DIVERSITY AS A COMMON FRAMEWORK. DESIGN TEACHING IN DIVERSE AND INTERDISCIPLINARY POSTGRADUATE COURSES

Laura FERRARELLO
Royal College of Art

ABSTRACT

The MRes in Art & Design is a twelve months postgraduate full-time course launched in 2016. The course is aimed at students who want to advance and challenge the discipline through the practice of art and design research. In this paper I will describe how diversity is approached in one of the MRes Pathways, design, as a teaching platform that supports the development of interdisciplinary knowledge via the learning experience drafted by the curriculum and implemented by the students. The Design Pathway is one of the four MRes pathways representing the college's schools, which weekly meetings build a multidisciplinary culture from the debates engineering, design, fine art, architecture and communication students exchange on research practice and methods. The pathway builds on this process and makes multidisciplinary interdisciplinary; students of different backgrounds (Engineering, Architecture, Product Design, Fashion, etc) are engaged in collaborative activities which aim to stimulate through the practice of design research self-criticality, reflection and questions. Some of the findings illustrated in this paper show how the engagement of staff and PhD/MPhil students across the different school's MA courses contributes to support interdisciplinary and foster the intermingling of ideas; this blurs the discipline boundary and develops an interdisciplinary profile built upon the discussion and critics of the different practices through applied design research. The MRes Design Pathway becomes an experiential journey where research design methodologies provide the space for disciplines like engineering and fashion to learn from each other and fuse the respective knowledge in cohesive wholes. From the evidence given by students' feedback the design pathway teaching model and curriculum have been proving to foster diversity as skill, identity and approach that students learn and develop throughout the course. This particular aspect of the curriculum makes the most of the impact in fostering and supporting a culture of interdisciplinary, which happens via a participative and active teaching leading towards the development of creative thinking in collaborative and interdisciplinary teams.

Keywords: Knowledge exchange, curriculum, design research

1   INTRODUCTION

In the recent years education has been an increasing relevant topic of debate across the globe. The fast pace at which technology has been shaping society is changing people's attitude and behaviour when interacting with services they access, tools they need and media they use to communicate and establish social relationships [1]. In the recent report published by the American National Academies of Science, Engineering and Medicines such particular context is summarised by the following questions: "What role should technology play? What do we want the future to look like, and how do we get there? Who gets to choose, and how does this change us as a society?"[2].

These questions address the necessity of a strategy society needs to cope with the fast development of complex and dynamic systems driven by learning technologies, which might take over some of the expertise humanity claimed until this particular moment in history. Until this moment, indeed, science, engineering and technology have been addressing techno-social infrastructural challenges by particular lens that looked at particular issues. Nonetheless the kind of complexity designed by technological development requires a more diverse background where problems are analysed not only from a technological/scientific perspective, but from others that understand the environment, i.e. the context in which the problem is located, and the human factor, which either contributed or could help define a

solution [3]. Our society requires skills beyond discipline; to tackle complexity society needs techno-humanistic approaches that from STEM (Science, Technology, Engineering and Mathematics) become STEAM (Art). Technical skills are no longer enough to design an infrastructure, a system or a circuit; society needs knowledge that overcomes disciplines [4] [5]. Under these terms the future of education should not only address what kind of discipline should be taught but also the method of teaching, the approach, attitude and degree of adaptation students develop through the process and experience of learning [6]. As mentioned by the American National Academies of Science, Engineering and Medicines education is about the skills but also about the learning environment [2].

This is the context and the questions the MRes Design Pathway addresses through its curriculum.

Looking at society and how systems are increasingly incorporating learning machines and interdisciplinary teams [7] the MRes Design Pathway fosters a model operating like a platform; this trains and provides future generations of adaptive skills beyond discipline and shaped upon the individual feasibility and ability to cope with new problems, as well as exposure to interdisciplinary teams and learning. The pathway aims at providing a model based on research that exposes students to external systems; in this model individual knowledge is constantly challenged and diverse backgrounds need to collaborate.

