Exploring Teaching Experiences With SPARK Using Augmented Reality and 5G Technology

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Abstract

This case study provides a unique lens into teaching experiences through the innovative project "Matariki Hunga Nui", which embodies co-learning with SPARK utilizing Augmented Reality and 5G Technology. In a transformative journey in design education, educators collaborate with industry partners to co-design live briefs aligned with course objectives. This project, a pedagogical innovation beacon, invites final-year Bachelor of Media Design students to form interdisciplinary teams. These groups, comprising motion designers, UX/UI specialists, and graphic designers, transcend traditional roles to embrace novel positions such as relationship designer, translator, behaviour designer, and visualiser, thereby nurturing an inclusive and dynamic learning environment. Recognised with a silver award in student and academic categories from the Design Institution of New Zealand, "Matariki Hunga Nui" demonstrates the power of experiential learning. The project aimed to revive Maori traditions in celebrating and appreciating the Matariki festival, utilising storytelling and augmented reality tools to locate the Matariki star cluster meaningfully. Educators facilitate co-learning and co-designing in studio-based settings, nurturing reflective practices through prototyping and design thinking. Agile tools enable iterative refinement, with ongoing evaluations before formal presentations. Under the program director's mentorship and with SPARK's collaboration, lecturers and students embark on technical exploration and hands-on experimentation, culminating in installations. The projects sourced from external entities offer invaluable insights derived from case studies and stakeholder perspectives. Educators evolve from knowledge dissemination to active mentorship, shaping student-led projects. This holistic approach equips educators and students with practical skills, fostering adaptability in design education's evolving landscape.

Keywords: Practice-Led Research, Autoethnography Research, Heuristic Enquiry, Participatory Design, Human-Centred Design, Digital Storytelling, Augmented Reality, Matariki Festival, Maori Practices, Co-design, Interdisciplinary Learning, Co-learning, Co-teaching, Industry Collaboration

Introduction

The purpose of this paper is to describe the process of implementing practice-led research, creative inquiry and industry engagement into the third-year curriculum of the Bachelor of Media Design (BMD) programme at Media Design School. There is a focus on practice-led research education, where a student gets the opportunity to design and work through whilst developing innovative solutions to complex issues. The program also focuses and innovations and research-based questions and activities: creativity, experimentation, reflection and practice are always at the forefront of this program. Also, the professionals are engaged in co-teaching, where different students get a chance to have interactions with their fellows, in addition to gaining insights on practices in the real industry and contemporary media contexts.

1. Positioning the Project

1.1 Interdisciplinary Group Project Component

Higher education institutions are found at the core of preparing students for professional life in today's world, especially in the digital and creative fields that change at the speed of light. The Bachelor of Media Design (BMD) of Media Design School provides a practice-led research model that engages students in designing, creative thinking, and professional practice. This climate of learning with appropriate modality promotes teamwork, problem-solving skills, and practical exposure of our students to fulfil their postgraduate education and professional goals. For example, the third year of the BMD degree combines these elements in terms of interdisciplinary group projects where in addition to enhancing their creative and technical aspects students receive key notions of project management and professionalism.

The interdisciplinary group projects in Media Design School as a third-year Bachelor of Media Design where the students work on an 8-week, 30-credit project that emulates a professional workspace. Working in teams consisting of students from different design disciplines, students are given a real-life client and task – a digital product or a campaign. With the basis of a client brief, students use creative thinking to address objectives and tasks for a real client, getting exposure to the client and professional requirements. It also acts as an opportunity to build important personality skills such as project management skills, communication, and teamwork which are so vital in the field of design. Furthermore, the principles of portfolio creation and studio organization are also introduced, which students find useful in their future jobs, or when managing a design studio. Contributing to the subject as well as other components of the third-year curriculum, this project prepares students for life-long learning and, if the student chooses postgraduate studies, thus lays the basis for the education of the graduates.

1.2 SPARK New Zealand

SPARK New Zealand is a telecommunications and digital services company that provides fixed-line telephone, mobile phones, broadband, and digital services such as cloud, security, digital transformation, and managed services. This collaboration is part of Te Korowai Tupu, SPARK initiatives. The initiatives strive to operate in a parity co-creative, co-design and co-partnership manner. Those guidelines sought by a Māori partnership are the frameworks that facilitate Māori to engage in the relationship. An essential concept that underpins Te Korowai Tupu is space – which ethnographically translates back to Spark and the communities. To

unlock the opportunity of shared space, therefore, Spark has opted to uphold the three beneath the Tiriti o Waitangi, namely Kaitiaki, Kawa and Kupungapere. Preserving and strengthening Māori individual and collective organizing phenomena such as whakapapa (ancestry), cultural practices, and taonga (treasured possession), including protocols, customs, and language by endorsing, supporting, and empowering local knowledge or mātauranga Māori. So, as we move into the new world of Tikanga in the digital environment, it is a significant and positive development of Tikanga and recognize that there are responsibilities that rest on all of us to protect our whānau members in this new frontier. This collaboration to co-partnership has committed resources to developing our rangatahi (youth), and a range of activities designed to increase their awareness, understanding and confidence in the digital world.

