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MISSING MISCOMMUNICATIONS IN INTERDISCIPLINARY DESIGN PRACTICE

Vanna Savina TORRISI and Ashley HALL
Royal College of Art

ABSTRACT

Interdisciplinarity is a key ingredient in amplifying the breadth of design explorations and the ability to merge different perspectives is essential for the future of design innovation. Several studies on collaborative work emphasize and support this point of view, however creative collaboration can trigger conflicts mainly due to interpretative differences between individuals with diverse disciplinary backgrounds. A common conception in design and interdisciplinary practice assumes that communications should be clear and effort should be made to reduce ambiguity in order to enhance creativity and efficiency. However, a number of case studies from interdisciplinary collaborations have indicated that the reverse may be true, that in fact miscommunications are a key ingredient of creativity and serendipitous exploitation of different meanings can engender new innovative solutions. Issues that arise in the course of interdisciplinary work can become a bridge or a barrier depending on team context and the ability to identify and investigate the nature of these issues can broaden the opportunity for translation. 'I'll take 9' is a masters teaching module that was selected for analysis to test the identification of miscommunications and the maximising of creative potentials. The findings shed light on interdisciplinarity and question the assumption that clarity and the avoidance of ambiguity in communication is a desired practice. Missing miscommunications emerges as a powerful insight into design creativity across disciplines and signifies the opportunity of using diverse interdisciplinary teams to creatively explore cultural, material, disciplinary and cognitive differences to exploit the chaos in design systems.

Keywords: Interdisciplinary design, industrial design, miscommunication, design thinking, innovation

1 INTRODUCTION

A number of research studies emphasise the advantages of interdisciplinary approaches to developing a multifaceted understanding of opportunities and problems that require complex design solutions [1]. The benefits of creative collaborations range from acquiring the ultimate output in a shorter development time, to the smoother transitions from development to delivery [2]. However the same studies focus on the conflicts that arise during the course of a project involving individuals with different backgrounds.

> "With insufficient encouragement to collectivize for the greater good, collaborative groups of designers quickly dysfunction. This dysfunction is often credited as helping foster the edginess and brilliance of the designer-genius, but this is hardly a sustainable argument in today's globally networked society relying on teams of deep practitioners from so many different disciplines, not only the creative ones" [3].

On the contrary a number of case studies show that miscommunication can be a design driving force generating multiple routes for innovative designs. The authors, A. Hall from the UK and V.S. Torrisi, an Architect from Italy are both engaged in teaching and researching on the Innovation Design Engineering (IDE) dual masters programme at the Royal College of Art and Imperial College London. They have both gained a broad experience in the field of interdisciplinarity through professional and academic collaborations, lecturing every year to over eighty students from multiple cultures and with

disciplinary backgrounds ranging from design and engineering to commerce, art and science. Several projects carried out by IDE in collaborations with other programmes have contributed to the development of this paper and in particular the two cases studies presented here have been crucial in framing the context and purpose of this research.
Departure Lounge is a one-week project run by Sculpture tutor Steve Bunn and co-author Torrisi involving students and senior staff from across the college, the London Festival of Architecture and the Serpentine Gallery. The project explores the latent potentials within the city by reinterpreting the brief of the workshop in which the themes of time, place and encounter were encompassed by architectural space, urban intervention and the physical transience of everyday experience. Students from sixteen different programmes self-selected into the workshop motivated by engaging in an interdisciplinary experience. Five teams were assembled combining Fine Art, Design, Architecture, Fashion and Applied Arts disciplines aiming for an interdisciplinary outcome focused upon problem solving, working with creative processes and narrative building skills. Several factors were key in determining the course of the workshop: the short length of the project, students from the same programme being spread across different teams, students at the beginning of their studies and a workshop brief that was deliberately open to a broad interpretation. A tacit willingness that all team members backgrounds should strongly input into the project encouraged the students to initiate creativity using disciplinary ingredients for new concepts. Activity began with a controversial debate where conflicting communications was caused by diverse disciplinary and cultural paradigms. Initial frictions and miscommunications were inevitable among students who had never met before and with diverse creative thinking and clashing time schedules dictated by different disciplinary routines. A very intense sketching and model making activity followed the initially intense verbal communications that produced a compromise tactic to sidestep conceptual ownership that replaced the earlier frictions.
Misunderstandings were still evident but beautifully merged in hand sketches drawings, full scale models, paintings, written words and short movies that were still speaking different but complementary languages. Students had a very different understanding and perception of the Departure Lounge theme that translated into intricate concepts with multi perspective visions, an impressive intellectual and inspirational breadth.
Observations in the course of the Departure Lounge case study alongside other experiences by the authors involving students from diverse backgrounds reinforced the belief that miscommunication in interdisciplinary design contexts could become a creative tactic for fostering the generation of innovations.
For the purpose of this paper the terms “Interdisciplinarity”, “Collaborative” and “Collaboration” are used loosely to describe an academic environment and projects involving individuals with diverse cultural and disciplinary backgrounds. The authors are aware that the case studies and design approaches presented here might be categorised as other types of collaborative activity including crossdisciplinary, transdisciplinary or metadisciplinary.

