Design and Technology Education: An International Journal
27.1

Landing your first job in Creative Technologies: Soft skills as Core skills

Ricardo Sosa, Aukland University of Technology, Aotearoa New Zealand
Rajiv Rajusha, Aukland University of Technology, Aotearoa New Zealand
Amabel Hunting, Aukland University of Technology, Aotearoa New Zealand

Abstract
Recent university graduates face an ever-changing professional landscape where it can be challenging to find jobs that lead to successful careers. This is particularly the case for emergent professions such as Creative Technologies, given the changing nature of technology and the value as well as the challenges of working across traditional disciplines. This paper presents a research project that seeks to help fresh creative technologists get better work opportunities in a changing landscape. Students, alumni, and industry experts were interviewed to identify current perceptions and practices, opportunities and challenges, and to generate insights that inform the design of future solutions. Three themes were identified from these interviews: unexplored existing opportunities, a demand for employability skills, and the need for better student-industry interactions. The first refers to opportunities that may already be available but lack sufficient recognition or need more visibility. The second points to the need of an ongoing dialogue between academia and industry to identify the changing landscape of skills in demand. The third highlights the need for creative collaborations across sectors and actors to increase the interaction between students and potential employers. The insights from this study inform the aspects that need to be addressed to design solutions that help Creative Technologies graduates start their careers in the right directions. The research raises new questions about why and how universities in the future can engage stakeholders to make the most of existing untapped opportunities and restructure processes to align with changing demands in industry.

Keywords
Creative Technologies, Employability, Research through Design

Introduction and Background
The influence of digital technologies is increasing as evidenced by terms such as the 'Fourth Industrial Revolution' (Schwab, 2017). This calls for technologists with advanced creative and transdisciplinary skillsets. The field of 'Creative Technologies' (Creative Tech) aims to prepare graduates who integrate practices and knowledge from various disciplines ranging from Computer Science, Design, Engineering, Entrepreneurship, and Fine Arts (Connor, 2016). This makes Creative Tech professionals prepared to go beyond traditional roles (Connor & Sosa, 2018; Giri, 2002) with the intention to generate new ideas and concepts and implement them into working solutions by bringing together a diverse set of skills across a range of technologies. In the short term, however, recent Creative Tech graduates can find it challenging to find career opportunities inside and beyond the creative industries where they can apply and continue to hone these transversal skills (Hearn et al., 2014; De Freitas and Almendra, 2021).

This study seeks to inform a design-led project to support the employability of recent graduates of Creative Technologies in Aotearoa New Zealand. The research originates from an identified need to better prepare work-ready graduates and connect them to industry, and an awareness of the challenges and limitations of conventional responses to enhance employability (Cranmer, 2006; Trevelyan, 2019). Graduate profiles of university programs in Creative Tech are typically oriented towards creative and critical uses of technology (Connor & Sosa, 2018). The Creative Tech skillset includes advanced technical skills across hardware and software platforms, collaborative teamwork capacities across specialties, creative prototyping, and a user-centred ethos to designing new technologies (Russel et al., 2008; Giri, 2002). The focus of this research is on the experiences of Creative Technologies students and graduates as they are a growing student body who remain under-represented in research to date.

The economic and cultural value of the creative industries is of strategic importance in countries like New Zealand and Australia where they are estimated to contribute nearly one-tenth of the Gross Domestic Product (GDP) and is one of the highest-growing sectors (Flew, 2019). In recent times, public policies have been implemented to strengthen the creative industries in New Zealand including the $60 million Cultural Sector Innovation Fund, the $70 million Creative Arts Recovery and Employment (CARE) Fund, and the $23 million Screen Production Recovery Fund. The skillset of Creative Technologies graduates is of strategic value for the sector in New Zealand as evidenced by the latest (2019) Long Term Skill Shortage List compiled by NZ Immigration[1] which includes occupations such as Multimedia Specialist, Film Animator, Web and Software Developer, and qualifications in demand such as Bachelor of Creative Software, Bachelor of Animation, and Bachelor of Digital Technologies. The fact that tertiary education providers in New Zealand have offered these occupations for the last ten years yet they are included in the skill shortages speaks of opportunities to better understand and address employability issues in fields like Creative Tech.

This research builds upon the existing literature on employability (Cranmer, 2006; Bui et al. 2019), future of work (Schwab, 2017; Gratton 2010), the gig economy (Healy et al., 2017). These areas inform the project's goal to examine how different stakeholders look at employability in this area, and how the nature of this type of work is changing in the local industries.

