iasdr2015interplay
BRISBANE | AUSTRALIA
IASDR2015 Congress
2-5 November 2015
Brisbane, Australia
www.iasdr2015.com
QUT

Designing Experiences with Wearables: A case study exploring the blurring boundaries of art, design, technology, culture and distance

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Abstract

This paper details a workshop aimed at exploring opportunities for experience design through wearable art and design concepts. Specifically it explores the structure of the workshop with respect to facilitating learning through technology in the development of experiential wearable art and design. A case study titled *Cloud Workshop: Wearables and Wellbeing; Enriching connections between citizens in the Asia-Pacific region* was initiated through a cooperative partnership between Hong Kong Baptist University (HKBU), Queensland University of Technology (QUT) and Griffith University (GU). Digital technologies facilitated collaboration through an inter-disciplinary, inter-national and inter-cultural approach (Facer & Sandford, 2010) between Australia and Hong Kong.

Students cooperated throughout a two-week period to develop innovative wearable concepts blending art, design and technology. An unpacking of the approach, pedagogical underpinning and final outcomes revealed distinct educational benefits as well as certain learning and technological challenges of the program. Qualitative feedback uncovered additional successes with respect to student engagement and enthusiasm, while uncovering shortcomings in the delivery and management of information and difficulties with cultural interactions.

Potential future versions of the program aim to take advantage of the positives and overcome the limitations of the current pedagogical approach. It is hoped the case study will become a catalyst for future workshops that blur the boundaries of art, design and technology to uncover further benefits and potentials for new outcomes in experience design.

design education; wearables; experience design; interdisciplinary; cloud computing

As physical distances between global citizens diminishes through the advent of digital bridges so too do traditional didactic and cultural boundaries (Beetham & Sharpe, 2013). The digital age permits revisiting, and often challenges, standard educational practices (Dirckinck-Holmfeld, Hodgson & McConnell, 2012) to uncover new opportunities for innovations in experience design (Wei, 2014) through the blurring of boundaries in art, design, technology, culture and distance. These changes herald new opportunities for education in experience design that permits connections across traditional disciplinary, educational, cultural and physical distance restrictions. It can be argued that these technologies pervading education are purely another tool at our disposal; nevertheless these tools have a distinct impact on the pedagogy and practice of teaching (Beetham & Sharpe, 2013) – as well as offer novel possibilities for experience design.

This paper details a case study that took advantage of the possibilities afforded by the networked age to explore the nature of design and art education and permit students to develop novel concepts exploring the experience of wearables. The workshop utilised digital technologies to facilitate the collaboration through an inter-disciplinary, inter-national and inter-cultural approach (Facer & Sandford, 2010). The focus was not on the technologies themselves, but rather the ways in which technologies were used and the possibilities they afforded for collaboration, learning and broader educational outcomes. Cloud Workshop was initiated through a cooperative partnership between QUT, HKBU and GU. Students were led by project coordinators from each university and were further supported by experts from design, technology, electronics, lecturers from QUT, GU, HKBU, HKCU (Hong Kong City University), The Edge State Library of Queensland, Seeed Studios and The Woolmark Company.

Following Selwyn's assertion that "…greater attention now needs to be paid on how digital technologies are actually being used – for better or for worse – in 'real-world' educational settings." (2010 p.66), this paper examined the approach, pedagogical underpinning and final outcomes revealing distinct educational benefits as well as certain learning and technological challenges of the program. Livingstone (2012) posited the potential for technology to transform the learning environment, rendering the learner more flexible in terms of knowledge acquisition and other "soft" skill attributes. In this program qualitative feedback uncovered additional successes in terms of soft skills with respect to student engagement and enthusiasm, while uncovering shortcomings in the delivery and management of information and difficulties with cultural interactions from a student perspective.

The Blurring of Boundaries in the Digital Age

The idea that the digital age has impacted the educational context in extraordinary ways is not a novel concept (Ercan, 2010; Praveena & Betsy, 2009). Although technology provides both opportunities and threats, the ways in which they are impacting and changing the nature of education are still been revealed, especially in regards to art, design and technology education (Radclyffe-Thomas, 2008).