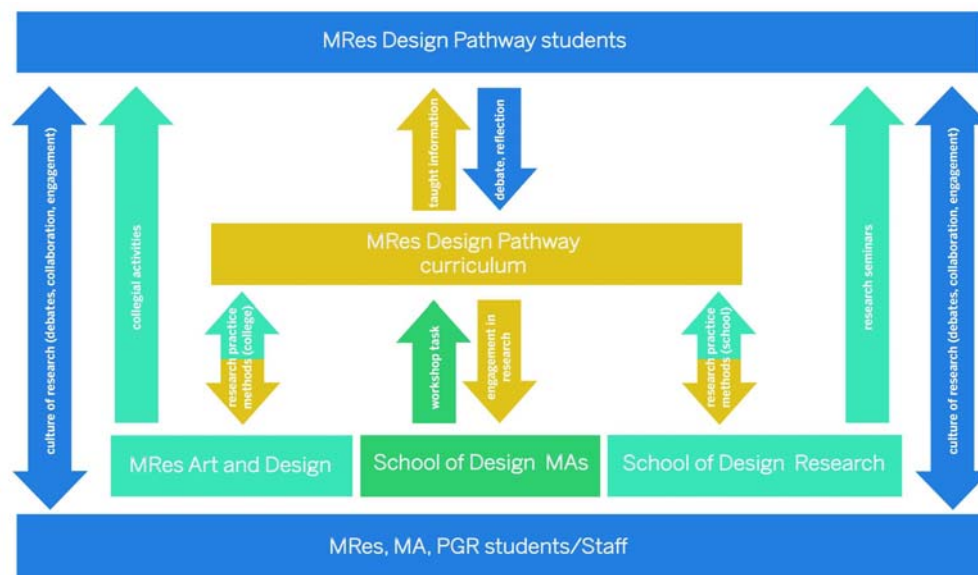## 2 DESIGN LEARNING ENVIRONMENTS THAT STIMULATE AND ENCOURAGE DIVERSITY

Figure 1. MRes Design relationship with the College and School of Design

The MRes in Art & Design (A&D) home is the Research Department at the Royal College of Art. For the nature of research, i.e. an open-ended and interdisciplinary investigation, the course equally engages the schools across the college through pathways that teach the approach to research in the field of study. This collegial structure helps interface cross-discipline students and staff in weekly meetings in which school pathways deliver research methods, approaches and tools. These meetings are not designed to merely teach notions but to create a place to discuss and debate the diversity of research (Fig.01).

The MRes Design Pathway plays on similar values, as its curriculum equally supports interdisciplinary and diversity of thinking; enrolled cross-discipline students (Engineering, Fashion, Computer Science, Architecture, Industrial Design, Design Product, etc.) come to the course with the common motivation of learning how design research practice can challenge professional and academic backgrounds. Whether the MRes will be medium to access higher research degree, like doctorate, or to implement the professional profile, students enrol to transform the existent background to pace social changes. Driven by curiosity and enthusiasm students push the boundaries of their discipline, which blurs throughout the length of the course through the influence received from the cohort. This creates an interdisciplinary environment where students are encouraged to explore possible future scenarios in

which human skills are integral part of complex systems and capable of designing strategies for social infrastructures, from institution to services, that understand the value and limitations of human-machines collaboration [7]. Current projects look at safety through behaviour and wellness, trust as design tool for autonomous transportation, human centred design strategies to shape the tech market strategies, ethic as design guideline for product design, etc.

To support this the Design Pathway looks at both the development of individual skills and ideas and the exposure to the community. This means that the pathway is understood as a systems of parts interacting with each other where the individual benefits and is challenged by the participation and interaction with the cohort.

According to Brezing, Childs et al each discipline fosters different methods of learning [8] and different cultures learn through different approaches. Nowadays such diversity is evident because of the mobility of scholars and students travelling across the globe to research and study in different cultures and countries. This factor opens the space to question methodologies, and leads the way to hybrid methods of learning aware of the respective benefits and limitations.

From the experience of teaching across countries Brezing, Childs *et al* [8] draw the conclusion that, being indeed aware of limitations and benefits, it is valuable to combine diverse methods for a more cohesive teaching system capable of incorporating different views. Similarly MIT researches Eppindeger, *et al* paired management and mechanical engineering with design products students in interdisciplinary groups with the intention to develop a hybrid approach to problem solving [9]. By assigning cross-disciplines groups a brief, the MIT researchers evaluated how students responded when exposed to different methods. In the experiment each discipline was given the opportunity to reflect on the respective practices and interrogate if a cross-disciplinary environment would have increased/decreased the will to take risks to solve problems under different parameters, processes and methods. Feedbacks outlined that a more open ended brief would have encouraged more interdisciplinary participation which result could have challenged each discipline. As noted by Brezing, Childs *et al* too, in interdisciplinary collaborations the learning environment is core, as the learning process doesn't relate to the taught notion only, but to the experience which develops the space for questioning and reflecting upon the validity of the received notions and approaches. The experience of learning takes then a critical role, as it provides students of the place to interrogate the skills they acquire; one of the methods that can measure the quality of such a place is the interest and motivation students develop throughout the process. Around this particular aspect researchers Kolonder *et al* from Georgia Institute of Technology draw a course which looked at the degree of engagement students develop with science, measured upon the parameters of interest, familiarity, personal experience and preconceptions on the discipline. The results of this research would have informed the development of methods capable of stimulating creative thinking and collaborative learning processes [10]. Based on practical first hand experience researchers planned activities aiming at developing individual self-awareness of the discipline's limitation and value; the researchers' role consisted of ensuring students had the right time and space to reflect on the experience of learning and the capability to build skills, motivation and interest. Hence learning becomes a process in which students build complexity through first hand experience which, on its turn, generates questions and reflection on the taught information and helps keep the bigger picture in mind [11].

