growth).

The depth of technical and theoretical content in the module could be adapted to the audience based on the experience level of the learners. Teaching started with Agile fundamentals – what is Agile and why Agile. This helped to highlight how Agile addresses issues like changing requirements, the need for frequent client feedback, shorter time-to-market cycles, and improving team collaboration. Different frameworks were introduced to students such as Scrum and Kanban. Key practices were taught such as requirements elicitation, user stories, backlog prioritisation, and the concept of a sprint. Other aspects such as systems modelling, prototype development, and testing were also integrated into the module together with project scheduling, tracking, and planning. Video lectures were used to provide students with background knowledge and concepts reviewed in lecture sessions.

The teaching of Agile included tools commonly used in industry such as Slack for collaboration and communication, Jira, and Trello for backlog management, sprint planning, and tracking progress. Familiarity with these tools can give learners a competitive edge when entering the job market, as many Agile teams depend on them to manage projects and collaborate. Prototyping tools such as InVision and OnShape were also included as resources on the module. Students were also encouraged to research other tools and use these within their projects. The importance of selecting appropriate cloud-based project management tools is well recognized industry, where successful adoption depends on a number of critical success factors (Assalaarachichi, 2025).

The industry experts were invited to set the assessment challenges for the module from a client perspective. The challenges were broad in scope and covered complex socio-economic problem areas such as healthy ageing and net zero. Digital transformation projects benefit from structured project management taxonomies that guide planning and execution in complex environments (Tarannum, 2025). It was also recognised that while Agile originated in software development it is now widely adopted in other sectors like healthcare, finance, and marketing. This was reflected in the assessment challenges, which were broad in scope. Working in Agile teams, students needed to use Agile tools and techniques to devise a solution to the challenge. The solution deliverable did not necessarily need to be a piece of software. Students initially used the Pugh matrix to help with making a decision about which project to choose and which particular problem area to focus their solution on. The assessment was designed so that students could build up their assessment as the module progressed. Materials were made available in advance for those students that wanted to forge ahead with progress.

Students had the opportunity to choose their own group of 4 or 5 students to work with on the assessment challenge. Students were encouraged to adopt an Agile mindset and culture to their groupwork, which included fostering open discussion/communication, active collaboration, embracing change, regular reflection, and iteration, and the importance of interacting with the industry experts as the client. Tutors gave students regular feedback on a weekly basis on their progress during class together with being available to answer any questions for clarification on the assessment requirements. In particular, tutors asked students about the progress that they had made during the previous week and what they had planned for the following week. Progress was noted down by the tutor so that they could be referred to in conversations with students the following week and also to show the student that the tutor was taking an active interest in their progress. Taking comments from mid-module feedback into consideration also helped with refining the teaching process further.

The assessment required students to work iteratively and collaboratively. The assessment aimed for hands-on work to analyse system and user requirements, create and update plans as well as iteratively model and present plans for implementation. To achieve the aim, students worked in teams to deliver a number of iterations of a prototype (practicing sprints and scrums). They presented the proposed solution as a team presentation and answered questions on its development.

In order to successfully complete the assessments students needed to engage with stakeholders to identify requirements, propose a solution, and communicate plans for implementation using Agile project management and information systems tools, and techniques. Students worked in teams to practice Agile development, working iteratively to prioritise, delegate,

and deliver tasks while responding to changing requirements. The marking criteria encouraged the usage of different Agile tools and techniques, effective collaborative group work, planning, and creative and innovative solutions to the challenge.

Suggestions of Agile tools and techniques were made for each of the aspects of the marking criteria. For example questions within the marking criteria helped students to focus on particular aspects of the project: Is there clear evidence of background research on the wider challenge and specific problem shown? Is the problem clearly framed from a user perspective, with requirements that are understandable and relatable? Is the problem clearly framed from a systems perspective, with data/information flow clearly and correctly demonstrated? The following deliverables were suggested to fulfil such criteria: screenshots of background research; user personas, user stories, functional requirements, non-functional requirements, system flow chart.

Students also completed an individual element to the assessment. This involved creating a log book of evidence of tools and techniques used throughout the project. This was shown in screenshots, images, etc. rather than lots of text. Students were encouraged to provide evidence for each element of the marking criteria. For example: Have you shown detailed project plans? Have appropriate planning tools and practices been applied appropriately? Evidence for this was suggested as (but not limited to) a Work Breakdown Structure and Gantt chart.