The available technology that students and educators have access to open up the possibilities to novel ways of interacting, collaborating, educating and consider art and design in creating novel wearable solutions. Here we refer to various digital cloud-based applications such as Skype, Facebook, Google (Drive, Docs, etc), Dropbox on personal computers as well as mobile platforms. One impact these technologies have is in providing the opportunity to blur the various boundaries within the educational and didactic context as well as breaching the various boundaries across institutions, national borders, distance, cultures and disciplines that are traditionally difficult to overcome. As a result of utilising these various technologies the organisers and students were able to readily move across those borders and design a program that permitted students and educators to connect in a multitude of ways.

The program did not take a determinist approach to the ways in which technology impacts these areas, but rather the students and educators using the technology shaped and co-created the available potentials afforded (Facer & Sandford, 2010). To underscore this point the types of technology and how they were to be used, although planned to some degree, were left up to the participants to make a decision about as the program progressed. At the heart of the program there was an interest in exploring the ways in which these technologies could be utilised to impact the educational framework as well as discover the ways in which they could instigate novel and original art and design outcomes.

Wearables and Experience Design

Experience is prime, and the product only a means (Hassenzahl, 2010 p.63)

Experience design asserts that design should be less about the product and more about the experiences they deliver. Thus, artefacts act as mediators between users and basic human needs, such as experience, meaning and emotions (Gomez, 2012; Desmet & Hekkert, 2007; Overbeeke, Djajadiningrat, Hummels, Wensveen, 2002; Hassenzahl, 2010).

As part of the workshop students were challenged to explore the ways in which wearables could connect individuals and the community across cultures and nations. Consequently there was significant focus on the experiences between people, and how wearables could facilitate these exchanges. Wearables that live on, near or in our bodies give rise to a previously unimaginable level of data about people and environments not previously available. By enabling the connection of divergent data sets, wearables provide life-augmenting levels of interactivity and potentials for experience design that were previously not possible.

From the onset of the project students gained exposure to different perspectives to the research theme from the vantage of the three facilitators' varied professional disciplines and research interests. Connecting via live digital video streaming enabled the project participants to access a wealth of shared knowledge, extending across research fields as well as the participants interests and skills. Students were presented with the proposition that wearables afford unique interactive, communicative and functional capabilities between

users, environment, information and digital data in unique ways. This was the driving force for the student concepts and the underlying context by which student groups began their design and art conceptualisation.

Case Study: Cloud Workshop

Aims + Approach

One of the primary aims was to explore the ways wearables could be created to connect across two different nations and exist not just in physical form, but also connect and interact through the cloud. The challenge posed to students was to develop some form of physical experiential artefact that existed in Brisbane and Hong Kong as separate entities but would function through exchanging data or other types of information.

The project was multi-disciplinary in nature based on three main knowledge areas included Art, Design and Technology (Figure 1). Students from disciplines including Visual Arts, Industrial Design, Product Design, Fashion, and Interaction and Visual Design were represented in the project teams.

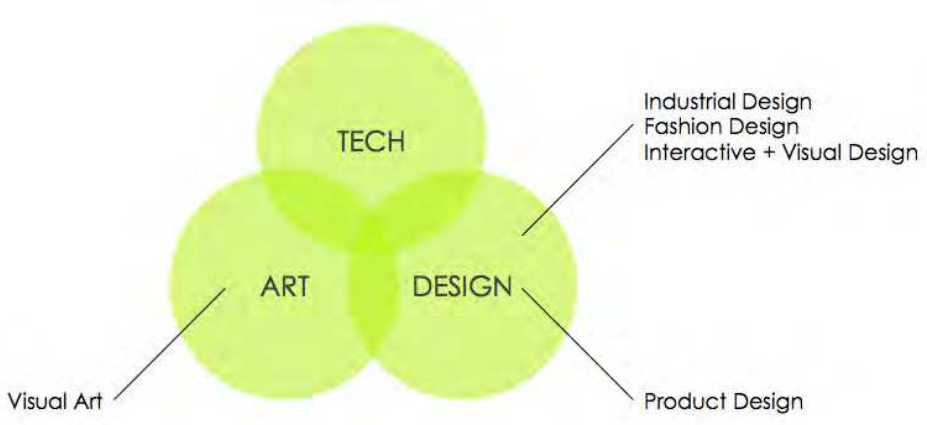

Figure 1: The intersection between Art, Design and Technology and the breakdown of disciplines represented in the student groups

