Ensuring consistency and tracking for OHS onboarding for Engineering Final Year Students

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ABSTRACT

CONTEXT

Occupational Health and Safety (OHS) training is critical for the well-being of all staff and students in the Engineering Faculty, where every year over 700 students undergo department-specific inductions for their Final Year Projects (FYP). The variety of training approaches, combined with interdisciplinary student teams and paper-based documentation, leads to significant logistical challenges and complicates compliance and tracking. This underscores the need for a streamlined and integrated OHS onboarding induction within the faculty.

PURPOSE

This practice paper aims to discuss the streamlining of the OHS induction process in the Engineering Faculty by developing a consistent, trackable, asynchronous online module. Motivated by the need to efficiently manage the large volume of inductions for FYP students and new staff, this self-paced module will standardise training, enhance safety, and improve compliance, while reducing the need for repeated scheduling.

APPROACH

This practice paper explores the need for streamlined OHS training for students to reduce risks and ensure compliance. Using the ADDIE model, we designed and delivered online modules through Moodle and H5P, consolidating existing content. A digital tracking system for OHS inductions was created with Frevvo, in collaboration with the university's IT department. Evaluation mechanisms were established to gather feedback from students and OHS officers for ongoing module refinement.

ANTICIPATED OUTCOMES

The online induction module launched for students in semester 1, 2024, and has been completed by 550 of the more than 700 enrolled students, thus fulfilling mandatory OHS requirements for FYP. Expected benefits include time savings, reduced accidents, improved traceability and improved safety compliance within the Faculty.

SUMMARY

This project shares insights and recommendations for developing a faculty-wide OHS induction program. It outlines pedagogical strategies for active learning and the process of digitizing OHS compliance forms (Khan, Egbue, Palkie, & Madden, 2017; Phillips, 2005) to improve compliance and visibility across the Faculty.

KEYWORDS

Occupational Health and Safety, Final Year Project, Online self-paced modules, onboarding

CONTEXT

Occupational Health and Safety (OHS) is a critical aspect of engineering education due to the inherent risks involved in working with hazardous materials, complex equipment, and high-risk environments. Engineering students, particularly those engaged in hands-on projects, routinely face potential dangers, making a foundational understanding of OHS principles essential for both their academic success and future professional safety. While the importance of OHS is well-documented in industries such as construction, manufacturing, and healthcare (Panik et al., 2024), OHS training in academic settings, particularly in university engineering faculties, has received far less attention in the literature (Paju & Kalle, 2015). This gap highlights the need for more focused efforts to ensure that engineering students are not only compliant with legal safety standards but also adequately prepared for the workplace.

Existing research primarily examines OHS compliance within industrial contexts, emphasising workplace safety cultures and accident prevention strategies (Panik et al., 2024). However, universities, particularly those with engineering programs, are increasingly recognizing the importance of instilling a safety culture among students prior to graduation. A strong foundation in OHS practices can significantly reduce risks during academic projects and provide students with a seamless transition into industries where safety compliance is paramount. Despite this growing awareness, there is limited consistency in how OHS training is delivered to engineering students, leaving a gap in both the literature and in practice.

Prior to the implementation of this faculty wide OHS training was conducted departmentally, leading to inconsistencies in the scope and depth of information provided to students. This challenge is especially pronounced in the engineering faculty as there are large cohorts of students and the new faculty-wide FYP allows students to work on complex, interdisciplinary projects. Addressing this issue requires a comprehensive, centralised approach to OHS education that not only ensures compliance but also fosters a robust safety culture within the academic setting.

Therefore, this project aims to fill this gap by developing a standardised, faculty-wide OHS training module for final-year engineering students. By aligning this training with both institutional goals and industry expectations, the module seeks to prepare students for the safety protocols and compliance measures they will encounter in their professional careers. This initiative also responds to the need for more streamlined and trackable OHS training processes across the Faculty of Engineering, ensuring that all students—regardless of their departmental affiliation—receive consistent, high-quality safety education.

PURPOSE

Despite the critical importance of Occupational Health and Safety (OHS) within the University, the Faculty of Engineering faced challenges due to a lack of a unified approach to OHS training and compliance tracking across departments. Historically, each department managed its own OHS inductions for staff and students, leading to inconsistencies in the training delivered. This decentralised approach became particularly problematic when onboarding over 900 FYP students annually. Each student required tailored safety inductions based on their projects, many of whom were unfamiliar with OHS protocols.