1.3 Collaborative Brief

As expected, due to the essentially open and fluid nature of the group project's format, Spark and Media Design School have written and agreed upon a specific brief for the project as well as co-taught the course. This checks that the project is liberal in its approach to creativity as a group project while at the same time promoting the practical, learning-by-doing approaches of co-teaching and co-learning.

The 'Brief' for the interdisciplinary group project is based on speculative design in which participants develop and design mock designs to depict design artefacts in practice. When students work together, they explore how the design impacts the future of society and violates conventionalist rules and regulations. A significant component of the work entails creating applications that augment physical experiences with 5G and augmented reality and honouring shared obligations to protect whānau in cyberspace as per tikanga (Māori customs). It also seeks to strengthen the relationship between Māori youth (Rangatahi) with riveting stories and technology as part of the mechanism to work with Spark. This process stimulates innovation as well as continued engagement within the community promoting the development of future generations of Māori leaders.

1.4 Matariki Hunga Nui Project

Matariki Hunga Nui is an AR application for Android devices, that aids the users in identifying the position of Matariki star cluster, preferably during the Matariki celebration, which celebrates Māori New Year.

Matariki is a time to gather. A time for sharing and collectivity, giving back to the environment, and being thankful. It is one of the opportunities for people to celebrate what makes a country outstanding. As the weather warms up and spring arrives, we want the people of Aotearoa to be invited to learn and celebrate Matariki with their families and friends. In regard to this project, the general objective of which is to create a virtual hub for Matariki, our whakaaro (intention) is grounded in the following whakatauki (proverb) 'Matariki hunga, Matariki hunga nui' which means literally 'Matariki has many devotees, Matariki unites people.' This whakatauki encouraged us to strive for a project that would unite people and fueled the name of our project.

Matariki Hunga Nui takes advantage of Augmented Reality to provide the users with interest and an interactive approach to how they can use the Te Waka o Rangi celestial navigation tool to identify the location of the Matariki star cluster in the dawn sky. With such knowledge

gained it will be our desire for people to gather with their loved ones just to appreciate the beauty of Matariki and make special memories out of it. The purpose is for people to use this knowledge to gather with those they care for to watch Matariki thus, forming interdependent partnerships between them, their environment and the seasons.

Figure 1: Representative Images of Matariki Hunga Nui Project in the Best Awards 2023 of the Design Institute of New Zealand

2. Co-designing and Research Method

2.1 Creative Thinking and Design Process

In a co-design context, creativity involves the choice of problems to solve, the generation of solutions, the assessment of these solutions, and the implementation of chosen solutions creativity involves two broad areas: exploration, where new ideas are generated and exploitation where ideas are applied (Bledow et al., 2009). Students' motivation must be incorporated in designing educational processes to address creativeness with the help of chosen individual distinctive features. This complex notion has changed from a narrow perspective of personal attention to considering global and community contexts (Choi et al., 2019), Therefore, it is crucial for design studies to develop both reflection and imagination for innovative solutions (Lin et al., 2021).