Art and Design were the primary knowledge base for students given their disciplinary backgrounds while technology was seeing as the nexus that permitted the students to engage with each other as well as utilise to create their wearable ideas (Figure 2).

Another dimension to the project was the cultural obstacle between Hong Kong and Australian students that was inherent in this type of collaboration. This cultural divide was considered both as an enabler as well as a potential challenge for the student teams and project outcomes. Likewise, the physical distance was also an important feature of the workshop that needed to be considered. These two characteristics of the workshop posed significant obstacles for collaboration but the organisers considered these as central to the theme and aim of the project.

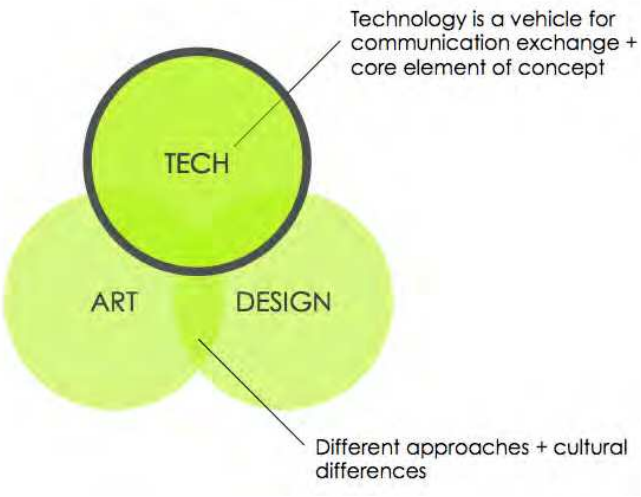

Figure 2: Technology as the vehicle for communication exchange
and concepts developed by the intersection of Art and Design disciplines

Process

Students were asked to attend an intensive six and half day workshop across a two-week period during July-August, 2014. During the first two days students were introduced to the project aims, objectives and presented with theory relevant to the workshop theme. Further wearable technologies, components and other equipment were introduced in both locations during the early stage of the project. For the remaining duration over the two weeks students were asked to collaborate, research, design and prototype future visions of wearable technologies that targeted the project aims. At the halfway mark, teams were asked to present initial concepts to each other over Skype (Figure 3). After feedback from the organiser's and fellow students, teams started the process of prototyping their visions. Finally, at the end of the two-week period an exhibition was held at both locations simultaneously to showcase the various student projects and prototypes (Figure 4).

Figure 3: Students presenting initial concepts in Australia and Hong Kong simultaneously

Figure 4: Exhibition presented simultaneously between Hong Kong (left) and Australia (right)

During this process one of the critical ways for teams to initiate concepts and ideas, organise, communicate and achieve outcomes was to collaborate and share information using Skype, Google Docs, Dropbox, Facebook, Instagram and any other means available to them. These types of programs were used throughout the entire project to assist organisers, teams, students and individuals communicate effectively across both countries. Students and organisers were free to use any variety of these programs to collaborate during the workshop period.

Project Teams

All teams included students from all three institutions as well as a mix of disciplines (although not all teams included the same discipline distribution). For QUT students the workshop was an extra-curricular activity and as such they were recruited by invitation. For HKBU and GU students this formed part of an assessable subject of their respective coursework. In all, 27 students were involved in the project including seven from QUT, eleven from HKBU and nine from GU and five groups were eventually formed.