The interdisciplinary nature of many FYP teams, with students from various departments working under supervisors from different fields, further complicated the training process. For example, a team might comprise mechanical, civil, and electrical engineering students, yet receive OHS instructions tied only to the supervisor's department, often neglecting the specific safety needs of the project environment.

To address these challenges, this project aims to streamline and standardise the OHS induction process within the Faculty by developing a consistent, trackable, and asynchronous online training module. This faculty-wide, self-paced module is designed to ensure that all FYP students receive comprehensive and uniform training on essential safety policies, procedures, and protocols, regardless of departmental affiliation. By adopting an asynchronous format, the module allows for flexibility in delivery while reducing the need for repetitive scheduling of live induction sessions, thus enhancing the overall efficiency of the OHS training process.

Beyond addressing logistical challenges, this initiative has a broader educational objective: preparing engineering students to meet industry safety standards. By aligning the training with industry-specific OHS practices, the module equips students with the practical knowledge and skills necessary to navigate safety protocols in their professional careers. This standardised training fosters a safety culture within the Faculty, ensuring students are industry-ready and capable of adhering to stringent OHS requirements in their future workplaces.

APPROACH

This paper presents a practice-based approach, detailing the development of an asynchronous Occupational Health and Safety (OHS) online induction module within the Faculty of Engineering. The focus of the approach is to provide a comprehensive understanding of the instructional design process and the evaluation framework used to assess the effectiveness of the induction. This allows for insights and potential lessons that can be adapted by other institutions seeking to implement similar programs.

The project followed the ADDIE instructional design model—a well-established framework that encompasses five stages: Analysis, Design, Development, Implementation, and Evaluation (Abd-Hamid & Walkner, 2017; Spatioti, Kazanidis, & Pange, 2022). The ADDIE model was selected for its holistic approach, ensuring that not only were pedagogical principles addressed, but that the entire life cycle of the module, from planning to evaluation, was meticulously considered. This ten-month project, which spanned from initial scoping to final delivery, was grounded in active learning and asynchronous online design principles to enhance student engagement and effectiveness in a self-paced learning environment.

Analysis phase

The analysis phase began with extensive stakeholder engagement to ensure that the online induction module would meet the diverse needs of FYP students across the Faculty of Engineering. Key stakeholders included OHS representatives from each department and the FYP Chief Examiner, whose insights were essential in identifying core safety risks and training requirements. This phase had two primary components: **needs assessment** and **content consolidation**.

The **needs assessment** involved auditing existing OHS training practices across departments, revealing significant inconsistencies in how safety training was delivered. Some departments had comprehensive, structured inductions, while others provided minimal or informal training. This disparity underscored the necessity for a standardised, cross-departmental OHS training approach that could ensure all students, regardless of their department, received consistent and comprehensive safety instruction.

In parallel, the **content consolidation** process posed a significant challenge. Each department had its own set of materials, ranging from PowerPoint slides and Moodle sites to policy documents, with large disparities. The task of gathering and unifying these resources into a coherent structure took several months. It required meticulous review to ensure key OHS principles were consistently represented across all departments, while still accounting for the diversity of engineering projects.

With these insights in place, the analysis phase concluded by establishing a clear design plan. This plan outlined the business objectives, project scope, and technical requirements, while also ensuring that the module catered to the diverse audience within and beyond the Faculty of Engineering. This foundation set the stage for the next critical phase: design.

Design phase

The design phase focused on leveraging active learning strategies and best practices in asynchronous learning to create an engaging, self-paced OHS training program. Modules were structured around core OHS principles, such as risk assessments, emergency protocols, and safe handling of hazardous materials. Interactive content, including videos, quizzes, and real-world case studies, was integrated to enhance retention and promote practical application of safety knowledge (see Figure 1).

Key design elements included:

- **Branching pathways**: Separate pathways for staff and students are required, as the module would eventually be shared to onboard new staff and PhD students after its launch to the FYP cohort.
- **Interactive elements:** Embedded interactive components throughout the online modules to provide opportunities for learners to practice their knowledge.
- **Embedded assessments:** Assessments within the modules were designed to require a 100% pass rate, with unlimited attempts allowed to ensure compliance and knowledge attainment.
- **Dual endpoints:** There are two potential endpoints for students; one for those not requiring a lab induction and an additional module for those who did.
- **Content tracking and restrictions:** Access to subsequent modules was restricted until the previous module was completed with a 100% pass rate.