The Design Council's "Double Diamond" framework, which is discover, define, develop, and deliver, combines explicit divergence and convergence processes to address issues (Onarheim & Friis-Olivarius, 2013). The first part of the process is about creating a problem frame through direct communication with people struggling with it and the second is about generating and prototyping solutions through collaboration between potential users and designers. These design processes are inherently social, calling for debates among students, and teachers to gain insights into design strengths and, more importantly, weaknesses. Innovative designer performance is characterized by a high level of motivation, a positive attitude towards risk-taking and self-confidence in performing high-risk stuff (Cross, 2011).
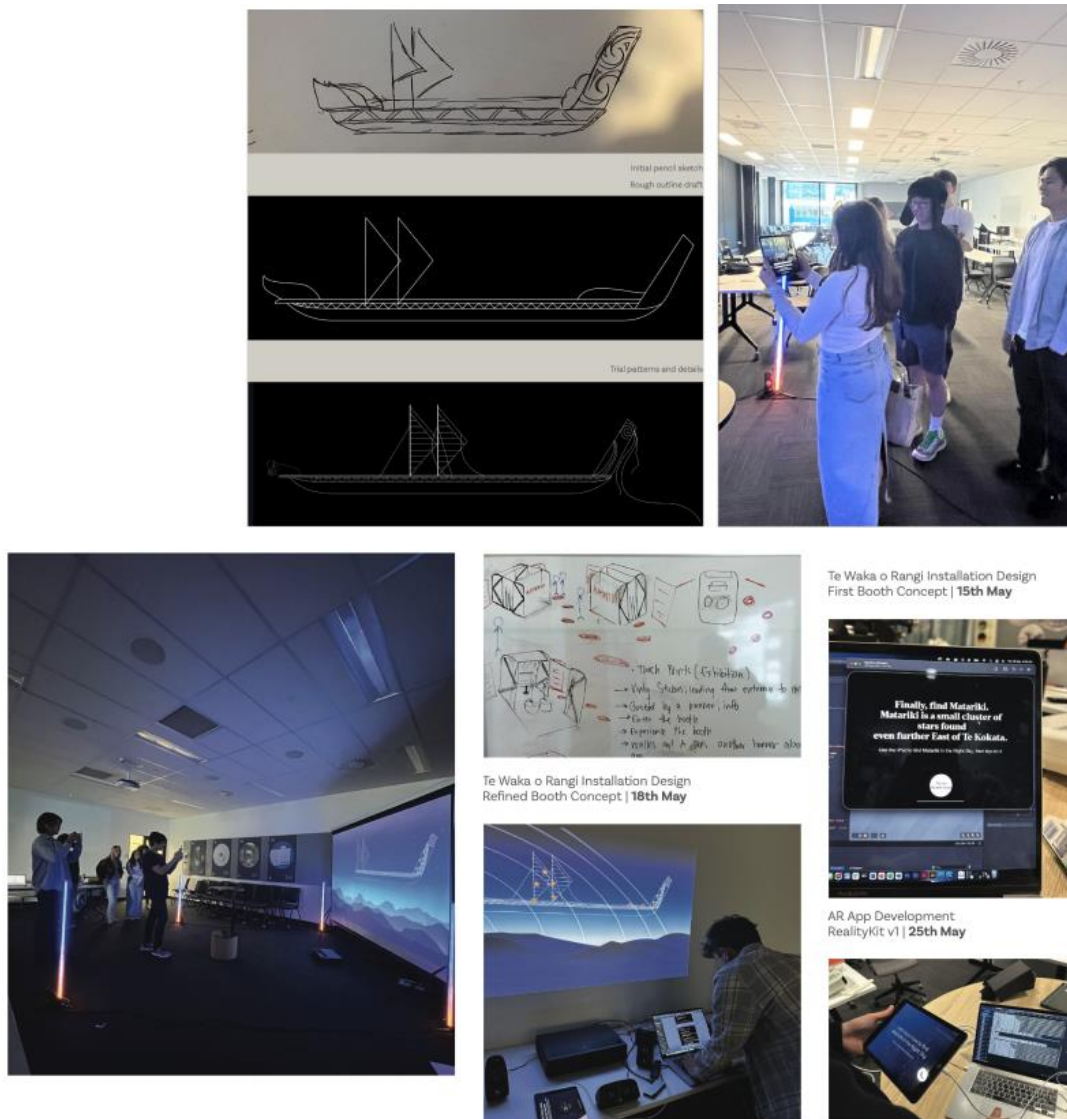
Figure 2: In-Studio and Presentation Session Photos Captured by Lecturers

These one-on-one meetings held within the group expose the participants to group brainstorming sessions which promote radical thinking as pointed out by Snyder (2014) in as much as ideas generated need to be innovative. Such closed-door meetings are conducted with invited participants restricted to just the lecturers and the team members and in keeping with the agile process espoused in the book by McGovern (2018) – feedback must be sought on the ideas being developed in an endless loop. nurse education promotes a risk-taking and creative environment that fosters idea exchange as found by Lai (2011) on creativity in a collaborative environment. Such collaborative construction allows students to augment what has already been said and think about their learning and performance all the time.

2.2 Participatory Co-design

However, participatory co-design is a powerful approach that improves collaborative design by engaging more users and being involved, protected, and appealing to others. Diversity enhances communication since there is opportunity in the discussion and everyone in the society has an equal chance to contribute (Duncan et al., 2021). Roles assigned for tasks respond to their performance, enhancing coordination with others and ensuring the contribution of each person (Cawood et al., 2022). Encompassing motion designers, UX/UI

designers, and graphic designers, relationships are extended to cover relation designers as well as behaviour designers; this fosters learning (Hernández et al., 2021). Engagement helps the members to post their ideas, and orientations provide focus in the group towards specific objectives.

