A2 Part 1: Risk Management Plan

Digital Learning Spaces Enhancement

Risk Identification

Brainstorming

Implementing the Delphi technique by consulting another expert in Project Management (Dr. EeHui Lim), revealed that a major problem that can occur during the project lifecycle are delays in project deliverable/deployment.

Using a Root Cause Analysis Diagram (Ishikawa/Fishbone) several risks identified which cause this problem.

These are represented in the diagram under the following categories:

- Processes
- People (which are a resource)
- Technology
- Environment

Two of these risks: issues with vendors or supply chain distributions and software bugs resulting in malfunctioning features are further elaborated in the risk register.

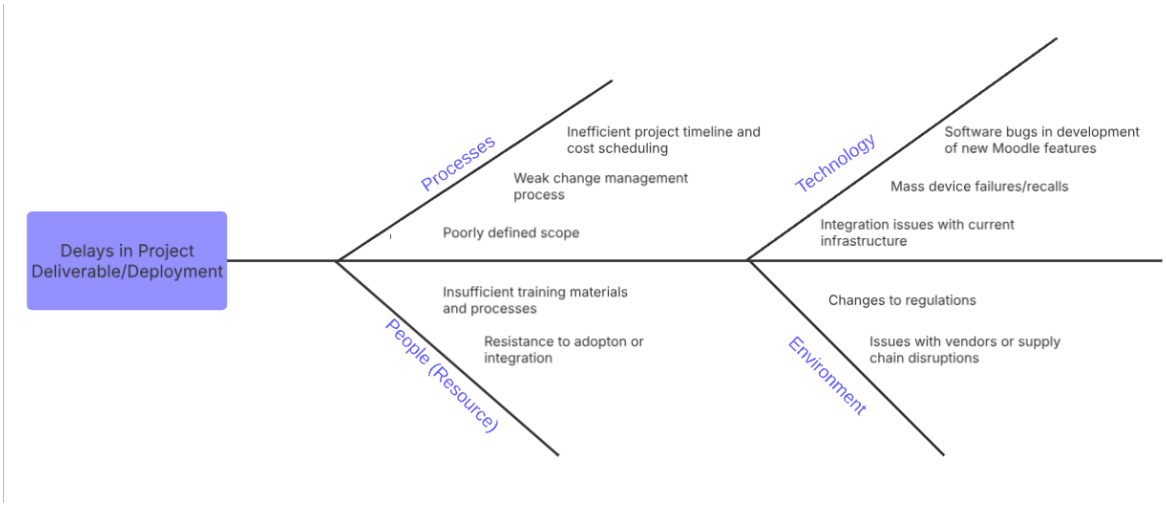

Figure 1: Root Cause Analysis Diagram of Project Problem - Delays in Project Deliverable/Deployment

Risk Register

RISK ID	RANK	RISK DESCRIPTION	IMPACT DESCRIPTION	PROBABILITY LEVEL	IMPACT LEVEL	PRIORITY LEVEL	RISK RESPONSE	RISK RESPONSE EXECUTION	OWNER
R01	1	Software bugs in development of new Moodle features	Software bugs in key functionalities like AI-driven video tracking and gamified quizzes could disrupt the learning environment and delay sprints by 2-3 weeks per iteration, extending the project timeline by 5-10%. This directly hinders project objectives of delivering accessible and engaging hybrid learning tools and affects Monash's strategic goal of leading in digital education innovation. Financially, bugs could increase costs by $10,000-$20,000 for additional testing and fixes. Reduced engagement from students and faculty may also harm alignment with SDG 4, which emphasises accessible and equitable learning environments.	5	4	20	*Mitigate: Automated Regression Testing and CI/CD Pipelines* Set up automated testing frameworks and CI/CD pipelines to ensure continuous integration and early bug detection. Reduces errors in critical features, such as AI-driven tools, by identifying issues early in the development cycle. Improves quality and efficiency by minimising manual testing and enabling timely, reliable feature deployment. *Transfer: Engage Third Party Specialists* Outsource testing to specialists for independent compliance and quality assurance. Ensures unbiased assessments of deliverables, leveraging expertise in accessibility and performance testing. Reduces internal workload and aligns deliverables with project objectives and stakeholder	Time: 1-2 weeks for setup and ongoing maintenance of test cases during sprints. Cost: $1,000–$5,000 for tools and licenses, plus additional expenses for training and infrastructure. Benefit: Improves software quality, reduces manual testing time, and ensures early bug detection (Gupta et al., 2019). -- Time: 1-2 weeks to identify and contract a provider, followed by 1-3 weeks for compliance and performance testing. Cost: $5,000–$15,000, depending on the testing scope. Benefit: Reduces internal workload and ensures independent, unbiased quality assurance (Fayezi et al., 2018).	Quality Assurance Specialist