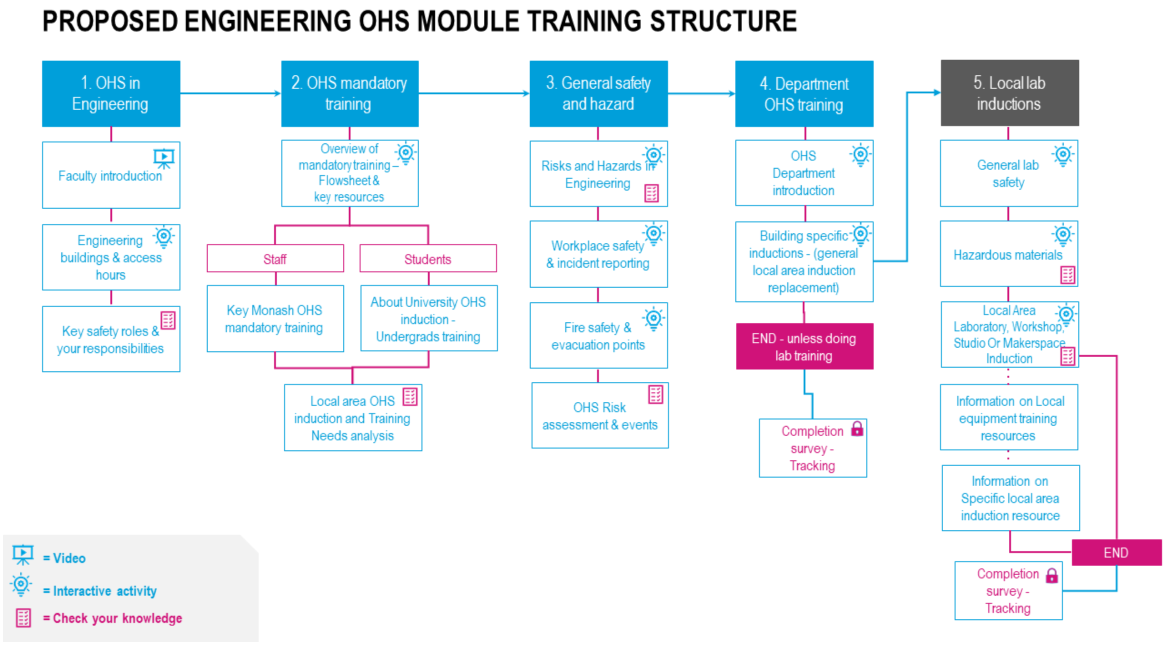

Figure 1: Engineering OHS Induction module design structure

Another critical aspect was ensuring that departmental Safety Officers could easily manage and update the Moodle site after the Educational Designer completed the module. This approach minimized the learning curve and avoided financial constraints related to software. The entire module was built in Moodle using H5P interactive books, allowing for an accessible and user-friendly experience.

We adhered to various instructional design principles, including Gagné's Nine Events of Instruction (Johnson, 2015) and Keller's ARCS Model of Motivation (Keller, 2010). Rather than merely reiterating policies, we aimed for an authentic learning experience using case studies and scenarios to reinforce safety knowledge.

To facilitate stakeholder engagement, we storyboarded all lessons and shared them with departmental Safety Officers for review. Recognizing the challenges non-educational experts faced in visualizing the final product from storyboards alone, we developed a prototype lesson to illustrate the expected output. This prototype clarified the rationale behind the storyboard structure and how students would interact with the content (Tripp & Bichelmeyer, 1990; Dong, 2021).

At the beginning of each lesson, we provided the module duration and learning outcomes to prepare students for their learning journey. An accessible table of contents enhanced navigation within the interactive book. We prioritized accessibility, ensuring compliance with WCAG AA standards. To further engage learners, we collaborated with a graphic designer to create custom visuals, which complemented the content and facilitated deeper exploration through H5P hotspots, reducing the need for lengthy text (Timbi-Sisalima et al., 2022).

We rewrote technical content provided by departmental Safety Officers into informal, easily digestible language suitable for an online self-paced learning environment (see Figure 2). Research indicates that the tone and clarity of e-learning materials significantly affect learner retention, especially for technical content (Clark, 2002; Clark & Mayer, 2002).