Figure 3: Behind the Scenes Photos Captured by Students

2.3 Storytelling Through Auto-Ethnography and Heuristic Inquiry

Human-centred design focuses on motivation, universality, perceptible, realizable, attainable and safe objectives to satisfy the design requirements. It also helps grow a close link between designers and users since the user needs and experience is considered vital in design. Heuristic inquiry supports this approach by enabling team members to learn through modelling and reflecting on what goes on in their manner of knowing and reacting to enhance appreciation for design problems (Moustakas, 1990). It means that one always takes an attempt and trial at developing an effective design for the user and so enhances the possibility of providing a design that fits the user by repeating this process. Human-centered design and heuristic approach bring people together to respect the process of collective learning and embrace the plurality of ideas toward arriving at solutions that the clients find satisfactory (Brown, 2009; Schön, 1983).

Reconstructing user experiences in UX practices, creating the user journey map through visual storyboarding, and generating the personified user personas assist groups in using individual narratives to envision cultural meanings. Personal storytelling is beneficial for oneself and others, for gaining different people's perspectives, and for improving interpersonal relationships within a team, which will help explore identities and emotional aspects regarding design. This approach places personal stories in cultural contexts allowing for better discourse and enhancing cooperation (Ellis et al., 2011; Bochner, 2000).

The integration of these approaches therefore has the potential of greatly improving the practice of teamwork in design. Using auto-ethnography, the team members create a positive environment by revealing themselves and their experiences, established and appreciated at

work. This, in turn, fosters a heuristic approach, where the team members are proactive concerning searches and tests and, therefore, innovative. n sum, narrative through this methodology enhances not only design but also a stronger collaborative and shared language in the team (Buchanan, 2001; Frayling, 1993).
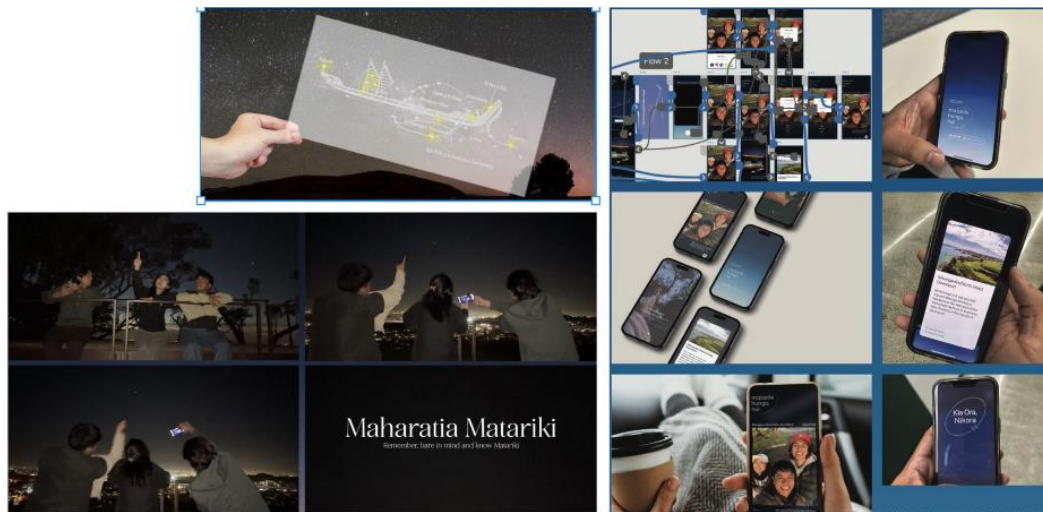

Figure 4: Documented Work-in-Progress Photos and Initial Prototypes by Students

2.4 Prototyping and Presentation

Two of the design processes that fully support the improvement of teamwork, and the further development of the ideas are the processes of prototyping and presentation. During work in progress presentation, everyone wants to share their progress with the team, thereby encouraging positive improvements. These sessions offer an opportunity to present what people brought into the work and have others point out what may have been missed, thus engendering ownership in the team members (Schön, 1983).

Prototyping is usually done in cycles and requires design review at various stages and hence involves the cycle of design and reviewing. This process also aids in the concerned area by channelling the early signs that need to be flagged: this helps in the refinement of the prototypes with the input of the users and relevant stakeholders (Brown, 2009). By synthesizing people's inputs into single feedback messages or using combined input, a group might develop unique ideas that can be easily merged into user-oriented solutions (Buchanan, 2001). In conclusion, the integration of prototyping, presentation and feedback is helpful in the promotion of interaction, and innovation, as well as the provision of effective usability and user-friendly digital solutions.