This research project aims to examine the existing challenges faced by students and recent graduates from the field of Creative Technologies to find appropriate entry-level jobs. The intent is to suggest pathways that will equip them with better career opportunities. The study informs a wider project that applies the methodology of 'Research through Design' (RtD) (Markussen, 2017) oriented towards creative action. The study frames the research question as a tentative design brief for this project asking:

> *"What do we need to know to better support recent graduates in Creative Technologies to find job opportunities that lead them to successful careers?"*

RtD methods link the problem-solving purposes of design practice with the knowledge-creation purposes of design research (Markussen, 2017). RtD leads to a systematic inquiry that takes

[1] Essential Skills, Ministry of Business, Innovation & Employment: https://skillshortages.immigration.govt.nz/

advantage of the unique insights gained through the design practice in an attempt to provide a better understanding of complex and future-oriented issues (Godin & Zahedi, 2014). RtD is generally defined as a kind of research relevant for design or as a kind of research for design that produces original knowledge (Findeli et al., 2008). Relevant RtD methods include project-grounded research (Grocott & Sosa, 2018), constructive design research (Koskinen et al., 2011), and practice-based (Koskinen et al., 2011; Candy, 2006). These research methods share an emphasis on the creative process being a "way of investigating what a potential future might be" (Zimmerman et al., 2010, p. 312).

There are three primary perspectives on employability. The first is at a macro/national workforce level (Almeida, 2007; Berntson et al., 2006; Lane et al., 2000) related to government policy or national-level skills agendas, or at an industry level (de Grip et al., 2004). The second is about employability in the field of human resource management related to the ability of individuals to get and retain jobs (Baruch, 2001; Forrier & Sels, 2003). The third is related to the universities being able to provide the graduates with skills that employers need (Mason et al., 2003). The work presented here can be placed at the centre of these areas on employability to understand the employability needs from industry, the career aspirations from graduates, and the education approaches from universities.

Design of the Study

This research stems from identifying a need to create better work opportunities for graduates of the Bachelor of Creative Technologies (BCT) program at Auckland University of Technology in Aotearoa New Zealand. The objective for this project derived from the research question is framed as:

> *To create evidence-based strategies to better support recent graduates in Creative Technologies find job opportunities that lead them to successful careers, and which specifically:*
>
> *1) Expose students to industry through opportunities for internships and employability*
>
> *2) Provide industry with early-career staff that have transdisciplinary skills and mindsets*

A research project was undertaken to examine the views, perspectives and experiences of those closely involved with the BCT program and the local Creative Tech industries to generate insights to design a strategy to support employability in this area. Due to its exploratory nature, the project was designed applying an inductive research strategy and adopted qualitative methods to help us identify the issues shaping the experiences of stakeholders. Due to the role of this research project to inform practice, a RtD approach was chosen making it action-oriented and aimed at designing creative solutions (Markussen, 2017). The data collected to inform a design response hinge on how stakeholders perceive work opportunities for Creative Tech graduates. To collect the data, we designed and conducted semi-structured interviews (guiding questions are included in the Appendix). A purposeful sampling strategy was selected to lead to a maximal variation approach for an in-depth exploration to inform creative design practice (Sanders and Stappers, 2012). The open-ended questions allowed the interviewees to elaborate their views without being constrained in terms of what the researchers may anticipate being the issues at play. To guide the process, an interview guide was formulated to assess and determine the set of questions (Mason 2004, Rubin & Rubin 2005).

A pilot study was conducted to inform the design of the interviews. This was conducted to understand the perception of participants of the research objectives and instruments, and to understand if these were the appropriate approach and participants for this research. Four pilot interviews were held with students and graduates. These allowed us to better understand the psyche of the target participants and expand the inclusion criteria to invite stakeholders. These consultations helped structure the design of the interviews and bring down their length to about 30 minutes. The strategy was to make general queries to understand how a range of stakeholders look at the research problem. The interviewer was an active listener to allow them to speak freely about their experiences and perspectives. The pilot interviews confirmed the value of including final year students and recent alumni, and they highlighted the need to also include industry experts who have hired and led projects with Creative Technologies graduates. The final interview protocol was set up and approval obtained from the university ethics committee. The interviewees were asked about their views on the core skills for a Creative Tech graduate, and the kind of companies that are a better fit for these skillsets. They were asked about how networking with professionals can be increased and how members of the industry could be better informed about their skillsets. The industry experts were additionally inquired about what profiles they would hire these graduates for. The interview questions were designed to give a sense of direction to the discussions and allowed participants to speak at length on the topics. With permission from each participant, the interviews were audio recorded and transcribed. The questions were kept open-ended and interviewees invited to elaborate their answers and include examples for clarity.

For the selection of students, a poster was displayed on their learning spaces. A brief about the research was shared with participants who contacted the researcher. A social media post also covered the aspects of the research and how it would be beneficial for everyone in the Creative Tech community, and it was used to reach out to alumni. The industry experts were defined as active professionals who have hired Creative Tech graduates and have led Creative Tech teams in industry or local government. We reached out to them through personal contacts and from the interviewees' suggestions. Participants who were a student of or worked with any of the researchers were excluded from the research process. Participant information sheets and consent forms were used in the recruitment protocol.