A breakdown of each group, theme, distribution per institution and outcome is provided in Table 1. As illustrated in this table, each group maintained a unique approach to the set task. For the purpose of this paper, three projects; (i) Techlace, (ii) Sine Language, and (iii) Illumine, are explored as exemplars of concepts that attempt to confront the concept of experience design most successfully.

Table 1: Group divisions and theme

Group	Project description	Students	Outcome
Techlace (n=6)	Displays the wearer's emotions to assist communication between strangers or across different cultures.	1 x QUT 2 x GU 3 x HKBU	Prototype - accessory and garment
Illumine (n=5)	An attempt at sustainable wearable costume that explores connections between people to enhance large scale events (e.g. music festivals) and create digital surfaces made up of the hundreds of people, each becoming as a pixel on a screen.	1 x QUT 2 x GU 2 x HKBU	Prototype - Origami folded paper - worn garment (various combinations)
Sine Language (n=6)	A sophisticated glove and neck garment used to break down language barriers between cultures through the use of persistence of vision.	2 x QUT 2 x GU 2 x HKBU	Prototype - dress in combination with glove (predominantly an accessory)
Ignite (n=5)	A dance garment that enhanced the dancers' movements and actions and transmitted this information across countries	2 x QUT 1 x GU 2 x HKBU	Prototype - dance costume, worn garment.
Gutan (n=5)	An exploratory fashion garment and bracelet that evokes ideas of celebration and friendship. It transmitted various messages from \ bracelet to wearable garment to connect people across the globe.	1 x QUT 2 x GU 2 x HKBU	Prototype - 3D printed bracelet, accessory

Techlace

The mantra underpinning the concept direction of Techlace is "feelings are beautiful, why hide them?". To serve this purpose, Techlace was created as a necklace and dress combination prototype to convey emotions through visual non-verbal cues using the process of illumination (Figure 5 and Figure 6). By focusing the design on non-verbal approaches to conveying emotion, the team were able to transcend cultural boundaries as the point of 'communication' between the necklace of one wearer and the dress worn by another. This concept aimed to help people understand one another and to comprehend if they are being offensive in another country and/or enable shy people to easily express emotion (Figure 5). The necklace component was designed in Brisbane and the dress component in Hong Kong.

Figure 5: Techlace expressing emotions 'angry' and 'euphoric/happy' (Australia)

Figure 6: Techlace dress design (Hong Kong)

Sine language

Sine language centred on the experience of dealing with different languages across cultures by developing a sophisticated glove and headpiece as a method to facilitate non-verbal communication between people. Through persistence of vision technology, the glove was designed to send a message (Figure 7). As a wearer's hand moves, a visual representation of a word is created (in a nominated language), and the headpiece subsequently receives the message and transmits a reaction/response (Figure 8). The glove is designed so it can be programmed and configured to represent different languages, depending on the context, as illustrated in Figure 7.

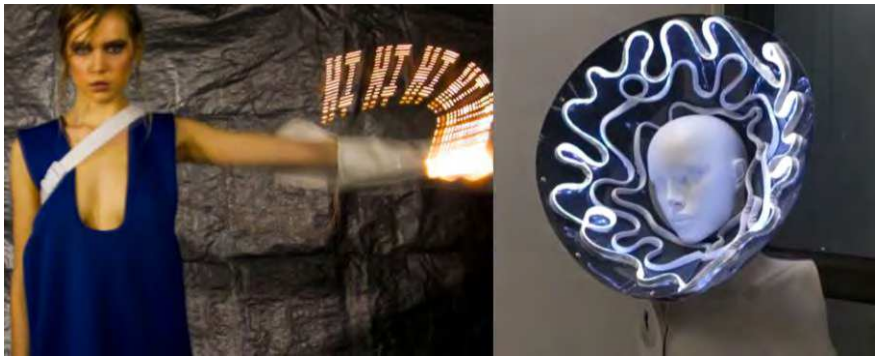

Figure 7: Sine Language transmission in English "Hi" (left, AU) and headpiece receiving (right, HK)

Figure 8: Visual representation of the glove capabilities “Nei Hou” (Hello in Cantonese)

Illumine

Illumine (Figure 9) is not so much person-to-person communication, rather the enhancement of group and festival-based experience. Illumine is designed to enhance the experience of public events. Using this product, each person at the event becomes a co-contributor to the immersive nature of the space. The garment worn individually acts as a collective visual display as people gather and coalesce to experience the festival or concert, with each person effectively becoming a 'pixel' in a larger display at the event (Figure 10). As illustrated in Figure 9, Illumine when worn, rests across the users' shoulders. This proposed design is made of paper and is recyclable to enhance sustainability of the 'one off' festival event item.