2 EVIDENCE IN THE FIELD

The authors reviewed literature discussing communication in the interdisciplinary area and they found that many of the papers exploring this field outline the issues of communications and viewed miscommunications as a problematic aspect. Shaw [4] points out that diversity is key in creative design collaborations yet it can cause potential interpersonal and managerial difficulties. Interpretative differences and misunderstandings are perceived as barriers to a richer understanding of the inputs from other disciplines and new communication strategies are explored to achieve clarity and enhance creativity [2]. Richter *et al* [5] focuses on the use of special disciplinary terminology that can lead to misunderstanding and underlines the importance of developing a common ground in interdisciplinary collaborations. However there are few research studies that lead towards seeing miscommunication as a positive aspect to be embraced and exploited, not to be avoided and “solved”. Morse *et al* [6] discuss the identification and examination of issues that can help or obstruct an interdisciplinary team project in order to broaden the opportunity of translating barriers into bridges more effectively.

> “We found that each issue is positioned on a spectrum and can become a bridge or a barrier depending on team context. For example the issue of “taking risks” to work with the unfamiliar can be a bridge to integration if the individual is willing to try something new and push

disciplinary boundaries, or a barrier if the students prefers only to conduct traditional disciplinary research". [6]

Chiang [7] focuses on communications in the processes of team-based design groups and points out that clear and frequent communication among the design team members is key to the successful development of creative ideas. However too many communications might lead to misunderstanding and generate conflicts. Chiang identified the co-sketching technique as a solution to unfocused or excessive verbal communications. The technique involves only written words and hand sketches and uses the review of the other team members drawings as a stimulus to prolific creative idea generation in a short period of time. Shah *et al* [8] point out that provocative stimulating components in a creative idea generation process could lead to misinterpretations.

"Misinterpretations lead designers along unexpected paths, increasing the chance for novel ideas". [8]

3 WORKSHOP

The findings of the Departure Lounge project and the literature reviewed confirmed the authors' experiences in the field of interdisciplinary collaborations and has led them to challenge the common conception in interdisciplinary design practice that misconceptions are something to be avoided and that they obscure clear understanding. What if ambiguity in design communication could enrich the ideas generation process and utilising conscious miscommunication could trigger designers to envision new creative directions?

In order to investigate how the agency of miscommunications could become part of the serendipitous events leading to innovative design solutions, a research project was designed to investigate a first year teaching module on the Innovation Design Engineering dual masters degree at the RCA. Each cohort of forty students is typically made up of around sixteen nationalities with fourteen different diverse disciplinary backgrounds ranging from physics, engineering, architecture and industrial design, to programming, graphics and design fine art forming a strong set of potential cultural and interdisciplinary interactions.

The I'll Take 9 Module was originally introduced by co-author A. Hall to tackle several shortcomings in design education on the masters programme. The first was to address the fact that most, if not all artefacts made on industrial design, engineering and innovation design engineering courses are produced as one offs. However our modern world is mostly composed of mass-produced objects and students need to experience the challenge of manufacturing products in order to appreciate some of the design and engineering drivers for successful and efficient designs. The module evolved to challenge students to design and make a production run of nine 'looks like – works like' domestic consumer products. An additional objective was to encourage students to learn the realities of industrial scenarios where designers often join teams and leave creative teams at different stages of the design process. 'Parking the ego' is a core skill in this type of environment where the ability to adopt and develop a project initiated by another designer and to critique and understand their objectives in taking the project forward is an essential skill.