Figure 5: Interface and Augmented Reality Prototype for User-Testing,
Documented by Students

3. Co-learning in Hybrid Environment

3.1 'MyLearn' Learning Platform

The 'MyLearn' is a portal where the students can log into a live synchronized class, for real-time participation in the discussions, and for watching recorded lectures. It allows for verbal and written feedback to be provided to supervisors or mentors as well as facilitating one on one or a group meeting. The platform also provides direct links to the lesson plans, learning resources, program outlines, assessment guidelines and grading systems to provide the same chance to both face-to-face and distance students.
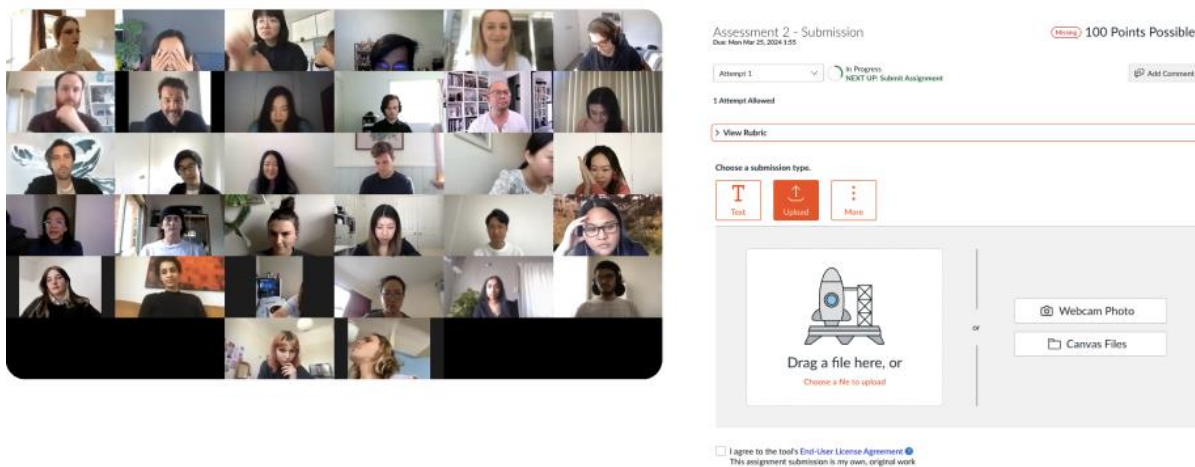

Figure 6: Screenshots of the Learning Platform and Virtual Class Sessions Captured
by the Lecturer

3.2 Virtual Classrooms and Physical Studio on Campus

The cohort is estimated at approximately 60 students, traditional and fully online. Classes take place from Tuesday to Friday, from 8:30 AM to 11:30 AM, except for Mondays when the students work independently. Although classes are delivered in physical classroom or studio lab in the institution, the my learn platform offers a live stream for remote learners to participate effectively (online). The virtual environment is installed with cameras and microphones to facilitate group meetings and discussion, live group presentations review, and face-to-face interaction between the physically present and zooming students. Such a strategy

means that the class is more open and a student, regardless of an emergency or sickness, would be able to contribute to any group discussion or meeting held in the virtual classroom. Furthermore, the presence of outside auditors, and others from the SPARK project team, means that it is easy to enter into the virtual classrooms to participate in projects.

Figure 7: Photo of Lecture Room on Campus and a Screenshot of
Virtual Team Meetings in Microsoft Teams, Captured by Lecturers

3.3 Collaborative Digital Project Management Tools

Microsoft Office and Microsoft Teams as external project management tools embedded in the learning platform also significantly contribute to intra-organizational communication through video calls, class notices, direct messaging, and appointments with lecturers, program coordinators, SPARK participants, and learners. These tools facilitate the coordination of interactions to enhance interaction between face-to-face and virtual participants (Martin et al., 2018).

FigJam boards by Figma are very useful for the development and documentation of projects; students can work together on tracking the processes of designs as well. These interactive boards facilitate discussions and the ability to review ongoing work in projects while documenting progress as well as highlighting the flow of an idea through the design phase and iterative changes through the use of conversations, documents, and other interactive elements (Brown & Thomas, 2021). Figma and Resolume Arena also help in creating prototypes for apps and augmented reality (AR) 3D experiences to help students understand how their apps fit into interactive installations. Furthermore, 3D mapping technology serves

the project branding since it brings about visual parallax for screen-based backgrounds and distinct other visual additions (Jones et al., 2020).

