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Merging work-integrated learning and research-based teaching in a Masters in Design studio (A collaboration with the Australian Paralympic Committee)

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Introduction: APC-UC collaboration

In 2012, the University of Canberra faculty of arts and design was approached by the APC to facilitate the start-up of long-term multidisciplinary design research collaboration between the two institutions. Through an in-depth discussion between the educational director of the APC and the heads of Industrial Design and Graphic Design, two initial design projects: design solutions for table centerpieces for the APC's Paralympian of the Year (POTY) awards ceremony and the research & visualization of the Australian Paralympic history through a series of poster designs, were facilitated and funded through a linkage grant. The initial outcome of the project was the generation of effective marketing collateral and original product and industrial design in support of athletes and the community involved in the Paralympic Games. However, the project also generated significant insight into the application of research-based teaching and design thinking in Graphic Design and Industrial Design. This paper outlines the process of work integrated learning facilitated through this project in an attempt to uncover the implied benefit of introducing projects of this nature at the undergraduate and postgraduate level.



Figure 1 Photograph of Paralympian and logo of the Australian Paralympic Committee
Source: Australian Paralympic Committee 2012

Combining research-based teaching, work-integrated learning and community outreach in design education

The three main activities in academic life and main components of any lecturer's work in most universities nowadays are teaching, research and service. It seems that most educators regard these as competing activities, one taking time from the other. As such, it is usual to find that most choose to focus mostly on research and teaching. Furthermore, in most research-oriented universities, excelling in research is desirable for one's academic development and tenure, even if this compromises one's dedication to teaching.

Coming from creative fields within the Arts & Design disciplines, with an awareness of the necessary naivety and optimism which fuels creativity, but without in-depth research (save for insights from personal experiences and informal discussions with colleagues), we think the synergy created between the three activities can provide an integrated and more meaningful creation and sharing of knowledge. This idea of integration of the three areas of academic life is summarized in Figure 2.