Figure 9: Illumine, worn item is equivalent to one pixel (refer Figure 10)

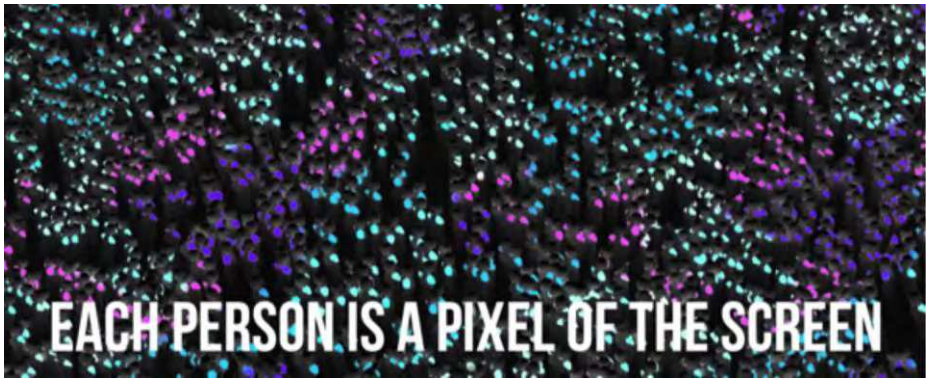

Figure 10: Illumine, example of collective visual display

All five prototypes developed were interesting and thought provoking, if somewhat underdeveloped. On reflection perhaps the fact the designs were not resolved had less to do with student insight or effort, and more to do with broader issues relating to the workshop structure and experience of this type of collaborative project and the challenges this posed. The next section expands on this and delves further into some reflections and analysis of feedback from students and organisers.

Reflections + Analysis

In the three instances highlighted, the student teams identified future opportunities for wearables that promote and assist non-verbal modes of communicating – with varying success in respect to experience design. Techlace (Figures 5 & 6) was a good example of a creative outcome that connected directly with emotional experiences between people and cultures. Sine Language (Figure 7 & 8) acted as a facilitator between people by allowing more effective communication through gesture and language. Enhancing group experiences, Illumine explored the ways in which wearables could enable individual and communal interaction. The focus of each prototype to enrich connections 'visually', are mostly likely due to the workshop framework centred on working in inter-cultural, inter-disciplinary teams across large distances. The creative outcomes attempted to transcend this distance boundary by sharing and transferring data and information across the two locations. This particular aspect of the design however, appeared to pose significant challenges for the groups, as they struggled to successfully blend ideas that were culturally sensitive or significantly meaningful.

Working in mixed teams was challenging given the different time zones, language barriers and varying levels of skill and capabilities. In most cases groups had limited to no knowledge of coding, sensors, arduinos or programming, resulting in limited scope and understanding of how to utilise the preferred technology at a sophisticated level.

The emphasis by teams on non-verbal communication is not surprising given that the majority of meaning between people is conveyed non-verbally with only a small percentage of meaning conveyed through spoken words (Heiss, 2007; Charlesworth, 2007). Given the challenges faced by teams due to cultural differences, it is logical to assume this inspired the non-verbal focus of the proposed wearable prototypes. Moreover, it can be argued that each prototype pertained "telepresence" as a form of mediation of experiences of geographically dispersed agents. Teams achieved this by ameliorating their physical and/or psychological proximity through particular communication technologies (Heiss, 2007; Milne, 2003; Steuer, 1992).