In order to address these aims a module structure was developed as follows. In stage one, students are formed into teams of three and randomly select a product and brand combination. The combination is deliberately disjunctive, for instance an Apple fly swatter, Marni birdbox, Ashok door wedge, VW toilet brush or Paul Smith ice cube tray. The disjunction functions as the innovation space when students realise that resolving a classic product-brand interpretation is problematic and requires an alternative design strategy. In week one the teams design and present three concepts for their product-brand combination to another group who select one to continue in the second week. In week two the teams developed their adoptive design and make a prototype to prove the design principle. At the end of week two teams present their design to yet another teams who critique the design concept, material choices, manufacturing techniques, aesthetics and detailing of the design in order to understand how to develop the designs they are about to receive. They then adopt this design for the final two weeks of the module where they construct the tooling, templates and jigs, and manufacture a production run of 9 units, resulting in 126 completed products made by the whole year group in 4 weeks. Experiencing the repetitive production of products and how this can shape and inform design decisions alongside

parking the ego and understanding how to critique received designs are all key design skills that are acquired by the end of the module.
Throughout this process a complex series of presentations, exchanges and communications take place between the groups and group members that significantly impact on the decisions made for the final design outputs. These form a fertile ground for exploring evidence for the possibility of missing miscommunication in interdisciplinary design practice. A one-week design research module allowed the investigation of this question and eighteen students representing three complete project trajectories (handover chains) from the recently completed I'll Take 9 module were selected. The one-week Research IDE module was developed to explore the research motivation of uncovering and exploring miscommunication and structured into the following phases:
Stage 1: *Identifying Miscommunications* - Nine of the fourteen I'll take 9 groups were asked produce a map diagrammatically representing the stage of the project phase they had worked on and to identify categories of miscommunications that occurred in between the projects stages. Four categories of miscommunication were identified and selected to span the variety of media used and knowledge communicated by the groups to discuss and identify miscommunications encountered in the process. The categories for identifying miscommunications were:

- Verbal language
- Visual language and drawings
- Design vision
- Knowledge of manufacturing and production techniques

The groups developed diagrams that included significant drawings, images and words to highlight important directions and steps within the design process and to identify a single keyword and image to effectively communicate the core message of the mapped design stage. Three complete design processes were mapped and diagrammatically represented before focusing on the analysis to explore if, where, why and how miscommunications occurred in the course of the project.
Stage 2: *Inspiring Mis-Communications* – Six new groups were formed and a meta-theme randomly assigned to each group. The groups developed one design concept by going through a session of C-sketching followed by discussions and creative collaboration work among group members. Each group produced hand sketches, drawings and a short sentence describing the design concept to be passed to another group. No verbal communication was allowed during the C-sketching session and between groups. The aim of introducing C-sketching was to isolate and compare a verbally rich creative exchange with a drawing rich creative exchange to see if miscommunications were more prevalent in one form or the other.
Stage 3: *Design Development* – The groups developed the design concepts generated by another group.
The structure of the research module aimed to give the students a deeper awareness of potential misunderstandings that might occur in interdisciplinary design processes. Techniques that could facilitate miscommunications yet foster creative and innovative idea generation were used to encourage students to understand that misunderstandings could be a design trigger and a stimulus to explore new directions rather than a barrier to success.

4 OUTPUT

Mapping the I'll take 9 stages highlighted that 56% of the participants identified divergent design visions dictated by different disciplinary approaches as the primary source of conflicts within groups, while the remaining 44% reported that miscommunications occurring between teams were mainly due to different levels of knowledge and experience of prototyping and manufacturing.
As one workshop participant stated: "During the exploration into the physical realms of testing, the engineer differs in opinions of the best way to crack the nut, as the designers opt for more complex approaches". Efficiency and feasibility versus complexity and originality were recurrent dichotomies that generated disciplinary misunderstanding and conflicting project objectives. However the project mappings often revealed a key finding that what was experienced as a problem during the early stage of the project often proved to be a turning point leading the design process towards more ambitious and intricate directions. Fig 2. illustrates a sample of mapping developed during the workshop.