The industry experts were also invited to give a guest lecture to show students the sorts of Agile projects that had transformed their business, together with key lessons learned and future plans for adopting Agile in their business. It also helped students to understand how Agile principles are applied in actual work environments. The industry experts also came into a seminar to listen to the ideas that students had for solutions to the assessment challenges. They were then able to give them feedback from a practice/industry point of view on ways to improve it for subsequent iterations of the prototype. The feedback received from students was really positive and the excitement built in-class knowing that they would get to talk directly to the industry experts who had set the challenges. The guest lecture acted as a way of inspiring students' ambitions to work in Agile teams and apply for Agile project management roles. This reflects wider evidence that mentoring plays a critical role through project management processes directly influencing skilled development and performance (Tan & Leong, 2025).

After students had submitted their assessments and these had been marked by tutors, the industry experts gave the students that submitted the best projects a prize which was a recommendation on LinkedIn. This acted as a mechanism for encouraging excellent project performance and as a way of showing future potential employers the areas that students had excelled in. There was also an opportunity for the most innovative and creative ideas to be taken forward by the industry experts as practically realized solutions. Again, strengthening the academic and industry bonds and enhancing student engagement towards a real-world realized outcome.

Establishing good communication channels with industry experts also helped with continuously updating and refining the Agile curriculum based on the evolving needs of the industry. This ensured that the teaching remained relevant and that students were equipped with the most up-to-date practices and tools. Students were also provided with guidance on how Agile can lead to specific roles like Scrum Master, Product Owner, Agile Coach, or Project Manager, and what steps are needed to achieve these positions. By showing students job adverts with salaries and skills needed helped to encourage enthusiasm for Agile ways of working and learning in preparation for the graduate employment market. Such involvement helped to accelerate learning and career readiness.

4.2. Experience – work placement module

All undergraduate students were required to find a graduate role/s for their work placement year. Students are required to work at least 16 hours per week over a minimum of 30 weeks. If more than one placement is undertaken each placement must last at least 5 weeks. Although the responsibility of securing a placement rests with the student, the university provides lots of support to help students to find a suitable placement.

The aim of the work placement assessment is to demonstrate the effective amalgamation of skills developed in the professional environment and academic learning. Through the exploration of the chosen issue or process for the organisation or its business environment, the student will demonstrate their ability to identify matters of importance to the organisation, explore them, and put forward practical solutions for improvement. This element of the assessment requires that students employ their interpersonal, analytical, problem-solving, and communication (verbal and written) skills throughout. It should be noted that interpersonal and other communication skills are important when undertaking the investigation as well as PM skills and techniques. These are all sophisticated employability skills which should be evident from the finished assessment and its delivery. The choice of topic may relate directly to the area in which the student works, to a wider part of the organisation, or to the business environment in which it operates.

On successful completion of the Placement year and Undergraduate Placement Assessment, a student will have, as a minimum, demonstrated their capacity to engage effectively with the terms of their placement contract(s). In addition, students who exceed the above minimum pass threshold will be able to demonstrate increasing personal and professional development; articulate key personal, cultural, professional, and disciplinary knowledge, and skills relevant to the placement experience and reflect on performance; and clearly communicate the ways in which placement-related skills can be transferred to support ongoing personal, professional, and academic development.

Students will need to complete an individual portfolio comprised of the following components: six work-based reflective pieces of work which reflect defined areas of work-based developments. This is then supplemented by a critical evaluation of an issue or process within your organization(s) or relevant business sector including recommendations and actions as appropriate, through a recorded video. This application of skills such as project management and stakeholder management help students to experience PM on a hands-on basis. They can apply Agile skills and PM to a real-world context.

Each student is allocated a work placement supervisor from the University. The University supervisor guides the student through the assessment process and gives feedback through regular meetings. This helps students to refine their ideas and develop each assessment aspect. Work placement supervisors also advise on the topic area to focus on for the presentation aspect of the assessment. Prior to starting the presentation project part of the assessment students complete a project outline and ethical form to ensure data collection has been considered from an ethical point of view and that the topic area studied relates to relevant literature and business theories. Students are encouraged to take an Agile approach to their management of each part of the assessment and reflect this in their end deliverable.