It is postulated that the workshop success was co-dependent on an effective integration of pedagogical and technological objectives. Embedding technology within a block delivery program run parallel in differing countries – was both intense and highly productive.

Communicative, cultural and technological struggles aside (i.e., lack of programming knowledge, and or understanding of sensors), students commented during and post-event about their productivity, their pride in the outcomes as well as their surprise at what was achieved in the short timeframe. The inclusion of technology and non-technology related items as part of the collaborative learning process links well with current research that cites a need to increase the use of IT for educational purposes (Laird & Kuh, 2005). While this observation is positive, it is clear that establishing richer links between the use of technology and desired educational outcomes (2005) are needed.

Two aspects will be reflected on below. Firstly a brief evaluation of the approach, pedagogy and expectations of the workshop will be discussed. Secondly qualitative feedback from student questionnaires pre and post workshop is reviewed in relation to the project.

Evaluation of Workshop Structure and Approach

Advantages

There were several positive elements that came out of the workshop in respect to the structure and approach. The multi-disciplinary nature of the project was perceived as overall positive with many students and organisers feeling buoyed about the potential of this type of collaboration. All involved felt they would benefit from interacting with international students from varying disciplines as well as contributors with varying expertise and background.

Additionally students perceived the fact they were learning about technology in a fast-paced and exploratory manner as exciting. The availability of experts and hands-on workshops to assist them through the project was seen as a great advantage and a significant learning opportunity to be taken advantage of.

Challenges

At the completion the organisers recognised that one of the challenges faced by students involved the structure of the workshop across the two-week period. The format consisted of two days of introduction to content and technology as well as safety inductions. By taking two days out of the initial part of the schedule it was determined that this did not permit the students to effectively connect as a team and thus prohibited them from effectively begin development of their ideas. On reflection these introductory activities and inductions could be performed prior to the workshop and the first days could be devoted to permitting the students to effectively engage and connect as teams.

Another challenge was the requirement that stipulated that the final design needed to work collaboratively across both Hong Kong and Australia. This particular condition placed some difficulty on certain teams to come up with an effective concept that would connect the two cultures together. Although seemingly an interesting aspect of the project, this appeared to

cause difficulties for the teams – perhaps due to the fact that many teams did not seem to bond easily until much later than anticipated.

Qualitative feedback from Students

Positives

There were two initial questions provided to the students before and after the workshop using a 1-5 Likert scale (1 being the lowest score and 5 being the highest score). In all, 12 students responded to the questions prior to the workshop, while 9 students responded to the questions posed after the workshop.

The pre-workshop question asked students whether they enjoyed the freedom and flexibility of working in a blended learning environment. The mean scores before and after were 4.42 and 4.44 respectively and it can be inferred that students enjoyed the blended learning environment of the workshop.

The post-workshop question centred on whether the inter-disciplinary / inter-cultural based learning environment was effective to gain new knowledge and skills. The mean scores before and after were 4.08 and 4.44 respectively, which emphasised that student's perception of the effectiveness of gaining new knowledge and skills through the workshop improved.

One short-answer question required students to reflect on what they most liked about the cloud workshop. Prior to the workshop students commented on looking forward to:

1. Working across cultures;
2. Learning new knowledge

Post-workshop the topics that student mentioned as enjoyable included:

1. Working with different disciplines;
2. Working across cultures;
3. Learning new knowledge; and
4. Freedom to explore novel outcomes

Improvements

Relevant data was collected based on what students thought could be improved or adapted. Prior to the workshop students commented on the possibility of the following:

1. Access to face to face interaction;
2. To be given enough time to do the required work;
3. To be provided with a specific project brief; and

4. To be provided with specialised knowledge about technology

After the workshop students commented on the following possible improvements:

1. Increased time for project development;
2. More project structure; and
3. More direct management of teams by organisers

It was interesting to note that some of the challenges outlined directly contradicted some of the advantages outlined. For example it was mentioned that freedom to explore novel outcomes was one of the positive aspects of the workshop; while at the same time students determined they would have preferred more structure and management throughout.