The applied structure fosters teamwork and innovation because it takes advantage of modern technologies to co-construct progress and apprentice work using efficient digital platforms while at the same time affording documentation (Smith & Taylor, 2021).
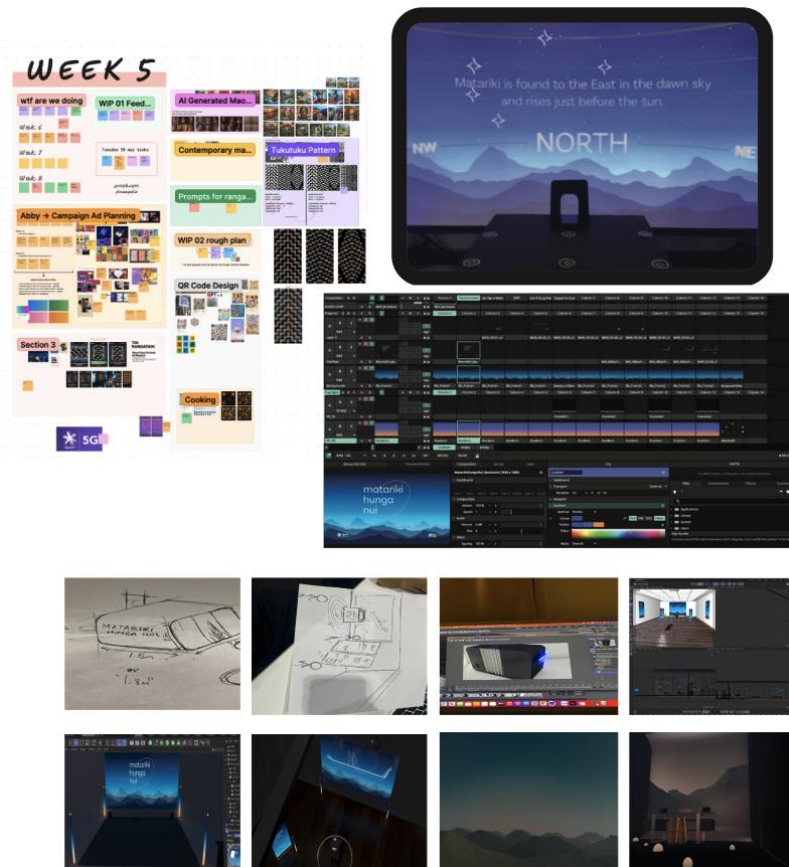

Figure 8: Screenshot Captured by Students of Digital Tools Used in the Project

4. Project Demo

Please view 'Matariki Hunga Nui' the documented augmented reality experience that brings people together under the stars of Matariki using this link or this address. https://bestawards.co.nz/toitanga/student-academic-toitanga/sam-oxford/matariki-hunga-nui/

5. Outcomes and Reflection

5.1 Effects of the Project's Creative Direction and Artefact Produced

The brand story was credible and emotionally appealing rather than only tied to the Matariki festival: it was an example of one Maori student's family culture. In essence, what remained essential to the telling of the entire story was togetherness and the joys of the now which, it indicates, preserves cultural identity. It added the value and importance of the star and which star form influenced the changing of the seasons in our lives, the meaning of the celebration.

Another important aspect of the project was the use of augmented reality: it was instrumental in the case of using the website. Thus, using graphics, the readers could follow the story at will by just finding and clicking on options, which gave them a great sense of ownership regarding how the story was exposed to the readers (Dodge et al., 2020). This interactive part was less boring than a traditional static text and combined the aspects of storytelling with a technical component.

In addition to the story, the project offered students valuable experiences of working in industry, realizing work cultures, and most importantly, exploring professional networks. It also helped them improve their design abilities and practice implementation during their studies by completing this task with time. The success of the project was also the result of its achievements at the 2023 NZ Best Design Awards where it was granted a 'Silver' in the Toitanga Student category.

Furthermore, the interaction made it easy to embrace consultative co-learning and co-teaching models within the course to promote a proactive and engaging learning culture (Bishop, 2011; Durie, 2003). Thus, students and educators all benefited from becoming a part of those collaborative efforts by getting a chance to create a much more developed and responsive learning environment with a shared value of knowing and valuing each other's perspectives.

Figure 9: A Photo Taken During Best Awards 2023 Dinner Night

5.2 The Role of the Lecturer in Collaboration

Building trust is especially important in a co-learning classroom, in which the lecturer is required to foster an environment where all students – online and face-to-face – are engaged. This includes encouraging interaction in terms of producing reasons, arguments and opinions where all the learners in the cohort feel they are part of the discussion. However, lecturers need to ensure that participants using the online platform may not be overshadowed or discouraged from expressing their opinions which may lead to silence. These dynamics may not be always obvious thus the need for constant interaction, and active listening to the experiences of all learners (Bovill, 2019).