Participants expressed high interest and enthusiasm for the project. During the interviews they spoke openly and expressed their views, experiences, and perspectives. Interviews varied from 20 to 40 minutes and were held at the university premises. A total of eight participants were interviewed, three identified as male and five as female. Four were industry experts including the CEO of a digital agency, a technical and recruitment head, and a local council member in charge of Creative Tech projects. Among the student and alumni were an entrepreneur who had recently started their own venture and another with five years of experience as freelancer. All had experience as interns at small or large companies working in Creative Tech projects. We adopted an approach to saturation as considered relevant in Research-through-Design methodology, namely based on their sufficiency to form valuable design insights, rather than on data, theoretical, or inductive criteria as customary in social studies (Aguinis & Solarino, 2019; Saunders et al., 2018). In other words, saturation was assessed to the extent that it produced actionable insights to formulate a design solution (Caplan 2018, p. 351).

After each interview, the first author conducted reflective journaling to associate closely with the data. For analysis of the data, thematic analysis was used. Terry et al., (2017) approach of a six-phase analytic process of thematic analysis was used to analyze the data. Familiarization with the data was followed by creating codes; a preliminary set was prepared by the first author and discussed in iterative sessions among the three authors.

Results

These discussions between members of the research team helped draw and refine the initial codes into groups and identify the underlying meanings and differences between groups. While reviewing the grouped codes, multiples ideas started materializing, which would later take shape into more cohesive themes. Some of the major early groupings were about what they think the university needs to do (both from the students' and industry experts' perspective), what industry experts expect from a Creative Tech graduate, and the existing gap between these expectations and the graduate profile of the program.

Additional insights emerged on the existing student-industry engagement practices, what to do about them, and what is needed to better inform industry professionals about the skillset of Creative Tech graduates. These ideas were iteratively combined, divided, and connected to merge into three final themes discussed in the next section, namely:

Theme 1 – Unexplored existing opportunities

Theme 2 – Upskilling the Graduate's 'Employability Skills'

Theme 3 – Strengthening Student-industry interaction platforms

These themes are discussed with an emphasis on how they inform a RtD project. Based on the epistemological nature of this study, these results are presented following transparency criteria for conceptual replication rather than exact or empirical replication (Aguinis & Solarino, 2019). In other words, we expect these results to be consistent in future studies that address the same research question but may use different procedures.

Theme 1 – Unexplored existing opportunities

The first important theme to emerge from the interviews is about opportunities that are already available in this area but are not adequately or sufficiently recognized. This finding draws attention at what already exists, provides evidence of its value, and suggests ways to make the best of it.

Firstly, the interviews suggest that several graduates have been employed in roles that are more specialized or mono-disciplinary, rather than transdisciplinary. This option for Creative Tech graduates to specialise in a narrower and more traditional field is confirmed by the job title that many of them use to identify with in their LinkedIn profiles, including those of our participants: Interactive Art Installation Designer, Digital Designer, Software Developer, Interactive Video, and Game Developer. This is also consistent with the job advertisements commonly found at present in New Zealand employment marketplaces (such as seek.co.nz) using the keyword "creative technologies": UX UI Designer, Data Engineer, Front-End Web Developer, Digital Campaign Manager, and IT Tutor. Some of these positions are associated to more traditional Design, Art, or Engineering programmes rather than a transdisciplinary area

like Creative Technologies. To quote a recent graduate who had further pursued postgraduate studies and then gone on to start their own firm:

> *"In terms of the BCT graduates I do see a lot of people gravitating towards sort of single disciplinary jobs".* (Abel, recent graduate, entrepreneur)

Interviewees expressed that the reasons for this *gravitation* towards more traditional roles included that students who initially choose Creative Technologies, identified with more specific areas of interest as they completed their studies. Another reason was that the job market offers a limited number of entry-level positions that require a transdisciplinary skillset, so Creative Tech graduates may have to compromise and apply for the more traditional jobs available. Time and money pressures right after graduation seemed to have been a contributing factor as well in such cases. They stated that while some graduates were happy at the prospect of having landed a job, others can find these traditional roles unsatisfactory. A view shared among interviewees was that in the long run, working at such jobs can be underwhelming and unsatisfactory. When inquiring about whether Creative Tech graduates felt their transdisciplinary skills were not completely utilised at most existing work opportunities, Samantha, a BCT student, expressed their disappointment that not all of their skills were being used. To quote them:

> *"If I am going for a certain role I would still be very disappointed in myself because I have spent so much time and effort doing this and that and when I move out of it, I will get a job where I am only doing this. So, all those other efforts that I put into it for my course I paid for, I would be disappointed. Yes, and I don't want to go out looking for a job that has this one position.".* (Samantha, BCT student)

A second aspect related to unexplored existing opportunities is regarding the type of companies a Creative Tech graduate aspires to join. The recent graduates interviewed expressed their preferences to work at start-ups and smaller sized companies as they perceive this would help them hone their transdisciplinary skills. As a participant put it:

> *"Yeah, smaller companies and start-ups are by merit of being smaller and having, spreading the workload across a smaller group of people, have more need for sort of transdisciplinary skills of at least mindsets. I feel like bigger companies are much more, like if you intern for a bigger company, they are like you are doing this role, this is what like, there are so many pieces in play, they can't have, like it's harder to have people who are free floaters".* (Aaron, recent graduate).