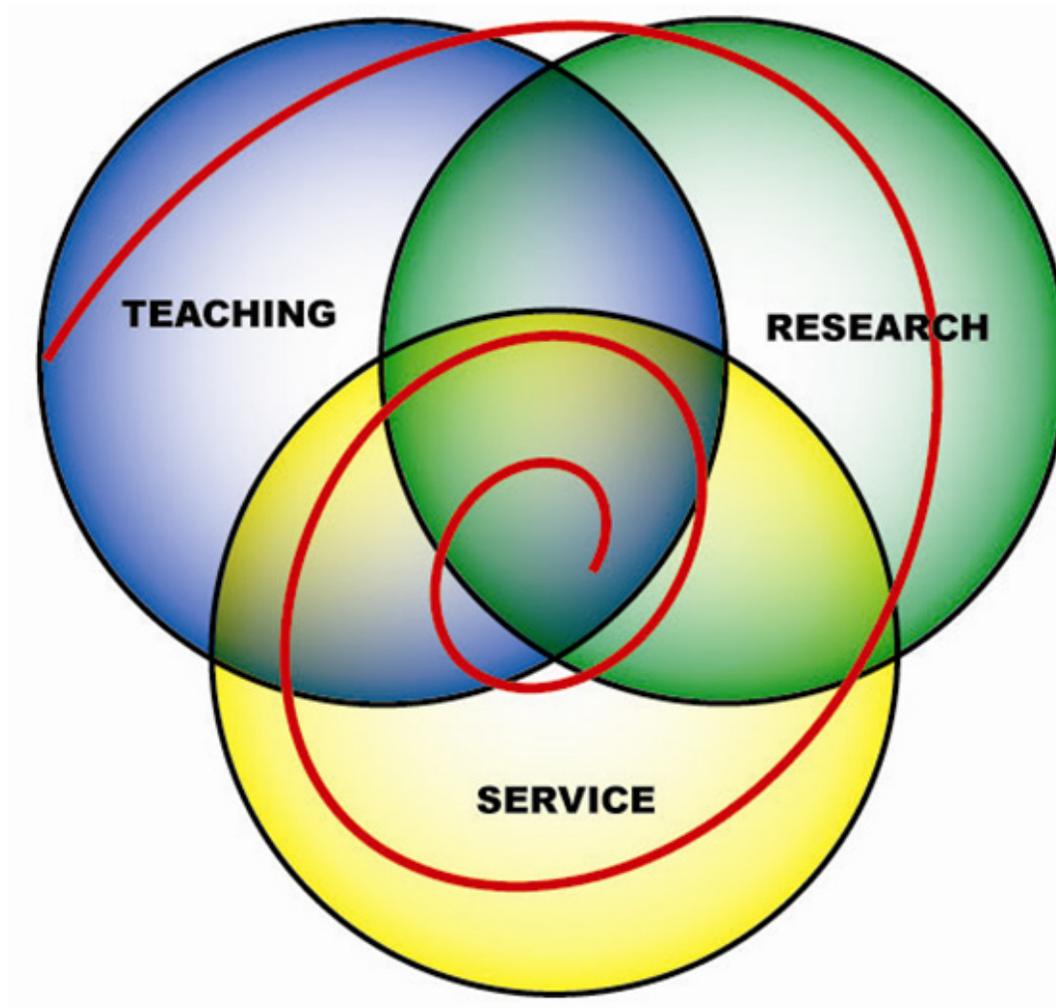


Figure 2 Integration of the three main areas of academic life

Source: Montana Hoyos, 2010

Many times the boundaries between disciplines offer the most exciting possibilities, as is

the case of Industrial Ecology, just to name a recent field of study that comprises seemingly opposite professions. The following are just a few possibilities of synergies between research, teaching and service:

1. Teaching-based research,
2. Teaching-based service,
3. Service-based research,
4. Service-based teaching,
5. Research-based teaching, and
6. Research-based service.

Research-based teaching is understood as teaching which not only trains students in lower thinking skills such as rote learning and memorization (as defined by many authors, especially Bloom and his taxonomy) but rather involves the development of higher order thinking, such as analysis, synthesis and problem solving.

Work Integrated Learning (WIL) can be defined as “situations where students spend time in a workplace setting, for example, ‘cooperative learning’, ‘internship’, ‘practicum placement’, ‘work practice’, ‘work-based learning’, to mention but a few (QUT p.1). WIL is not a new concept and has been employed in higher education for many years as a means to incorporate employability and ‘real life’ learning into the student experience. Many universities in Australia promote the idea WIL. The University of Canberra has adopted work integrated learning as one of its five “signature themes” for educational programs and is pursuing a comprehensive agenda to embed WIL as an important component of professionally-oriented courses at the University, such as the Design courses.

Practice-led research methodology in design

Historically, the design disciplines have borrowed methods from the sciences and the humanities, the two widely accepted areas of knowledge. In the book “Designerly Ways of Knowing”, Cross (2006) proposes that design stands by its own as a field of knowledge, separated from the humanities and the sciences. He argues this by suggesting that as well as humanities depend on literacy and their object of study is the human experience, sciences depend on numeracy and their object of study is the natural world. Different then from the humanities and the sciences, the “designerly way of knowing” depends on modeling, and its objective is the creation of the artificial world, as illustrated in figure 3.