Apart from giving their trust, lecturers are indeed instrumental in the solution-finding process of their classroom. When they discuss and plan the user testing, they contribute to difficulties generally associated with the storytelling and the technicality's implementation. This often involves a physically close interaction between the lecturers and the students to solve various

simple technical problems that may arise during their practical assessment exercises. Such active participation fosters a dynamic learning model that creates space for the spirit of innovation and creativity (Kafai & Burke, 2015).

The third function of the lecturer is the supervising or facilitating of the teaching process. This involves adopting an ecological learning approach, allowing for adjustments and improvisations based on the group's responses and the class's learning pace (Dewey, 1938). By remaining flexible and responsive, educators can create a more effective and engaging learning environment.

For some lecturers, particularly those from diverse cultural backgrounds, engaging in research and knowledge development can be challenging. This is especially true for migrant lecturers unfamiliar with te reo Māori and Te Ao Māori, who may struggle to integrate this knowledge into their teaching. Yet, this challenge presents an opportunity for co-learning with students in co-design settings, where both lecturers and students can develop new insights together, enriching the learning process for all (Grosfoguel, 2011).

Additionally, lecturers must evaluate the goals, values, and time commitments of stakeholders, such as SPARK, to fully understand the benefits of collaborative efforts. This evaluation extends to understanding the objectives and aspirations of students, lecturers, and program leaders alike. By aligning the goals of all parties involved, educators can create a sense of accountability and ownership, ensuring that collaboration is meaningful and productive. Navigating these varied perspectives encourages the development of a shared vision, ultimately enhancing the learning experience (Freire, 2000).

5.3 The Role of Industry in Collaboration

Riki and Manu wanted to encourage other youth to experiment with creative technology and for this reason, getting involved in Media Design School was instrumental in co-creating a project with the user during the undergraduate level. It was their vision that the results of this intention would ignite intent from future learners that studies in design and creative technology will propel a new generation of Māori youth. It was their first encounter with collaborative learning and collaborative designing in the academic environment and they were receptive to the idea. They adopted the different briefs, assessments and academic standards; devoting their time during the semester to engage in discussions and contribute useful feedback. Students' activities were motivated by their willingness to explore more from the pupils as well as share their experiences and knowledge with the pupils.

Much of the knowledge, Riki and Manu from SPARK shared with the participants was well-received concerning the combination of information technology strategies and Māori values. They were able to learn how young designers rehearse the object of study and their feelings towards SPARK because these learners use 5G technology in their products. For SPARK, it gave a chance to get to know the emerging designers' needs and concerns as well as to perceive the cultural and technological divide.

An important point of the project was the inclusion of the Te Ao Māori (Māori paradigm) in the professional environment. This was important in eradicating general whakamā (shyness or hesitation) that participants demonstrated during the interaction making it easier for all of them to express themselves. In as much as none of the students was fully conversant with Te Reo (Maori language) the undertaking served to reduce their tension over Maori interaction.

By engaging with Te Korowai Tupu (SPARK initiative), they were able to bring Te Ao Māori and Te reo Māori into their professional practice, enhancing their cultural knowledge as well as touching their design profession (Te Riele & Tamaaru, 2010). But more than just helping the students understand Māori undertones, it also provided a precedent for their future employment in creative and technological dimensions.

Figure 10: Group Photo Taken During the Second Installation at
Spark Innovation Center, Auckland

5.4 Collaborative Process Model for Creativity and Execution in Design Courses

In design education, the students, lecturers and partners in industry, as well as the leaders of a program are all active participants in projects and negotiate their responsibilities within tasks based on the project context and the skills, knowledge and experience of all actors involved. Proposing an agile model (see figure) that acknowledges this element of creative and practical organization; one that breaks free from set conventions for a more diverse and productive approach to problem-solving that benefits the group's entire dynamic.

Mentorship Aspect: They supervise projects by addressing challenges promptly and effectively guide collaboration by establishing relevant learning tasks

Group Aspect: Group members inspire one another and provide necessary support, acting as a catalyst for creativity and innovation.

Learner Aspect: Interaction with lecturers, industry partners, and peers enables learners to clarify their motivations and build self-confidence.