A strong theme that students found positive about the workshop was collaborating with other disciplines and with other cultures beyond their own. This was a repetitive positive feedback from the workshop. On the other hand a common concern was the amount of time provided to complete the project - or rather the amount of information and activities to be completed in the project timeframe.

Conclusion + Future Work

The digital age permits revisiting standard educational practices (Dirckinck-Holmfeld, Hodgson & McConnell, 2012) to uncover new opportunities for innovations in experience design. Wearables afford unique interaction, communication and functional capabilities between users and their environment with the capacity to drastically impact people's lives.

This paper outlined a case study, titled Cloud Workshop, which took advantage of the possibilities afforded by the networked digital age to explore the nature of experience design with wearables through an inter-disciplinary, inter-national and inter-institutional approach (Facer & Sandford, 2010). Developing critical understanding of digital technologies through an inter-disciplinary, inter-cultural and inter-national learning context is crucial in the 21st century that will help ensure students become informed creative leaders capable considerate of the broader implications of emerging technologies.

In all, five groups presented projects varying in scope and approach. The paper highlights three projects including Techlace, Sine Language and Illumine, as exemplars of wearable creations that offer novel ways of interaction. In each instance, the student teams identified future opportunities for wearables that promote and assist non-verbal modes of communicating. Although experience design was at the core of all prototypes developed and the concept was embraced by all; some groups achieved a more successful integration of the approach than others.

Cloud Workshop was largely successful but further developments are needed. Any success is co-dependent on an effective integration of pedagogical and technological objectives. Students commented during and post-event about their productivity, their pride in the

outcomes as well as their surprise at what was achieved in the short timeframe. Nevertheless, there were distinct communicative and technological struggles. It was also clear that establishing richer links between the use of technology and desired educational outcomes are needed.

An unpacking of the approach, pedagogical underpinning and final outcomes revealed distinct educational benefits as well as certain learning and technological challenges of the program (Selwyn, 2010). Qualitative feedback uncovered additional successes with respect to student engagement and enthusiasm, while uncovering shortcomings in the delivery and management of information and difficulties with cultural interactions from a student perspective (Livingstone, 2012).

Three main elements considered for change in the next round include (i) preparing more thoroughly for the cultural exchange between students, (ii) providing more structure around project themes, (iii) and supporting students with expert knowledgeable around coding. It is hoped these changes will improve the pedagogical and learning outcomes and result in improved and more sophisticated wearable prototypes based on exploring concepts of experience design. More broadly, it is envisioned that the workshop structure and the advantages, challenges and limitations described will permit educators in design and art to explore novel pedagogy techniques to facilitate learning in the modern educational environment. Technology and creativity are the drivers of the Cloud Workshop, and as Mishra & The Deep-Play Research Group (2012) underscore "new technologies have had an immense impact on the how we live, work and communicate... " and it is for this reason that "teaching and learning in this emerging world needs to emphasize these twin issues—technology and creativity" (2012).

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Author Biographies

Rafael Gomez

Rafael Gomez holds a PhD in design and emotional experience, and is a prominent researcher in the field, publishing nationally and internationally. Increasingly, his research is revealing the complex emotional relationship between products and wellbeing at the intersection of design and wearable health technologies. In addition, Gomez has over 15 years industry design experience in aviation, construction, medical, government and consumer electronics industries and is design director for Propaganda Mill, a multidisciplinary design company. He is an Industrial Design lecturer at Queensland University of Technology and leads an international design study tour to Asia, which has receiving significant funding from the New Colombo Plan from the Australian Government. He is a Council Member of the Design Institute of Australia Queensland Chapter, Founder and Chair of the Design and Emotion Society Australia Chapter and Committee Member for the 2015 IASDR Design Conference.