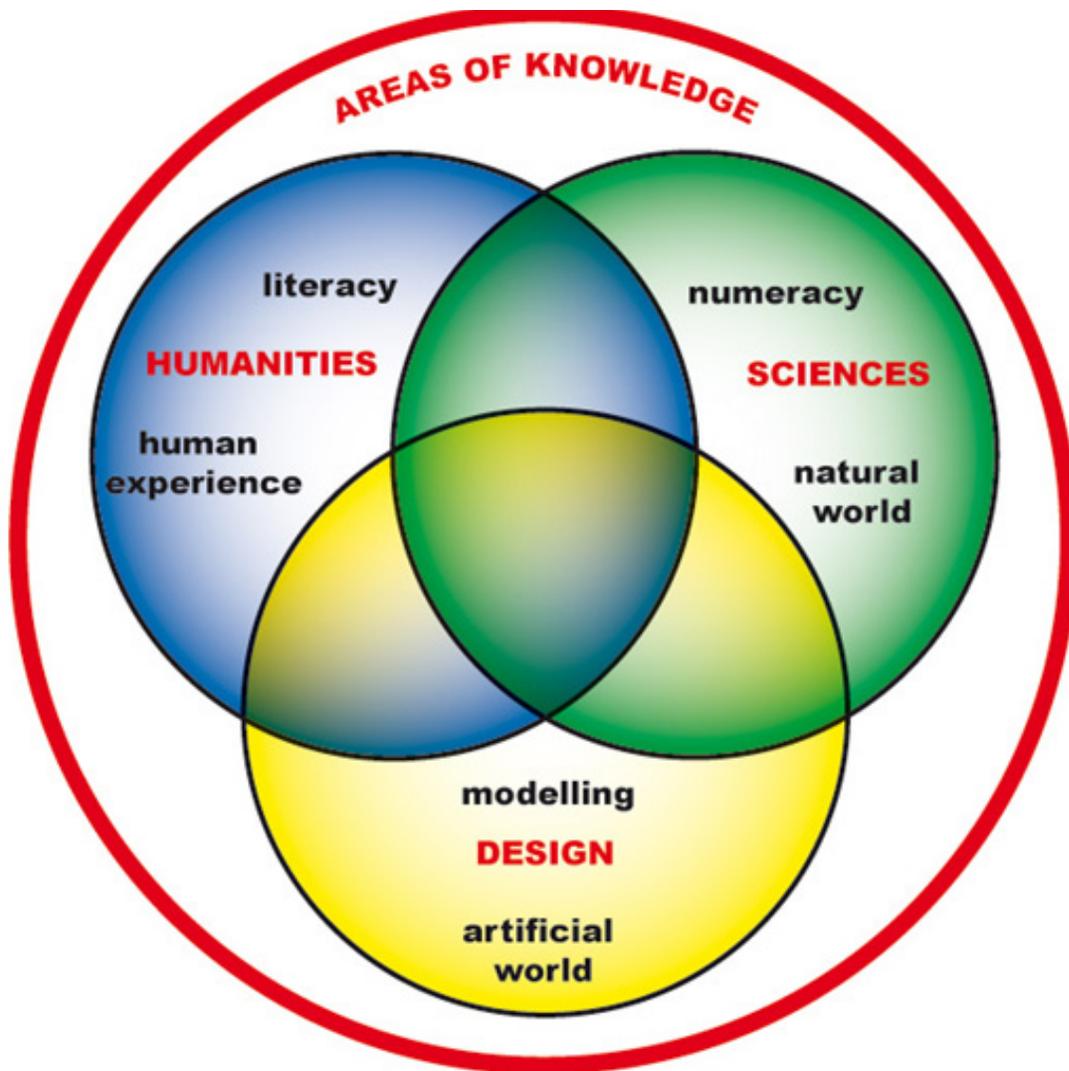


Figure 3 Design as an area of knowledge, based on Cross (2006)

Source: Montana Hoyos, 2010

Within the framework provided by Cross, we can see that research within the Arts & Design fields is evolving rapidly, with new modes of construction of knowledge through practice. There is no single definition of 'design research' (Frayling 1993, Laurel 2003, Downton 2004, Crouch & Pearce 2012). The most recent 'constructive design research' (Koskinen et al 2011) is defined as "design research in which construction - be it product, system, space or media - takes centre place and becomes the key means in constructing knowledge." Furthermore, Candy (2006) explains that "if the research leads primarily to new understandings about the nature of practice, it is practice-led." Within this context, we would define this project as a 'practice-led, constructive-design-research' project.

Within this project, 2 parts were developed as follows: Visualization of Australian Paralympic History supported by data collection from the archives of the APC (graphic design), and table centrepiece designs (industrial design) for the major biannual event of the APC, the POTY award. The overall research process for the entire project was completed in the following stages:

Stage 1: Review of literature regarding sports and design, marketing and promotion, community attitudes towards people with disabilities, community awareness campaigns and attitude change.

Stage 2: Application to a Linkage Research Grant

Stage 3: Development of each individual case study

Stage 4: Reflection on the design process and solutions

Stage 5: Dissemination of results through academic papers

Design thinking in practice – posters for paralympic games

According to the APC, whereas lots of motivational materials for the Olympics exist, there is not much in the way of motivational materials/display for the Paralympics. The APC felt that a poster set of this nature was necessary to both validate the achievements of past athletes and to motivate future/current athletes to achieve their goals. The aim was to create design elements for the Olympic village that could both educate and motivate Australian paralympians whilst being a resource that could promote understanding of the games to athletes and representatives from other countries. With a limited budget and timeframe, this resource needed to be easily duplicated, able to be viewed from a distance, have capabilities of being 'studied' to pass time between sports matches, as well as the possibility for future application as a display at in the APC offices in Sydney. In response to this brief, Dr. Scharoun created 13 colorful posters to visualise the Australian Paralympic history and used the process involved in the creation of these posters as a case study to teach the design thinking process to third year students in the unit: Professional Practice.