Institutional Aspect: Embracing these dynamic roles, the collaborative process within design education becomes a powerful framework for fostering creativity and execution.
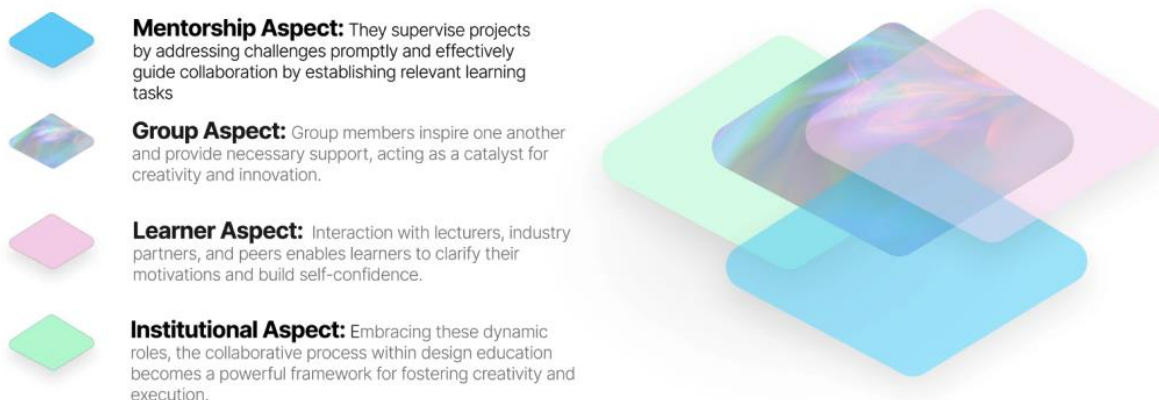
Figure 11: Visual Model of the Collaborative Process Creativity and Collaboration
Effectiveness in the Design Course

Mentorship is a foundational component in this setting. Mentors set the tone of the group discussions and the directions of learning collaborations arising from their setup of special

tasks as well as tackling hiccups when they occur. The mentor's role can be shifted based on the individual's skills, knowledge and experience based on the task and discussion context of the project. This kind of mentorship makes the learners feel controlled and safe while also offering a map to further creativity and usefulness (Schön, 1983).

Within the functions of a group, team, or organization, individuals encourage their peers to be creative and innovative within the team environment. Work harmonization does not only stimulate the generation of new ideas, but it also increases the overall creative capital of a group since any given member relies on the input of other team members (Brown, 2009).

Each individual involved in the project is considered a learner. The programme leaders, lecturers, partners in industry and fellow students get the opportunity to develop learning opportunities and develop confidence in what they take away from the project. Communication is paramount to developing new capabilities in learners to escape the paradigm of traditional knowledge and develop innovative solutions for a given problem. Such interplay is a part of the identity formation process and enables students to become creative risk-takers (Buchanan, 2001).

Lastly, from an institutional perspective, the fluidity and flexibility that these roles entail augur well with an effective and potent paradigm for creativity and production in design education. The implementation of flexible roles means that not only the students and mentors, but also the specific industrial partners and leaders of corresponding programs are involved in the creation of a more innovative, skillfully applicable, and professionally beneficial learning environment. This model is not only beneficial for students in terms of content but also good for their practice when they must engage in real-life design problems.

Conclusion

In conclusion, the presentation highlights the collaborative impact of the "Matariki Hunga Nui" project, a case study that combined augmented reality and 5G technology in design education to celebrate Māori culture. This collaboration organized between Media Design School and SPARK New Zealand allowed students to grasp the principles of co-design, narratives, and new technologies, as well as upholding Māori culture.

Incorporating the use of Māori cultural tools, and knowledge regarding Matariki as part of the project helped students extensively learn cultural storytelling through technology as well as give technology a cultural touch. This also pointed to the question of the integration of disabled learners into design education. The expectation evolved from the typical knowledge-provider mode of teachers to guides and enablers who fostered a sense of ownership over their work among learners. Such set-up – studio-based, co-learning – enabled trust and interaction, generating an active, reciprocal learning environment. With the help of augmented reality and the 5G network, the students were able to create interactive and culturally engaging story narratives. Through this exposure, they were able to gain industry-related experiences and experience a broadening of their creativity.

The success and visibility of the project evidence the value of this approach in using co-design, cultural respect and advanced technology as the road map for subsequent projects in the fields of design and technology education. This included positioning educators as facilitators and SPARK's Māori Development team acted as the industry partners through which the project was located firmly with the Māori cultural narrative that was beneficial and

showcased how the industry can partner with academia to foster inclusivity and improvement in design. The award won at the NZ Best Design Awards 2023 created credibility for this educational paradigm that uses co-design, cultural responsiveness, and technology integration as the competency-based model for design and creative technologies education as exemplars for other similar initiatives to consider.

All in all, Matariki Hunga Nui reflects a good case demonstrating how cultural heritage and advanced technology can enhance the learning process and experiences by bridging academic and professional skills along with cultural perspectives. This project shows the benefits of integrating industry collaboration, identity, cultural relevance and technology for a more inclusive and impactful design education framework.

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