4.3. Application – SSM consultancy module

Many graduates moving from a business school education to employment encounter a growing amount of uncertainty and complexity in business and industry. The amount that can be taught solely through cognitive processes is limited, and students can also learn best through doing and engaging with others. Students must learn how to solve problems in real-world scenarios. This module's assessment goal is to provide a team-based activity that tackles the pedagogical conundrum of how to foster and evaluate the development of such abilities. Skills such as leadership, team working, problem solving, and conflict management can be developed in this scenario. The use of problem-based learning to increase students' competency and confidence in handling difficult and unclear problem situations sometimes known as "wicked problems" is what makes this scenario and activity innovative.

This exercise is used with final-year (level 6) undergraduate students at Aston University. The activity runs throughout one ten-week term. Eight weeks are based on the planning of the event. Then, two weeks are the event window in which students choose a 24-hour window to run their event.

Students are organized into teams of five or six and challenged to raise as much money as possible for their chosen charity/charities in a 24-hour window. The teams compete against each other, particularly in relation to the amount raised.

The team context of the activity is important since students learn not only about their own performance in problem solving but also about the interpersonal and group dynamics of team working. The creativity of the fund-raising idea and how well the team worked together are also assessed. A peer review assessment of each other's contributions is assessed through online software called Teammates. Finally, each student will submit a reflection of their journey on the module, based around a reflective cycle and three critical incidents that would have happened during the fundraising event, from planning, execution, to post execution.

The planning for this fundraising event uses the Soft Systems Methodology (SSM) (Checkland, 1986). SSM has been successfully used in many different contexts for complex problem-solving (e.g., Aryee & Hansen, 2022; Sharma, et al., 2019). This is an approach that uses stakeholders and relationships and interactions to understand the complex and ambiguous challenge that the students are facing when first planning for the fundraising event. With its seven-stage structure it provides a framework for structuring and framing wicked problems by initially thinking about what is happening in the real world from the point of view of different stakeholders. The comparison between the real world and idealized worlds allows for an eventual accommodation of future ways forward. The use of rich pictures and modelling of activities help to plan for the event and understand the dynamics of the different stakeholders. Understanding the world views of the stakeholders are important to understand how to manage these interactions.

As the future leaders of a society that is increasingly complex and challenging it is important that higher education students have a good grasp of social, political, economic, and environmental issues and also feel equipped to propose reasonable recommendations. The use of the SSM in a scaffolded, group-based learning approach provides students with a framework to learn about and engage with complex issues.

The module aims to understand different approaches to structure a consulting intervention. Students will develop an understanding of effective versus ineffective consulting practices through experience and critical reflection. Students will be better prepared to carry out successful consulting projects within organizations, either as an external investigator or as a line manager given a one-off problem-solving task. Students successfully completing this module will be able to design and execute a fundraising event in a complex and ambiguous situation, evaluate, and select appropriate consulting methods and tools for their challenge, reflect on their consulting practice, and performance both as an individual and in the context of a team activity.

SSM is used to plan and structure the event. Stakeholder management and PM is central to this planning. Students work in teams 5 or 6 and use SSM analysis to explore the design and execution of the event. Students are encouraged to use empathetic discourse to experience what the stakeholder wants and needs in the context of the fundraising event. Empathy enriches the SSM process by ensuring the human side of systems is as important as the technical side (Bentley, 1993). It is about creating solutions that work not just in theory but in real, messy, human-centric environments (Checkland & Scholes, 1999). Understanding worldviews in relation to project management learning and teaching is important as it shapes how individuals and organizations approach problems, decision-making, and strategies. A worldview is a broad perspective or belief system that influences how people perceive and interact with the world (Checkland & Poulter, 2006). Being aware of worldviews in operations management allows organizations to operate in a more inclusive, thoughtful, and adaptive manner, ultimately leading to more effective practices and learning outcomes.

The module is assessed by group work and individual assessment. Group work is assessed through fundraising event design and creativity, the amount raised for charity, and then peer assessments of team members. Stakeholder management and conceptual project management principles are applied during the fundraising activity. Students then write a portfolio that should be a reflective account of their overall experience of the challenge, from the initial launch of the activity to the post activity reflection and analysis. The purpose of the portfolio is for the student to demonstrate an understanding of the application of the ideas and concepts of the module in the delivery of a real-world consulting assignment. The reflective nature of the account gives the student the opportunity to critically analyse their experience, both as individuals and as team members. Students are asked to reflect on their experiences and be self-aware and also

aware of team members feelings and emotions. The critical aspect of the reflection is important since it involves assessing the strengths and limitations of the various concepts and theories when applied in the real world.