Tricia Flanagan

Tricia Flanagan (PhD) began her career as a fashion and costume designer, but has been working as a practicing artist and academic since 1996. She has a PhD (Public Art) from the University of Newcastle and a Master of Arts in Visual Art from the Bauhaus University. Her practice currently focuses on the public sphere through the mediums of site-specific sculpture, social sculpture, sound sculpture, sculptural installation, wearables and performance installation. Flanagan has received awards, published and exhibited internationally and is represented in private and public collections in Australia, Ireland, Germany, Italy and China. In 2009 she established the Wearables Lab at the Academy of Visual Arts at Hong Kong Baptist University where she currently works. Flanagan also sits on the programming committee for the Design, User Experience and Usability (DUXU) Initiative in the context of Human Computer Interaction International (HCII).

Rebekah Davis

Rebekah Davis (PhD) is a Lecturer in digital technologies, design methods and Convenor of the Product Design Major at the Queensland College of Art, Griffith University. She is a Queensland Chapter Council Member for the Design Institute of Australia, managing the Education and Research Portfolio. Beck holds a PhD (Industrial Design, QUT) in the analysis of gestural interactions between design teams as well as the use of metaphors and analogies during the creative process. She continues to research early stage design and is currently exploring “Mediated Interactions: How Technologies Shape Experiences and Creative Collaborations” funded by a New Researcher Grant. She recently cocurated the Experimental Thinking / Design Practices (2015) exhibition at Griffith University Art Gallery, Brisbane and managed the Design in Flux (2014) exhibition at Crane Arts, Philadelphia.

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Important dates

Final paper submission
25 August 2015

Final Poster submission
25 August 2015

Workshop proposals
30 June 2015

Exhibition proposals
15 August 2015

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Forthcoming Publications

(http://iasdr2015.com/wp-content/uploads/2014/05/SMTlogo.jpg)**Studies in Material Thinking Special Volume**

We are pleased to announce our partnership with the journal ***Studies in Material Thinking.*** The journal will publish Special volume of a post-conference invited research papers. The aim of this volume is to further reinforce future discourse regarding notions of interplay between design research, science, technology and arts. The focus will be on trans-disciplinary knowledge and its application in practice.

Full information about the journal is available at www.materialthinking.o (http://www.materialthinking.o)

IASDR2015 INTERPLAY EDITED BOOK

We plan to publish an edited book of selected papers. The papers should be expanded into the book chapters. The selected authors will be invited to publish.

The focus will be on interplay, trans-disciplinarily research and transformational innovation.

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iasdr QUT

IASDR2015 INTERPLAY
2-5 November 2015, Brisbane Australia
Proceedings Publication
www.iasdr2015.com

ISBN - 978-0-646-94318-3

Design: Manuela Taboada and Carly Hare

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All long and short papers were double-blind peer reviewed.

Papers are in an alphabetical order by first author and page number in the IASDR2015 Proceedings.

IASDR2015
Introduction

Welcome to the Proceedings of IASDR2015 INTERPLAY.

These proceedings contain all papers that are accepted for oral or poster presentations. All manuscripts were submitted electronically and were double-blind peer reviewed. They are in an alphabetical order by first author and page number in the IASDR2015 Proceedings.

INTERPLAY

The theme of the Congress was INTERPLAY. It focused on an understanding of interactions between design research with science, technology and the arts. This continual INTERPLAY provided opportunities to explore relationships between cross-disciplinary knowledge and various design research approaches.

IASDR2015 aimed to establish trans-disciplinary research platforms across diverse domains to foster new research and education opportunities and stimulate innovation. The papers presented here support or challenge this vision. They formed a platform for the future debate about trans-disciplinary research and education.

IASDR2015 brought together 230 papers from 26 countries. This represents 45% of all full papers and short papers (posters) submitted.

There are many people who have been involved in making this congress happen. I would like to thank all our chairs, program committee members, advisers, reviewers and QUT Conferences. Special thank goes to Thea Blackler, Ben Kraal, Nithikul Nimkulrat, Ding-Bang Luh, Yukari Nagai, Marianella Chamorro-Koc, Manuela Taboada and Carly Hare for all their hard work they have done to make this event happen.

Vesna Popovic
IASDR2015 Chair
Queensland University of Technology

Long Papers

Short Papers

IADR2015

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