3   ACTION LEARNING ENVIRONMENTS

The department in which the MRes Design Pathway sits is Research in the School of Design, which cross-discipline community of Postgraduate Researchers (PGR) and staff make its environment an excellent space to debate and share ideas. The exposure to such culture places the pathway in a privileged position for the value gained by interacting with the community of researchers and academics; this is something students inherit from the school and foster through a sense of identity, membership and engagement. The process through which membership is constructed pivots on key actions aiming at activating natural processes of collaboration and participation through the learning experience. Hence the understanding of the Design Pathway curriculum as teaching platform to prompt a sense of belonging that sees students, members of staff and PGRs across the School's MAs collaborate in workshop activities, seminars and sprints on design practice methods. Any workshop leader receives equal guidelines: (1) theory has to be delivered through an active and engaged activity that aims at solving a problem by collaborating in interdisciplinary groups of 3 or 4; (2) outcomes need to be simple but the process needs to be articulated to get groups reflect and debate on the actions

taken to solve the problem; (3) all groups need to present and discuss the outcomes. In the students' assessment documents I verified how well a method was received and the degree of ownership developed. The active learning helped grow self-criticality, which increased the sense of ownership and the fluency on practicing research. In the assessments students raised questions on the value of adopting methods of design research in the solo project and if these methods could be used otherwise. Hence the workshop worked as an engaged space of collaborative action learning where the discipline per se is less relevant than the discussion and evaluation of the value, role and benefits of research practice methodologies. In one of the sprints we observed that the freedom offered by simple outcomes gave students the opportunity to focus on the process rather than the result, which removed pressure of performance thus adding value to the same process of learning.

Figure 2. Interdisciplinary teams sharing ideas through the workshop outcome

3   REFLECTIONS

The Design Pathway participated and engaged curriculum provides students of the space to develop ownership on the research methods, which help see individual disciplines under different eyes. This leads to a process of self-criticality that triggers the transition from multi to interdisciplinary debates. As workshop activities run in groups and decision-making has to be negotiated, the process becomes an engaged opportunity to learn how different disciplines articulate, generate and criticise ideas. None of the workshop activities are new to the discipline; the novelty is only in the diverse environment in which activities are practiced. For instance in one of the workshops lead by a fashion tutor one of the groups used the piece of fabric as a medium to bound and another one as a medium to discuss the process in action (Fig. 03). The fashion tutor recognised the results as unexpected; normally fashion students would be more focused on producing a beautiful outcome rather than reflecting and recording the process to achieve it. For Design Pathway students the workshop became an active tool for learning, which actions were medium to reflect and observe. The sequence of workshops scheduled across the term delivered (1) the basics of design research methods through the contribution of experts in the field; (2) an instrument to build familiarity with the ambiguity of research.

As an open ended form of investigation research can destabilise the individual's confidence and build insecurity, in particular in an interdisciplinary environment; this is something to tackle and take into account to avoid demotivation and frustration. The group dynamics are something to observe too, in terms of the roles and positions individuals take in a "neutral" field, whether this "neutral" field exists or it is something that facilitates leadership. One of the insights gained so far indicates that personal motivation, engagement and trust on the process are qualities that help students take risks, once they become familiar with the feeling of unsettlement. I observed that students find the group the supporting reference that helps navigate tensions, even though the group behaves also as source of tension that, if not properly tackled, is perceived as obstacle. Even though group members recognise the creative value of the group, which instils motivation, this plays to be one of the most difficult spaces to manage diversity. On one hand the group helps students build resilience towards collaboration and trust on the bigger picture that overcomes insecurity and contrasts; on the other hand

the group builds frustration and endemic contrasts embedded in diverse approaches. This aspect is a challenge that could be tackled through transparent leadership based on trust and personal responsibility towards the group.