5. Student evaluation of the scaffolded approach to assessment

Overall, there were clear improvements to students grasp of Agile concepts throughout the three years of study. At the end of each module students were asked to evaluate the overall learning experience. The sections that follow show interesting students quotes which help to give a flavour of their experiences and opinions.

5.1. Agile module

For the Agile module students made a number of positive comments about the learning, teaching and assessment. In particular they liked the clear explanations and content provided to support the development of a prototype solution together with working in a group and building skills throughout the module. These are some examples of quotes from students.

> *"I really enjoyed the module. It was well-structured and helped me to understand Agile practices more effectively, which I found extremely beneficial".*
>
> *"The lecturers clear explanations and guidance significantly enhanced my understanding of Agile concepts. The feedback provided was always informative and effective, enabling me to improve my work to a great extent".*
>
> *"I really enjoyed working as a group on a challenge and identifying problems and proposing user-centric solutions".*
>
> *"Knowledge is buildable with lots of skills demonstrated that are useful in multiple areas".*
>
> *"The content is interesting, and loads of information have been provided to help us deliver our project. I'm quite pleased, with the way we have been given the freedom to choose our group members and also the way independency is being encouraged to go about the project".*
>
> *"The planning and process of how to achieve what we need is very helpful".*
>
> *"We have a lot of time to interact with our group members to develop the assignment during classes".*

The industry experts involved in the module commented on their experiences of working with the students. In particular they positively commented on giving feedback to students, contributing to their learning experience and real-world nature of the challenge set. These are some examples of quotes from the industry experts.

> "*It's great to hear that the session was useful and sparked enthusiastic discussions among the students. We are glad to contribute to their learning experience and hope the session provided them with more confidence as they progress with their projects".*
>
> *"We enjoyed working with the students and were impressed with their ability to turnaround substantial work within the short period. The students' creative approach to the challenges brought fresh ideas and demonstrated essential skills beyond basic brainstorming. We are well pleased to see the students pushing the boundaries with the careful guidance of their lecturers".*
>
> "*From our end, we believe these goals were achieved: helped students with real-life or real-time business problems to provide the experience of a real-world scenario; provided a big picture point of view on how to solve/address global problems such as Healthy Ageing and Sustainable Development goals from a holistic angle and include*

these in their solutioning; and motivated them by giving constructive feedback through our experience and sharing with them some of the tools and methods that we deploy in our consulting practice".

5.2. Effective management consultancy module

The Effective Management Consultancy module also received a number of positive feedback comments from students. Some examples are given below. In particular students liked the helpful and supportive nature of the module, the creativity aspect and practical seminars.

"The flexibility in the module is nice as it doesn't feel like a traditional academic module".

"The module is really good and will be very useful in the future. Probably one of the most interesting modules so far in the degree. Lecturers are really good, supportive and helpful".

"An exciting module that differentiated itself from other typical modules. I am enjoying the creativity aspect of the module as we are free to create whatever event we want. The seminar times are well structured giving us enough time to work through content but also have enough time to conduct group work".

"Interesting concept, different to other modules".

"The seminar is very practical and engaging. All information is delivered clearly, and help is available immediately when unsure of something".

"Unique course, allows students to be creative".

6. Discussion

6.1. Theoretical implications

This study contributes to the growing body of literature on Agile pedagogy and scaffolded learning by demonstrating how a structured, multi-year assessment framework can enhance student engagement, deepen learning, and improve employability outcomes. Drawing on Bruner's (1966) theory of scaffolding and Vygotsky's (1978) Zone of Proximal Development, the framework operationalises these concepts through a sequence of assessments that build progressively from understanding to experience and application. The findings support Murtagh and Webster's (2010) assertion that scaffolded teaching and assessment can lead to improved academic achievement when aligned with student needs and learning outcomes.

Moreover, the integration of Agile project management into non-software contexts such as consultancy, fundraising, and placement-based challenges extends the theoretical understanding of Agile as a flexible, cross-disciplinary methodology. This aligns with recent research (Noleto et al., 2023) that highlights Agile's adaptability across sectors and supports the argument that Agile is not confined to software development but is a broader project management philosophy.