Figure 4 Example of a poster illustrating the History of the APC

Source: Scharoun, 2012

The design process involved in creating the posters evolved from a 'problem focused' design thinking process and can therefore be used as an effective teaching tool in showing the application of design thinking techniques in professional graphic design practice. Cross (2011) explains that designers are typically 'solution-focused' rather than 'problem-focused.' A "solution-focused" approach often allows for more innovative and human based results rather than process-based results that rely on scientific factors. "Creative thinking has tended to be regarded as mysterious, but new explanatory descriptions of creativity in design are beginning to emerge from empirical studies," explains Cross (p.17). "In particular, it no longer seems correct to promote the key feature of creative design as dependent upon an intuitive, heroic

'creative leap' from problem to solution. Problem framing, co-evolution, and conceptual bridging between problem space and solution space seem to be better descriptors of what actually happens in creative design."

Through dissecting the design process involved in creating the posters and showing the students a timeline of client interaction, research, documentation, budgetary requirements, evaluation process, audience testing (survey) and final design solution, students learn the key skills of design thinking. This, notes Cross, is essential in bridging the gap between "solution focused designers" and "problem focused designers." For the purpose of explaining design thinking and application in industry, the poster example was positioned in terms of design thinking process and was evaluated along the five steps in the design thinking process, as defined by IDEO. IDEO, a leader in Design thinking techniques, breaks the design process into five steps; Discovery, Interpretation, Ideation, Experimentation, and Evolution. Each step leads to a creative solution that solves a known or otherwise unknown problem. The poster example, therefore, was mapped to each step in the process (as below) as a means to show a research and thinking process from beginning to end.

1. Discovery: This involved creating meaningful solutions for people and begins with a deep understanding of their needs. Therefore thorough research into the Paralympic Games, the athletes and motivational graphics for past games was undertaken.
2. Interpretation: Interpretation transforms stories into meaningful insights. Research into the games, graphics and athletes motivational needs was then interpreted and observed to transition into actionable opportunities for design.
3. Ideation: Brainstorming and generation of concepts for the client was then attempted resulting in a variety of tangible solutions.
4. Experimentation: A design solution is created and then prototyped and tested on the client and end user. Even early and rough prototypes can evoke a direct response and help shape the design to further improve and refine the idea.
5. Evolution: The poster design is finalized based on client/end user feedback and placed in the environment (Olympic Games). The solution was then evaluated post-games by athletes for potential improvements. Based on the feedback the design was extended to be used as community engagement pieces and educational tools (for example, at the US Embassy in Canberra).

**Master's in design studio project: designs for the paralympian of the year poty award
2012**

For the second project, Dr Montana Hoyos and a group of 9 Masters in Industrial Design (MID) students from UC, from both first and second year worked together within a vertical studio project on design solutions for table centerpieces for the APC's Paralympian of the Year (POTY) awards ceremony, celebrated in November 2012. Based on an initial research about Paralympic branding and through the study of visual elements derived from the APC imagery and graphic material and the 2012 London Paralympic Games – including logos, architectural icons, landscapes and images of athletes in action – the group of students designed and managed the manufacture and distribution of 100 centerpieces, within the general guidelines and event design concepts discussed with the APC, as well as an external event-design & management company and the venue managers.

Briefly summarized, the design process of the centrepieces was as follows:

1. An initial meeting with the APC to define client objectives was shared with case study 1 (poster designs). In this 'discovery' phase, initial discussions informed the development of the design brief, which aimed for novel, beautiful and sculptural table centerpieces incorporating light, to convey the message of the Paralympic spirit, Australian identity and the context of London 2012 Paralympic Games.
2. Australian Paralympic gold medallist Peter Brooks gave an introductory lecture to UC-MID students. This session was very informative and motivational (as students felt great pride in designing for a 'national' team).
3. The students individually generated initial design concepts (ideation), based on their initial research. For example, many of the designs for the Olympic and Paralympic Games of 2012 were based on ideas of cultural identity and iconography of London. The Paralympic Games branding and logos also offered insight into what values needed to be communicated through forms, materials, colours and textures. Furthermore, by using as an example the history of the development of the iconic Olympic and Paralympic torches, the team of industrial design students explored ways of communicating culture and national identity through the design of a product.