Aaron expressed feeling similar to other recent graduates who felt that working at a start-up is more advantageous because they look for people who can fit into multiple roles and positions. This seems to lead to the inference that people working in smaller companies are more likely to have a transdisciplinary mindset. Additionally, they felt that large companies have very set processes and defined roles, which were less suitable for a Creative Tech graduate. This view was not shared by the industry experts interviewed. They did not consider that size of the company was a key factor for where the Creative Tech graduates should look for work opportunities. In contrast, they consider the biggest factor to be to work at a place where they can be mentored by an expert. One interviewee said:

> *"I think companies that are mid to well established with a good art director or senior design team available for guidance and mentoring".* (Susan, industry expert)

This insight coming from industry experience points toward companies in the creative technologies domain that have the bandwidth and expertise to provide students and fresh graduates with a level of mentoring that helps them nurture their skillset. Based on their size alone, small start-ups seem less likely to afford such mentorship opportunities. This insight would seem to require a change of outlook by Creative Tech graduates. Instead of aspiring to work predominately at start-ups or small companies they would access career advantages by working at companies where they can learn from seasoned experts.

A third aspect of the existing work opportunities that could be re-examined are internships. Currently, the BCT programme offers students varied opportunities, including internships, to give a leg up into the environment where they will work in the future. Internships help students learn professional work skills and network with people, which could go a long way in deciding how successful they are in their career. However, when discussing internships, a seasoned professional mentioned that the current model of internships in Universities may need to be re-evaluated:

> *"But I just wonder if the model of internship is outdated. And maybe that needs to be relooked at".* (Heather, industry expert)

The participants suggested that the model of internships, including those at place in the BCT, deserves more attention in future studies with the perspective that alternative models might work better for transdisciplinary students in the creative industries. One of the interviewees used the term 'project-based internships', where students ought to be associated with the internship for the length of the project and not be time bound as most current internships are. A "project-based internship" would take a person through the entire lifecycle of a project, thus simulating better the actual work conditions in the industry and it would be a better simulation of freelance work.

A fourth aspect of existing opportunities is exposure to an entrepreneurial environment, which most interviewees considered to be important. They expressed that the BCT learning experience already motivates students to think entrepreneurially, but more needs to be done to enable students to act upon their entrepreneurial intentions. As one interviewee commented:

> *"I think, when I first started the whole kind of idea around BCT, and what we were doing was the fact that we were building up for jobs that were not created and that a lot of the reason why we needed a kind of entrepreneurial streak is because the things that we wanted to do hadn't been made yet or they hadn't been offered as a job, or there wasn't a company that hadn't started that yet".* (Adele, recent graduate)

A graduate with experience as an entrepreneur, reflected that an external push was what helped him venture out and taught him the rigours of starting up their company. Interviewees suggest that entrepreneurship remains an unexplored opportunity for the BCT graduates and, by providing the right environments and platforms, it could lead to the inception of more start-ups in this area.

Participants felt that students could be more active in terms of reaching out to people to find the right work opportunities. Some also felt that companies could do more to make opportunities visible, but the prerogative was on the students and recent graduates. A BCT student though had a different perspective on this. She felt that industry wasn't very aware and confident about Creative Technologies and the transdisciplinary skillsets of these graduates, and therefore there weren't many jobs advertised matching their skillsets. As she stated:

> *"Creative tech is very new, you search up anywhere, there's barely any jobs out there. So, a lot of times people don't know, so they don't highlight in the job prescription what a candidate should have or not".* (Samantha, student)

It was argued that while transdisciplinarity is the forte for these students, they often end up in mono-disciplinary and more traditional roles. Reasons offered included own insecurities and a lack of non-traditional roles being offered by industry. Having exposure to multiple disciplines gives them the edge to also work exclusively in one of these disciplines if required and thus be employable in more traditional roles, although that is not perceived as a space where they use their full potential as Creative Tech graduates. Another aspect is that they might have an interest in a single domain and are utilizing the BCT platform to holistically understand how things work together. This would appear to be a manifestation of the multiple elective courses available and self-directed project briefs the BCT program provides to help students choose their own path. While working and growing in a uni-disciplinary role would build on only one skill, it would still allow these graduates to be in a better position than others if they need to pivot to other disciplines at a later stage in their careers.