							expectations, including accessibility and timely deployment.		
R02	2	Issues with vendors or supply chain disruptions	Delays in procuring critical hardware (e.g., interactive displays, conferencing systems) can result in cascading delays of 2-4 weeks in installation, training, and system deployment. These disruptions undermine the project's goal to deliver hybrid-ready classrooms in time for the new semester and prevent Monash from meeting its digitisation strategy milestones. Additional costs of $5,000-$15,000 for expedited shipping or alternative sourcing could further reduce budget flexibility. The inability to deploy accessible tools on time hinders alignment with SDG 4 and slows innovation, misaligning with SDG 9 and Infrastructure, which prioritises resilient, innovative educational systems.	4	3	12	*Mitigate: Conduct Vendor Risk Assessments* Evaluate suppliers' stability, reliability, and ability to handle disruptions by analysing financial health, delivery history, and contingency plans. Proactively identify reliable vendors to minimise delays caused by supply chain issues. Enhances overall supply chain resilience, ensuring timely delivery of critical components and alignment with project timelines and objectives. *Avoid: Maintain Buffer Stock of Critical Components* Procure and store critical hardware components early to prevent delays caused by supply chain disruptions. Avoid cascading delays in installation and training by creating a safety net for tight deadlines or task dependencies. Reduces the risk of missed deadlines and ensures	Time: Requires 1-2 weeks during the planning phase to evaluate supplier stability, financial health, delivery history, and contingency plans. Cost: Estimated at $1,000–$3,000 for administrative tasks or external audits. Benefit: Reduces the risk of mid-project delays and disruptions by identifying reliable suppliers early. Ensures supply chain resilience and supports project timelines and objectives (Christopher & Holweg, 2017). -- Time: Requires 1-2 additional weeks during the procurement phase to prioritise early ordering and arrange storage. Cost: Adds 5–10% to the procurement budget, approximately $3,000–	Business Analyst and/or Project Manager

							operational continuity, supporting project goals and stakeholder expectations despite external uncertainties.	$8,000, for early purchases and storage fees. Benefit: Ensures availability of critical hardware even during supply chain disruptions. Prevents cascading delays in installation and training, ensuring smooth project execution and alignment with deadlines (Ivanov & Dolgui, 2020).	

Risk Analysis - Rationale

Risk 01: Software bugs in development of new Moodle features

- Software bugs are a common challenge in development, particularly in Agile methodologies, due to their incremental and iterative delivery model. While Agile promotes rapid feedback and adaptability, it also increases the likelihood of bugs being introduced in successive iterations. Each new feature or change within a sprint may not fully integrate or be tested with the existing infrastructure, leading to potential compatibility issues. This risk is heightened for complex features such as AI-driven video tracking, which may perform correctly in isolation but encounter malfunctions or compatibility issues when integrated into broader systems (Gupta et al., 2019).

- Recent studies on educational technology implementations estimate a 4/5 likelihood for software bugs. The quantifiable impact of such bugs includes additional time for resolution, leading to deployment delays that negatively affect the project timeline and risk exceeding the planned constraints. Bugs can cause 2-3 weeks of delay per sprint, resulting in a 5-10% overall delay to the project timeline. Financially, these delays can increase project costs through extra testing and post-deployment fixes, estimated between $10,000 - $20,000 (Waseem et al., 2017).

- Bugs in critical functional requirements, such as AI-driven video tracking and Moodle quiz gamification, can disrupt deployment, hinder student engagement, and discourage teaching faculty for adopting and integrating the new features and technologies into their teaching delivery (Al-Azawei et al., 2019). This ultimately undermines the project's ability to meet its objectives, broader goals and success criteria for student experience (satisfaction and engagement).

Risk 02: Issues with Vendors or Supply Chain Disruptions

- Procurement challenges are prevalent in projects involving hardware components due to supply chain disruptions caused by global market conditions and vendor availability. The likelihood of this risk is rated as 3/5 (possible), though its external nature makes it difficult to predict. Vendor delays in delivering critical hardware, such as interactive displays or video conferencing tools, can significantly affect project timelines. Such delays cascade into the execution phase by impacting installation, system integration, and training schedules (Christopher & Holweg, 2017).
- Recent data from similar projects suggests a 30-40% chance of vendor-related delays affecting hardware deliverables, such as the installation of new digital devices to support hybrid and flexible learning models. Delays of 2-3 weeks per component can lead to a 2-4 week overall delay in the project schedule, depending on task dependencies like training and testing. To mitigate these delays, additional costs of $5,000 - $15,000 may be incurred for expedited shipping or transitioning to alternative suppliers (Ivanov & Dolgui, 2020).

- Vendor delays can undermine the project's alignment with its broader goals and impact its contributions to SDGs 4 and 9. Delays hinder the delivery of hybrid learning models, reducing accessibility and satisfaction for students and staff. Furthermore, infrastructure gaps, slowed innovation, and operational inefficiencies can add to the workload of IT support teams, compromising the project's goal to deliver efficient and modern learning environments (Fayezi et al., 2018). Ultimately, these disruptions threaten Monash University's reputation as a leader in educational excellence and its ability to meet stakeholder expectations for high-quality,

accessible, and technology-driven learning spaces.