Figures 5 and 6 Pin-up of examples of initial centrepiece design concepts by MID students

Source: UC-MID students, as per acknowledgements, 2012



Figures 7 and 8 Pin-up of examples of initial centrepiece design concepts by MID students

Source: UC-MID students, as per acknowledgements, 2012

1. After an internal evaluation moderated by 2 ID staff members, a screening and evaluation of the 9 concepts proposed by the students was done by representatives of the APC. After discussing them with their members, they selected 2 of the design solutions which, in their own words, 'inspired them'. One of the chosen designs was mainly inspired in 2012 year's Olympic and Paralympic torch (designed by Edward Barber and Jay Osgerby) as seen in figure 9, while the other one was mainly inspired by London's iconic building in 30 St Mary Axe (known as 'the Gherkin', designed by Sir Norman Foster and Arup Engineers), as seen in figure 10.



Figures 9 and 10 Examples of final centrepiece prototypes designed and manufactured by MID students, inspired by the 2012 torch (fig. 9) and the London 'gherkin' building (fig. 10)

Source: UC-MID students, as per acknowledgements, 2012

1. In view of the 2 chosen solutions by the APC and after consultation with the students, in order to maximize the benefit of the project while reducing the workload, the 9 MID students were divided in 2 groups, of 4 and 5 students, to collectively refine, detail, and manufacture each of the 2 chosen centrepiece (experimentation phase) .
2. In academic week 7, these 2 groups presented working prototypes and design reports to the project coordinator (evolution phase). Main feedback at this stage was in terms of manufacturing, materials, and processes, in relation to the allocated budget (\$70 AUD per unit, to manufacture 50 units of each design, for a total of 100 units).

3. Students managed the manufacture of the 2 chosen designs. In view of manufacturing costs and lack of suppliers in the region, students had to sub-contract the production of parts, and had to assemble by themselves the 100 final products.



Figure 11 Manufacturing of 50 units of each design chosen by APC staff
Source: photography by Montana Hoyos, 2012

This proved to be an excellent, although time-consuming, Work-Integrated Learning (WIL) experience. One of the groups went over the budget and ended up working many days and nights due to inadequate decisions of materials and manufacturing, while the other group managed to produce the final design in a very efficient and cost-effective manner. The experience of personally assembling the products was very valuable for the students, and after

personal reflection they expressed that 'they would definitely consider the ease of assembly of their designs more carefully in the future'.

Finally, both groups were also challenged with the packaging and delivery of the final centrepieces, and this was coordinated with attendance by students and staff to the POTY award ceremony.



Figures 12 and 13 Final centrepieces in use during the Paralympian of the Year (POTY) award ceremony
Source: photography by Montana Hoyos, 2012

Although time-consuming, the project was an invaluable WIL experience, as students were exposed to the complete life-cycle of a product development, from conceptualization to costing, manufacture, assembly, packaging and distribution. Furthermore, anecdotal evidence suggests that attending the award ceremony and seeing their designs in the event was a great experience for the students.