In conclusion, start-ups are perceived by the students to offer roles with which they associate better due to their own entrepreneurial outlook. This is also because start-ups and smaller companies use digital technologies in more disruptive ways according to the interviewees. While this provides them with the opportunity to be at the fore of path breaking changes in technology, a lack of mentoring and learning at such venues might impact them negatively. Larger companies would afford them instead better support for growth and mentorship. Novel internship models that suit non-traditional transdisciplinary roles could also be explored, and the university could identify and promote ways for students to develop their entrepreneurial intentions.

Theme 2 – Upskilling the Graduate's 'Employability Skills'

While multiple industry experts expressed the view that the BCT graduates are highly skilled at Creative Technologies, they felt there is a need to upskill them to make them more employable. Industry participants identified collaborative, problem-solving, and professional work skills as the main areas of improvement for students to have an effective transition to the work environment. Professional work skills included communication skills, basic work etiquette, and networking skills. The industry experts expressed an expectation for a level of professionalism from the Creative Tech graduates who work with them. A recent graduate, recalling their internship experience acknowledged that industry placement helps in developing these skills:

> *"You start to learn skills that BCT can't offer. Just probably because they don't have enough time to teach us that. So, it's good to have. Professional skills, getting to ask questions to a professional one on one is extremely helpful, just kind of building those, kind of connections through that".* (Adele, recent graduate)

Being better communicators not only makes students more valuable for the company where they work, but also gives them a better start in finding more opportunities due to their improved ability to communicate their ideas and skillsets. An industry expert articulated:

> *"A really important skill I recommend people would have is how to communicate ideas. I have an idea, or I have an application or something like that, how can I communicate that's things effectiveness, how can I communicate that idea of that thing effectively with background information and reference and everything. So basically, being able to communicate ideas effectively at the very least".* (Jack, industry expert)

Basic work etiquette such as punctuality, email writing ethics, understanding how to address clients, track work and perform as a team member, were identified as the main professional skills that would help graduates stand out. An industry expert lamented the lack of these skills in some graduates who have had joined them and had created some embarrassing situations at work.

> *"I think it's a little bit of the soft skills. Someone who, I kind of class communication skills under professionalism, and basic professionalism as in showing up on time, giving fair warning if they are unable to come, being able to dress appropriately …, like what you want to wear, for example when we have an event or something and we are going to a meeting with a client we don't want to see like ripped shorts and bright red socks up to the knees sort of thing. I am giving that as a live example of something that's happened."* (Kate, industry expert)

The general perception among interviewees was that 'networking skills' would enhance the job-hunting effectiveness for students. The industry experts felt that the better the students get at networking, the more opportunities would open up for them. Another industry expert suggested that the students and graduates be more proactive in locating networking opportunities and to be prepared to introduce themselves, show their work, and connect with the relevant community.

Collaborative capacities and problem-solving skills were also deemed as strategic skills that the graduates should excel at. While these appear to be skills students tend to pick up during their years at university, the data from our participants suggests that more emphasis needs to be placed in developing these skills in students. When an expert was inquired what skills, they look for in fresh graduates this is how they defined "core skills":

> *"Core skills - I think that the biggest one is the ability to collaborate, which is from what I have seen in terms of design graduates across multiple disciplines is that this particular degree teaches, like its collaborative, its colab, like it teaches collaborative work more than anything else, so that's the one main thing is understanding, I would like purposely bring in a BCT grad for collaborative purposes".* (Heather, industry expert)

While it would appear that some BCT graduates excel in technical areas, there seems to be a need for some upskilling to be better at collaborative skills, problem solving skills, and to make them more desirable professionally. Notably, the way interviewees refer to these skills as "core" rather than "soft" helps to reframe conversations and initiatives to prepare Creative Tech students.

Theme 3 – Strengthening student-industry interaction platforms

The third important theme from the interview data was a result of participants stressing on the need for improving existing and creating new platforms for student-industry interactions. These include improving aspects of existing events and processes, as well as creating new venues and systems for students and industry personnel to interact. All participants see the university as playing a major role to address these needs. Interviewees agreed that the BCT program produces skilled graduates, and many of them further described these graduates as being better prepared than the average in the industry. Moreover, some interviewees reflected on the perceived advantages that BCT graduates bring to industry:

> *"When I worked with AUT grads that we had, they were miles ahead of what anybody else could do. Like there's not much of that happening in NZ, so I think that's actually the problem more than anything and I would be really sad for BCT students, if AUT thought that they had to change what BCT was, to conform to the industry*." (Heather, industry expert)

The first aspect the data analysis propounds is about changes to how the existing student-industry interactions are handled, with a focus to strengthen existing relations and establish new ones. One industry expert when inquired about what could be done at the university's end to create stronger student-industry relationships, mentioned the idea of creating 'industry allies'. These would be people who work with the university and their networks to promote more of such talented creative technologists.