The study also reinforces the importance of authentic, real-world learning experiences in higher education. By embedding industry collaboration and iterative feedback into the curriculum, the framework aligns with constructivist theories of learning and supports Freire's (1984) call for education that is relevant to students' lived experiences.

6.2. Practical implications

From a practical standpoint, the scaffolded assessment framework offers a replicable model for other higher education institutions seeking to enhance student engagement and employability. The use of real-world challenges, industry-set assessments, and iterative feedback mechanisms mirrors Agile principles and prepares students for the dynamic demands of the modern workplace. The positive student feedback and improved attainment outcomes suggest that this approach not only enhances academic performance but also fosters critical soft skills such as teamwork, communication, and adaptability.

The study also highlights the importance of consistency and clarity in scaffolded support. As noted by Stanier (2015), mismatches between tutor and student expectations can undermine the effectiveness of scaffolding. Therefore, institutions adopting this model should ensure alignment across modules and academic years, with clear communication of assessment criteria and expectations.

Furthermore, the integration of Agile tools and techniques into the curriculum such as Jira, Trello, and Planning Poker provides students with hands-on experience that is directly transferable to industry settings. This practical exposure, combined with reflective assessments and peer feedback, equips students with a holistic understanding of Agile project management and its real-world applications.

7. Conclusion

Agile methodologies are increasingly recognized as essential for graduates entering dynamic work environments (Greenburg et al., 2022). Teaching Agile to undergraduate students can help to build knowledge of Agile technicalities together with soft skills, increasing their attractiveness to employers. Teaching Agile effectively can equip students to adopt a dynamic, collaborative, and customer-focused way of working. In particular linking industry with teaching Agile creates a mutually beneficial relationship between students, academics, and employers. For industry, organisations can gain access to bright talented students, sparking new idea creation potentially helping them to remain competitive in their respective markets. For students it ensures that they gain relevant, practical skills making them more employable in various sectors. It prepares them for effectively contributing to high-performing teams and provides opportunities to work on real-world projects that simulate industry challenges.

Continuous feedback, learning from failures and incremental improvement were key parts of the modules in the case study discussed in this paper that assisted in fostering Agile ways of working amongst students. Through the modules students gained hands-on experience in managing sprints and collaborating in a team to produce an end-product, all of which contributed to increasing their overall engagement in the subject area. Such practical experiences are strong selling points in job interviews. Through industry links academics were able to ensure that teaching materials were in line with current industry techniques and standards, students were actively engaged, and the assessments were relevant to real-world situations. By considering understanding, experiencing and application in a scaffolded assessment framework students were able to be actively engaged in their learning experience and gain hand-on transferable workplace skills. Studying alongside their peers in group-based project work helped to further embed and enhance knowledge and skills into their repertoire. The use of scaffolding in particular helped to structure assessments providing tutor, peer, and industry support during the learning journey.

This is ongoing research as future refinements to the teaching and learning techniques will be made and additional ways for linking industry and academia in the modules will be explored. Other future research could include the exploration of the use of AI to see how industry is now using this and the effect it is having on Agile teams in the workplace. The same teaching techniques employed at Aston could be replicated at other universities with a different cohort of students and results compared to ascertain challenges and opportunities. Learners could be prepared for larger scale projects and leadership roles in large organisations by the closer collaboration of different teams.

While the findings of this study are promising, several limitations should be acknowledged. First, the research is based on a single case study at one UK-based university, which may limit the generalisability of the results to other institutional contexts or international settings. Second, the evaluation of student outcomes was primarily qualitative, relying on student feedback and tutor observations, rather than longitudinal or quantitative measures of academic performance or employability. Third, the study did not include a control group or comparative analysis with non-scaffolded assessment approaches, which would have strengthened the causal claims regarding the effectiveness of the framework. Finally, while industry involvement was a key strength, the variability in industry partner engagement across cohorts may have influenced the consistency of student experiences.

Having Agile knowledge and experience can help to set job candidates apart from those without these skills. In competitive industries like technology, Agile experience on a curriculum vitae can signal to employers that a candidate is ready to contribute to Agile teams and projects from the start of their employment. As Agile continues to evolve and influence project management, having Agile expertise ensures that candidates stay relevant and competitive in the future job market.

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