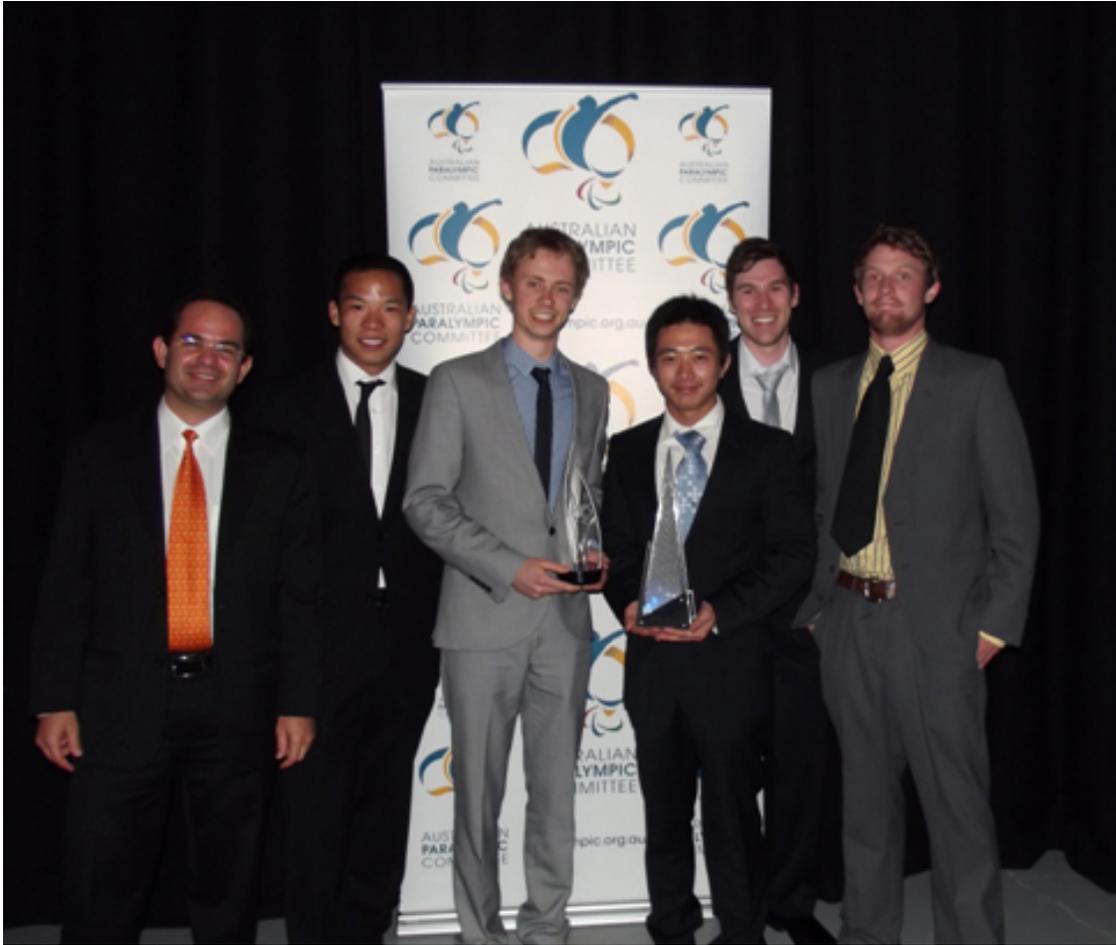


Figure 14 Staff and MID students with their designs during the Paralympian of the Year (POTY) award ceremony

Source: photography by APC staff, 2012



Figure 15 Community outreach, exhibition of the projects in the US embassy in Canberra, 2013
Source: photography US embassy staff, 2013

Conclusions

Early career academics around the world struggle to achieve an adequate balance between teaching, research and service. The authors suggest different combinations of these three elements, and through the projects described in this paper, explored merging aspects of practice-based research, work integrated learning, research-based teaching, community engagement and design thinking in graphic and industrial design.

The roles of design disciplines in promoting general public awareness and self-awareness of Paralympic sports have been rarely discussed in academic literature, and this collaboration with the Australian Paralympic Committee (APC) provided a good opportunity for studying these roles.

The poster design part of the project (graphic design) suggested that posters can be effective means to communicate and empower Paralympic athletes. Initial exhibition promoted self-awareness and empowered the Paralympic athletes, and subsequent exhibitions have engaged and educated the wider community. The posters were also a suitable teaching tool to show graphic design students examples of design thinking applied to a graphic design project.

The POTY award centerpiece design part of the project (industrial design) merged research-based teaching and practice-led research in design, providing a great opportunity for Work Integrated Learning (WIL), as the designs proposed by the students and chosen by APC staff were manufactured. This offered the students a 'real-life' experience of design project-planning and management, team-work, dealing with clients as well as manufacturers and suppliers, and working within a budget, whilst giving them a sense of 'authentic achievement' too. It also provided unique and custom made designs to the Australian Paralympic Committee, resulting in a win-win situation for both UC and APC.

Overall, this 'practice-led, constructive design research' project allowed both students and staff to critically reflect on both design processes and the roles of Graphic and Industrial Design within society, and further collaboration between the two institutions is expected.

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