Secondly, the university's engagement program with smaller to medium-sized companies is seen as needing strengthening. When inquired if the university should reach out to such companies, a recent graduate who had seen this closely, said it was difficult:

> *"Yeah, like the smaller sort of start-ups or sort of not start-ups but just beyond that, coz I know it can be quite daunting to engage AUT".* (Abel, recent graduate, entrepreneur)

The third aspect towards building the university's engagement with industry is to improve student-industry interactions by trialling improved internships models that monitor students' progress and learning. Talking about the importance of monitoring internships, one industry expert suggested that unmonitored internships could affect the student's wellbeing and/or be a waste of time. Another industry expert spoke about students not taking internships seriously, which affects the industry professionals' perspectives towards inviting students in future, and their relations with such educational organizations. Developing new internship models would help create long-term relations with industry while strengthening existing relations with companies.

The fourth aspect towards building the university's engagement with industry to improve student-industry interactions would be to assess the current events organised at the university. The current showcase is an annual two-hour event held after the end of the semester in November. Students from all years put up their work in the studio space for Creative Technologies. Industry experts interviewed expressed a high level of interest in the content of the annual show. At the same time, they mentioned that certain aspects could be refined, like the duration, location, and presentation to improve its impact. Recent graduates also spoke

about the constraints in time and space at the current student showcase which leads to the students losing a lot of 'punch' in their work.

Apart from the showcase, interviewees suggested that organizing events incorporating interactive elements like panel discussions or hackathons, with students leading some of them would help build platforms for student-industry interactions. An interesting aspect here is that such events were organised at the university earlier but were discontinued, potentially due to a lack of feedback from industry and other stakeholders about the value of such events. Another industry expert commented that seeing students involved in the organisation of events helped them to look out for students they might consider hiring as well. As Kate stated:

> *"I am a big believer in events doing a lot of good to showcase how good students could be, especially because usually the most competitive students are the ones who are there. I think that in a sense the interactive events, events where people are working together in groups to create projects like game jams, hackathons things like that. You can see the work and you can see the processes and the problems and problem solving. That to me has always been more, like I have wanted to hire people from seeing that".* (Kate, industry expert)

Lastly, interviewees suggested the need for a central repository that would display information about everything related to the creative technologies industry. This would be about events happening around Auckland where they could participate and showcase their work, available or upcoming work opportunities, developments happening and the latest trends in the industry, among other things. An industry representative also mentioned that they are quite often unsure of the quality of the interns they get and have to go by the word of mouth of their references in academia and a platform that helped them assess the skills of the students would be desirable. The interviewees generally all agreed on the strategic importance of growing a more comprehensive student-industry interaction environment.

A Design Response: An Employability Agency for Creative Technologies

The study presented here informs a Research-through-Design project that aims to produce an evidence-based and design-led strategy to support graduates in the Creative Technologies fields. The evidence produced in this study was analysed by the research team over multiple sessions applying the first "bridging strategy" of deriving design ideas from data as defined in generative design research (Sanders & Stappers 2012, p. 204). This process led to the initial synthesis of a type of "Employability Agency for Creative Tech" to support recent graduates in this area find job opportunities by practising and honing their core skills. While the insights produced by our study inform the design of such agency, this is only presented here as a strategy, rather than a detailed solution, which will be covered in future work. The design of such agency is undergoing a process of development. The feedback from participants and other stakeholder would help us validate and/or refine the final proposals for an Employability Agency such as the one tentatively sketched here.

Although we had initially considered a solution being driven by and for students, the study helped us discern a more complex picture where roles, responsibilities, and tasks go beyond the capacities and field of action of students. Rather than an agency being *student-led*, the views and ideas from interviewees suggest a comprehensive strategy led by multiple actors in a

variety of contexts to prepare students locate, apply, and get jobs where they can demonstrate their preparedness for Creative Tech careers. Industry experts also expressed their preference for more specific student involvement in the running of university-industry events. They identified situations where students can demonstrate their skills and dispositions as part of a larger picture of university-industry partnerships. In addition, all the interviewees felt that having students drive a comprehensive solutions such as an agency would be too taxing on them.

A second general insight from our study highlighted the need for systemic initiatives, and the importance of assessing their short and long-term impacts. The work required to connect students and recent graduates with adequate employment opportunities could be distributed among existing entities inside and outside the university. Some interviewees further pointed to the need for a dedicated team that coordinates and documents a range of ongoing and future activities to garner best results. Periodic monitoring of these initiatives by establishing a feedback system to reassess their effectiveness were deemed as essential to build inter-institutional knowledge.

The third general insight points toward synchronizing employment and entrepreneurial activities with the academic calendar for increased efficacy. This is primarily because students have their schedules aligned to the university calendar. Therefore, the planning around this work should be based on an annual academic plan with a semester-wise focus. Additionally, since the current annual showcase is held at the end of the second semester, the agency would do best to work around the existing timeline.