Figure 3. Interdisciplinary teams collaborate in the one of the workshops

4   CONCLUSIONS

This paper described the MRes Design Pathway curriculum as an interdisciplinary platform that supports and fosters diversity across cultures and expertise. Motivated by the transformations society is facing through the fourth industrial revolution [12] the curriculum aims at suggest a model of education capable of addressing and directing our fast changing society. I described how the Design Pathway operates through workshops as media to deliver notions and engage staff, PGR and students. This creates active learning environments that overcome the singularity of the discipline and look at the values of self reflection, discussion, participation and debate. The curriculum most impactful aspect is indeed in creating a culture of proactive diversity and curiosity that supports students in shaping a unique journey where disciplines play a minor role. The curriculum structure encourages an interdisciplinary approach elaborated on the complexity of the environment (people, topic, process). Findings of this approach are the development of a personal interdisciplinary profile; a more critical attitude to learning which questions notions through first hand experience; acknowledgement of the value/limitations collaboration; a learning process that encourages curiosity through personal motivation.

Nonetheless the specific environment in which this takes place needs to be acknowledged; the Design Pathway focuses on the practice of design research; this builds a particular scenario for the dynamics through which research operates, like addressing problems, not solutions, and identifying social challenges design can tackle. Such system needs curiosity, motivation and direct engagement of its members; hence the cross-disciplinary environment plays an important role to support the system. As previously mentioned with the fashion example, the sense of unsettlement given by diversity of approaches helps detach the individual from known processes and undertake new actions that activate the sense of self-critically and reflection. This particular mechanism needs a cross-discipline community, which in the MRes is found at a collegial and pathway scale, and the student's motivation to interrogate society through design research methods. My experience and research interests in participatory activities practiced with different kinds of communities, from engineering, design, humanities and business, played an important role on structuring the curriculum. The curriculum is a strategy to investigate how design research can be a valuable instrument to make strategic impact in social challenges and how engineering and humanities can bridge and exchange knowledge. The tangible results achieved so far are the solo research proposals, which do not dwell in the exercise of the course but look at the impact the project would and can create in society and in the particular area of investigation. Students describe their experience as a way to rethink about themselves, their goal and what they are trying to achieve in their career. The interpolation between personal and common learning has been proven as collider that merges and create the space to think and reflect.

REFERENCES

[1]   The Open Learning University, *The Future of Empowerment*, November 2017. Available at http://www.open.edu/openlearn/society-politics-law/sociology/future-empowerment [Accessed on 2018, 26 February]

[2]   Committee on Information Technology, Automation, and the U.S. Workforce. Where Are We and Where Do We Go from Here?, 2017 (The National Academies Press, Washington DC)

[3]   Cannadine, D. Rushing students through university and fixating on science is not the way forward. Available: https://amp.theguardian.com/commentisfree/2017/dec/22/rushing-students-university-fixating-science-humanities. [Accessed on 2018, 26 February] 22 December 2017

[4]   Frenkel, L. Online courses don't work, but education can still be disrupted. Available: [http://www.wired.co.uk/article/education-seth-godin-altmba-jolt-nuschool. [Accessed on 2018, 26 February] 28 January 2018

[5]   Fleming, L., Perfecting Cross- Pollination, in *Harvard Business Review*, September 2004

[6]   Jones, R., Fail Again Fail Better, in Jacob, J., M., Baas, J., *Learning Mind: Experience into Art,* 2010 (University of California Press, Berkeley, Los Angeles, London), pp. 151- 163

[7]   William, G., The workplaces of the future will be more human, not less. Available: http://www.wired.co.uk/article/learn-to-code-future-of-work [Accessed on 2018, 26 February]

[8]   Brezing, A., Childs, P., YIim, H., Bland, P., W., Rau, P., P. Approaches to a Cross-Cultural Engineering Design Theory. In *Engineering and Design Product Education EPDE 2011*

[9]   Eppinger, S., Fine C., H., Ulrich, K., T., *Interdisciplinary Product Design Education.* 1990, IEEE

[10] Kolodner, J., Crismond, D., Gray, J., Holbrook, J., Puntambekar, S., *Learning by Design from Theory to Practice,*

[11] Janis P. Terpenny, Richard M. Goff, Mitzi R. Vernon, William R. Green, *Utilising Assistive technology Design projects and Interdisciplinary Teams to Foster Inquiry and learning in Engineering Design*

[12] Schwab, K. *The Fourth Industrial Revolution,* 2016 (The World Economic Forum, Geneva)