Overall, diverse instructional design principles were employed to develop an online induction program that allows students to learn OHS fundamentals at their own pace, equipping them with essential safety knowledge for their time at Monash Engineering.

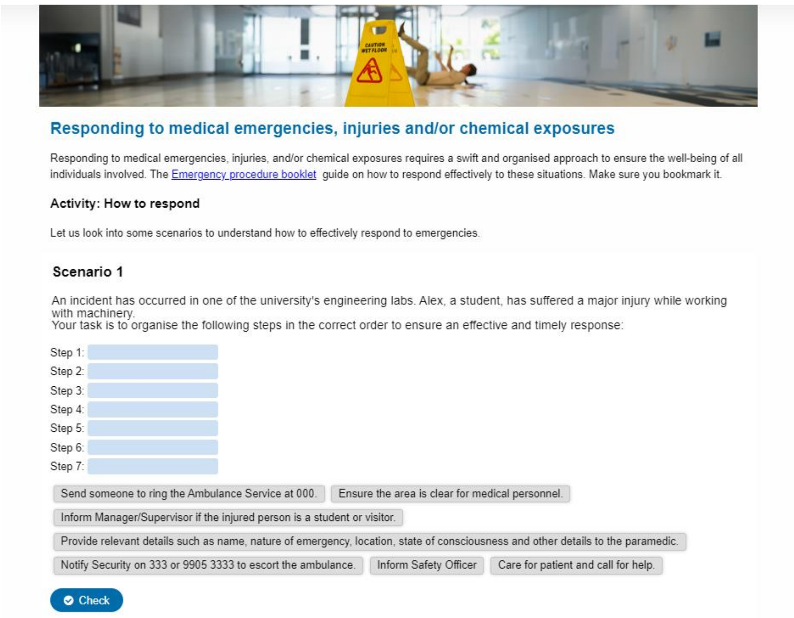

Figure 2: Excerpt of lesson using scenarios

Development phase

The design phase was the most time-consuming part of the process, requiring meticulous attention before progressing to the development phase. We ultimately developed 13 lessons, four module assessments, and a range of supporting resources, all while establishing a user-friendly design and navigation within the Moodle site. All lessons were constructed in Moodle using the H5P interactive book, and quizzes were created in Moodle Quiz to ensure trackability.

During this phase, we also developed a digital tracking system for OHS inductions using Frevvo, in collaboration with the university IT department. Our goal was to replicate the paper form previously used into an online digital form that required three levels of sign-off: one from the student, one from the direct supervisor and finally the safety officer of the supervisor's department. This task proved to be more complex than anticipated due to the intricacies of the software used.

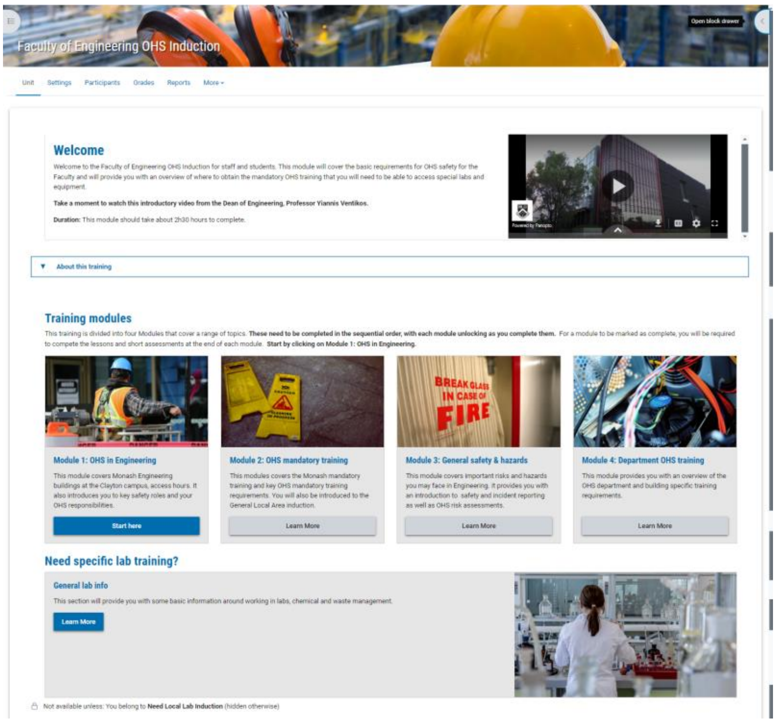

Figure 3: Induction landing page showing the navigation and customisation of Moodle.