Actionable insights related to Theme 1
The interview data revealed several ongoing opportunities that could be more explicitly acknowledged, explored, and utilized. This theme asks for focused initiatives to identify such opportunities and measure their value. It also guides future employability strategies to aid students and recent graduates make informed decisions about pursuing them. The employability agency needs to work explicitly to identify such opportunities.

Based on this theme, the agency would first go about identifying specific companies and qualify the availability of opportunities there. Simultaneously it would interact with students and recent graduates and inform them about the value addition mentorship would bring in and about the long-term benefits of landing in transdisciplinary roles as against mono-disciplinary roles. It would highlight to the students the pros and cons of working at start-ups or larger companies. It would also guide the students on how to make the best of mono-disciplinary roles and the importance of realising the value addition they would undergo in transdisciplinary roles and discuss strategies about how to morph those positions they might land into, into positions with Creative Tech-relevant responsibilities.

Another aspect for the agency would be to explore internships primarily, but not confined to being ‘Project-based’ and work with the BCT leadership at the university to explore and evaluate them. The Agency would also work with them to bridge entrepreneurial thinking to entrepreneurial action by both identifying more university-industry partnerships and seeking internal changes within the program that would bring about this.

Actionable insights related to Theme 2

Akin all university graduates in general, an overall improvement is required to improve the professional skills of Creative Tech graduates. The reframing of so-called soft skills as being "core skills" for practitioners in this area stands out. An action plan around this would require tweaking the curricular and extra-curricular orientations of the BCT programme to incorporate such content in better integrated ways with the more technical content of the curriculum. The plan could involve learning outcomes aligned to develop these skills not as separated from the so-called hard skills as happens in most other undergraduate programmes. The plan could also attempt to get students involved in participating and running events where the integration of all core skills is put into practice in ways that are ascertained by industry representatives.

Based on this, the agency would need to devise and implement an assessment strategy of the core skills and their integration for industry to provide feedback and for students to improve upon and address. The agency could work closely with representatives from the university and with the BCT Leadership to develop a process that would help the graduates in identifying strengths and weaknesses in their core skills. Students could then be directed towards self-directed improvement activities, or work with the programme leadership to develop a schedule of activities to strengthen core skills identified. Personality development trainers could be contacted to develop a program structured specifically for the creative tech graduates. The direct participation of students in planning and running some of these events would be valued by prospective employers.

Actionable insights related to Theme 3

The theme focuses on the need for an improved student-industry interaction. The agency needs to work closely with the university, students, graduates and industry experts. Aspects that need work include the university's engagement program with smaller to medium sized companies, the need to finding and creating new 'allies' in the industry, the current annual showcase, introducing new events fostering high student-industry interaction and creating a central repository to act as an information centre both for the students and the industry. For this the agency would need to incorporate changes in existing processes and events.

Based on this theme, the agency could go out and identify and meet champions of creative technologies and nurture strong relations with them. The agency would reach out to these allies in future to develop stronger industry relations. It would also identify and work with smaller to medium sized companies and seek relevant employability and internship opportunities at these organizations. The agency would also work with the BCT leadership to inquire if a restructuring of the annual showcase could be a possibility, and if such an opportunity arises, work on the duration, content and audience. The Agency could also work with them to revive high student-industry interaction events like hackathons, meet-ups and panel discussions, some led by students. These events are highly recommended by interviewees and were held at the university but have since been discontinued, probably due to a lack of effective feedback from the industry. It would also work to create a central repository which would collectively over time, try to accommodate all the information about events, companies and other relevant opportunities for students. The central repository would also, over time, try and accommodate specific student related information, including their strength in different domains, details of their current and previous projects and the kind of projects they would be interested to be a part of in future, and possibly recommendations and feedbacks

about them from their peers and professors. This would help the agency over time to work with industry and students to connect them.

Discussion

This research grew out of a perception that transdisciplinary Creative Tech graduates were landing up with work opportunities that were not to their satisfaction or which did not utilise their skillsets completely. The inclusion of occupations such as Multimedia Specialist, Web and Software Developer, Animation, and Digital Technologies in the list of skill shortages defined by the government speaks of opportunities to better understand and address employability issues in fields like Creative Tech. This motivated a design-oriented project into understanding and tackling the employability issues in this area. A study to inform a RtD project was undertaken to create a design response to explore the issues and ideas to improve the situation in future. The study consisted of interviews with stakeholders and the interview data helped to inductively identify actionable insights to synthesise a tentative strategy for a future "Employability Agency for Creative Technologies".