Ultimately, these risks are potential threats to the University's position and opportunities as global leaders in educational excellence and advancing its digital teaching capabilities and its ability to meet stakeholder expectation for modern, accessible and efficient learning spaces.

Risk Prioritisation

Matrix

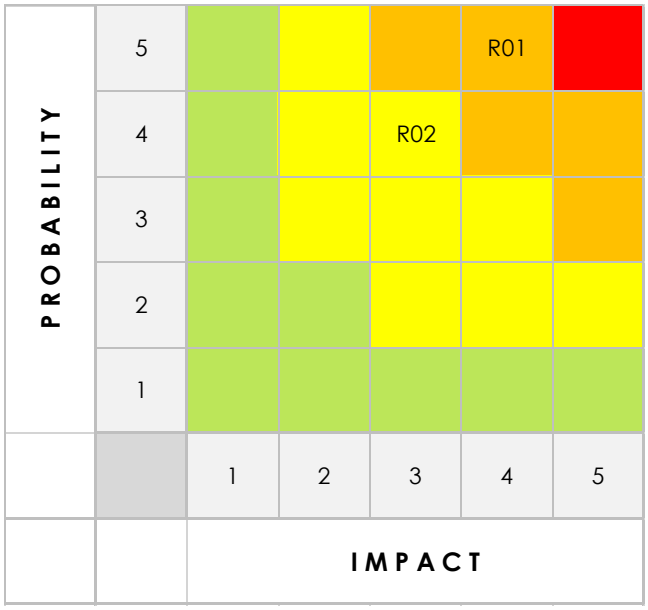

Figure 2: Risk Probability and Impact Matrix

Justification

R01: Software Bugs in Development of New Moodle Features

This risk is ranked highly due to its probability (4) in an Agile development environment, where rapid and iterative changes inherently increase the chance of bugs in complex functionalities. Bugs in critical features, such as AI-driven tools, have a high impact (5) as they disrupt deployment schedules, reduce the reliability of deliverables, and compromise user experience. These challenges directly affect project outcomes by delaying the achievement of objectives related to student engagement and hybrid learning capabilities. Furthermore, unresolved software issues undermine the University's goals of delivering innovative, high-quality educational tools and could reduce stakeholder confidence in the broader digitisation strategy.

R02: Issues with Vendors or Supply Chain Disruptions

This risk is classified as moderate (likelihood 3, impact 4) because vendor-related delays, while possible, are subject to external factors such as global supply chain conditions. However, their impact is significant, as delays in procuring critical hardware could cascade into disruptions in installation, integration, and training activities. Such delays threaten the timely delivery of hybrid-ready classrooms and compromise operational efficiency. This misalignment affects project objectives like meeting

accessibility and student satisfaction objectives and KPIs, as well as broader institutional strategies, such as Monash's reputation for digital innovation and alignment with SDGs 4 and 9.

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Generative AI Declaration:
OpenAI ChatGPT 4o has been used in this piece for research purposes, some anecdotal evidence, grammatical corrections, sentence structuring and enhance overall understanding.

References

Al-Azawei, A., Serenelli, F., & Lundqvist, K. (2019). Universal design for learning (UDL): A content analysis of peer-reviewed journal papers from 2012 to 2015. *Journal of the Scholarship of Teaching and Learning*, *19*(1), 31-45. https://doi.org/10.14434/josotl.v19i1.24166

Christopher, M., & Holweg, M. (2017). Supply chain 2.0: Managing supply chains in the era of turbulence. *International Journal of Physical Distribution & Logistics Management*, *47*(1), 2-21. https://doi.org/10.1108/IJPDLM-09-2015-0235

Fayezi, S., Zutshi, A., & O'Loughlin, A. (2018). Understanding and managing complexity in supply chains: A focus on procurement processes. *Supply Chain Management: An International Journal*, *23*(5), 337-361. https://doi.org/10.1108/SCM-08-2017-0265

Gupta, S., Sharda, R., & Greve, R. A. (2019). Intelligent systems in education: Applications and challenges. *Communications of the ACM*, *62*(5), 30-32. https://doi.org/10.1145/3331565

Ivanov, D., & Dolgui, A. (2020). Stress testing supply chains and creating viable business models for the COVID-19 world. *International Journal of Production Research*, *58*(10), 2904-2915. https://doi.org/10.1080/00207543.2020.1750727

Waseem, M., Shahzad, K., & Asif, M. (2017). Agile development: A step forward in software development methodology. *International Journal of Advanced Computer Science and Applications*, *8*(5), 252-258. https://doi.org/10.14569/IJACSA.2017.080531