Implementation phase

The module was introduced at the commencement of Semester 1, 2024, and was administered to approximately 700 final-year students. This initiative was the first of its kind where FYP students were provided with a singular, consistent source of OHS training. This online OHS module constituted one of five mandatory tasks each student needed to undertake to ensure a comprehensive OHS induction process for final year engineering students.

Historically, students were required to complete only two or three elements, including risk assessment training, department-specific OHS training, and laboratory induction if applicable. However, there was no centralised system for documenting these inductions, nor was there a standardised protocol for general faculty OHS training for students. This led to some students being under prepared for risks associated with general project work. Consequently, some students only engaged in general risk assessment training without a clear understanding of its integration within the broader organisational context.

Evaluation phase

As part of the project we conducted a feedback survey in Moodle for students to complete once they finished the entire online induction. The purpose of this was to gather students' feedback on the module, design, content covered and a range of other questions to help improve the module before launching an improved version of the training to FYP students and new staff to the Faculty of Engineering in semester 2.

To give a broader picture of the success of the training and to add richness to the student evaluations, we collected feedback from the OHS officers on the content. A feedback mechanism for them to provide us with any urgent changes or general feedback to improve the modules and lessons was devised. This allowed us to improve the module and ensure we were providing a relevant and engaging online induction.

OUTCOMES

The online Engineering OHS induction module launched in Semester 1, 2024, and has since been completed by 550 of the more than 700 enrolled students. Following this successful initial rollout, the module was further implemented in Semester 2, 2024. The project garnered recognition through the Dean's Award for Professional Staff, highlighting its role as a faculty-led initiative that streamlined OHS education and established a centralized tracking system that had previously been absent.

While this data shows there is a group of students who are not doing the training, this is something the FYP staff are able to trace and support students who are struggling, whereas before this was implemented, no one had the ability to know definitively if this training had been undertaken.

Evaluation data collected from students via a Kirkpatrick Level 1 survey questionnaire enabled the design team to make necessary adjustments before the Semester 2 rollout. Unfortunately, ethical approval was not obtained in time to share these results in this paper. Using Kirkpatrick's Level 4 framework (Kaufman & Keller, 1994), we identified several lessons learned that could benefit others looking to implement similar initiatives:

1. **Prototype early**: Early prototyping is crucial for identifying and addressing potential issues.
2. **Effective committees**: Smaller, more focused working groups tend to be more effective than larger committees. The design phase was extended significantly due to the large number of stakeholders involved.
3. **Secure early stakeholder buy-In:** Gaining stakeholder buy-in is critical and can often be the most challenging aspect. Achieving consensus among diverse stakeholders is essential for success.
4. **Prioritize tracking and compliance:** Establishing robust mechanisms for tracking completions and compliance should be prioritized early in the project.

SUMMARY

The online Engineering OHS induction module has helped to enhance safety training within the Faculty while engaging learners through the diverse range of pedagogical and assessment strategies that encourage active learning. By streamlining the induction process, this initiative has significantly reduced the time spent on basic training, allowing staff to allocate more resources toward lab-specific instruction. Furthermore, it has established a consistent and centralized training framework for all Final Year Students, better equipping them for their projects and facilitating a smoother transition to workplace safety protocols.

Notably, this project marks the first implementation of a digital process for OHS compliance forms, alongside a centralized system for monitoring training completion across the Faculty. While progress has been made, further improvements are necessary to achieve 100%

completion tracking through the Frevvo form. Looking ahead, plans are underway to expand the induction program to include new staff and to refine the module based on participant feedback. The ultimate goal is to increase efficiency, reduce accident rates, and elevate safety standards within the Faculty.

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Acknowledgements

I would like to acknowledge the support of Seema Chugh, Moses Wan, Kathryn Kolo, and Katrina Mitchell for all their amazing work and support throughout this project. Without their efforts, this would not have been possible.

Generative AI was used to gain feedback on writing tone and clarity during final edits (Copilot). These outputs were considered, and some were adapted by the author; no direct substitutions of AI generated text were made.

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