The topic of this research elicited unexpectedly high interest from a range of stakeholders who play a range of roles and have different agendas and priorities. The topic also highlighted the sense of urgency and anxiety that students and recent graduates have in terms of finding the right work opportunities. Arguably the main result of this study was related to the lack of awareness about existing initiatives and opportunities that go unaddressed, or whose value is not sufficiently appreciated. Beyond the student showcase, in the past more interactive events were organised by the BCT including hackathons and meet-ups. Their dissipation could be explained by a lack of understanding of the value they carry for students and graduates. It is therefore highly pertinent for the creative technologies school and the university in general to be taking feedback from industry and other involved stakeholders.

This study also brought forth the idea about how certain ongoing initiatives such as internships, entrepreneurship and the university's engagement policies with companies could be relooked at to make them more relevant for all involved. It is important for the university to refine existing platforms to enhance their relevance over time. Further research to inform this would be an interesting area to explore.

While this study examined the employability of students and recent graduates of one program at a particular university, this research fits into a more general space. The development of employability as an agenda to be included in the graduate academic program is an area of existing research (Harvey, 2000). What fuels research in this space is the perception of students and recent graduates about them being industry ready (typically informed by an inadequately collected feedback from industry about what exactly the industry needs) and the argued gap between the capabilities of the graduate and the competency levels expected in industry (Almi et al., 2011).

The limitations of this study include a small sample size and a lack of validation of the design, both primarily an effect of the advent of the pandemic, Covid-19. Since saturation in this study was assessed to the extent that it produced actionable insights to formulate a design solution (Caplan 2018, p. 351), the number of participants does not majorly impact the study. The testing of the design response with the participants would have produced strong validation of

the study undertaken. The design response formulated from the results of this study diverges sufficiently from conventional approaches to employability training (Cranmer, 2006), including curriculum reform and formal assessment (Trevelyan, 2019). However, it remains to be developed in detail with the inputs from stakeholders and its feasibility and effectiveness assessed, which remains for future work.

The next phase of the study will take into consideration factors related to resources required to implement the strategy generated here. Future work will reach out to a larger audience by capturing quantitative data using a short survey which could possibly yield further issues to explore. According to the initial design of the study, additional interviews would have helped increase and refine the themes identified and could have helped elaborate the design solution in more detail. Despite these shortcomings, the study informs future work. The ideas towards an employability agency derived from this work could be examined in the larger context for related undergraduate programmes in the university and could also inform wider university-industry partnerships as well as entrepreneurial programmes. The project seeks new partnerships with other tertiary institutions in the region that offer courses related to Creative Technologies. We also plan to incorporate to our study a view derived from “teaching-learning ecologies” in the workplace (Bailey and Barley, 2010) given the current state of the Creative Technologies profession in Aotearoa New Zealand. The Covid-19 pandemic has had a profound effect on the work culture, with people having to work alone in isolation from their homes. This would certainly have affected creative technologists especially with the nature of their roles being transdisciplinary. This aspect could also be explored. We also plan to explore how core skills are valued in a post-pandemic work environment and if there is a perceived need among graduates for a type of skills beyond those identified here.

Lastly, given the increasing uptake of online and remote learning modes due to the Covid-19 pandemic, future disruptions in this area are to be expected. With increases in remote work and the automation of creative tasks, the study presented here could be valuable to continuously inform employability initiatives. Insights from our research demonstrates the value for universities to work closely with external stakeholders to make the most of untapped opportunities and restructure processes to align with changing demands in industry and society.

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Appendix 1

Interview Topic Guide

1. What are the core skills people look in a "Bachelor of Creative Technologies" (BCT) graduate?
2. What kind of companies are a better fit for the skill sets (focusing on the transdisciplinary skills) of a BCT graduate? (start-ups or larger well established companies)
3. What are the entry level roles BCT grads join into generally? Are these to the satisfaction of the graduates? What are your views on this?
4. What do you think the creative technologies industry is doing that is beneficial for the BCT graduates joining into the industry?
5. What are the advantages and disadvantages of internships or any other work opportunities during the study period?
6. What do you think could be ways to get more internships / work opportunities – Specific to the Creative Technologies domain?
7. What could be the advantages and disadvantages of Work-integrated-Learning for a BCT graduate?
8. How could members of the industry be better educated about the transdisciplinary skillsets of the BCT graduates?
9. How could networking with industry people working in the creative technologies domain be increased?
10. Would an event (like the current annual Showcase at AUT or other events that happen across Auckland, elsewhere) be a better exposure for the students to showcase their expertise and network with industry representatives?
11. How would you plan/shape organize such an event? Let's say you were the creative director for planning and organising such an event, that would..
    a. Help students showcase their prowess at what they do to the industry representatives in general.
    b. Help create networking opportunities for people working in creative technologies domain, students and university representatives and professors.
    c. Would such an event only be a "showcase" of what the students can make or will it be competitive.
    d. What would be the duration of such an event? A couple of hours or a whole day, or even longer ?
12. What could be other ways to increase industry exposure for the BCT graduates?
13. What profiles would you hire a BCT grad for?