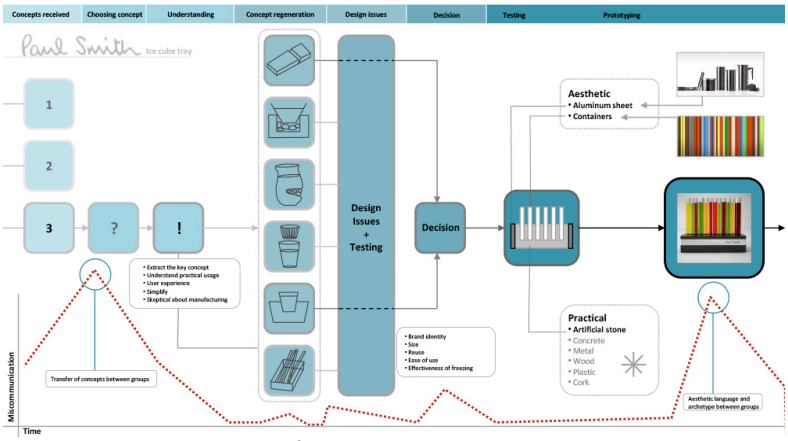

Figure 2. Illustration of a sample I'll take 9 mapping diagram

Students were familiar with the C-sketch technique successfully used in previous workshops, however they pointed out that this time their creativity was more deeply stimulated by the lack of verbal communication combined with the awareness that miscommunication could be exploited in the idea generation process. One student commented: "The simple fact of understanding and using miscommunication allows us to be more creative".

Moreover it seemed that an excess of verbal communications among I'll take 9 groups inhibited further explorations of the inherited concepts developed in the following stage of the design process. However groups reported that they were very keen on maintaining extensive communication among members as misunderstanding or lack of information was perceived as a problem when the final design was manufactured. As one student stated "I think on I'll take 9 we saw miscommunication as just dead ends, we didn't follow on (...) and so it wasn't constructive miscommunication. There was nothing to develop further".

During the course of the Missing Miscommunications research module a brief but intense research, sketching and 3D modelling activity delivered 6 embryonic and yet original design concepts that proposed innovative new technologies and materials and envisioned potential future scenarios. The design ideas developed showed a high level of creativity, but a minimized focus on feasibility highlighted that miscommunication can be a trigger during the initial idea generation phase, but it becomes a barrier when approaching the development and delivery phases of the design process.

5 DISCUSSIONS AND CONCLUSIONS

The authors design research investigation began through an insight on interdisciplinary communications gained in the collaborative Departure Lounge project. Following the insight, further research unearthed miscommunications as a potentially important aspect of exchanges between interdisciplinary groups. The Research IDE week module tested out the existence of miscommunications by mapping them across media, conceptual and knowledge exchanges between groups on the earlier I'll Take 9 module. These experiences were then tested by introducing students to the C-sketch method that relied much more heavily on drawings rather than verbal communications.

The I'll take 9 mapping process demonstrated that different typologies of miscommunications occurred in the course of the project. Four categories of miscommunications including verbal and visual language were selected. However the students pointed out that conflicts and misunderstandings were mainly caused by the diverse disciplinary approaches to design as well as by different levels of knowledge of prototyping and manufacturing processes.

Miscommunications among members of the same group during the development of the I'll Take 9 stages were constructive and fostered the exploration of new creative directions. However miscommunications between groups exchanging design concepts at the end of each stage lead towards either rejection or an uncritical acceptance of them. There was no attempt to reinterpret other groups concepts. This was due to several factors: tutors feedback strongly influenced students decisions about discarding design concepts that did not look convincing, the reassurance of concepts that were fully developed and extensively presented along with data and detailed information to be manufactured and the frequent communication among I'll take 9 groups that became a sort of constraint to further

explorations of the concepts inherited by other groups. This contrasted with the silent C- sketch session that encouraged students to freely reinterpret each others early ideas by exploiting miscommunication to generate novel design concepts aiming at delivering innovation.
In comparing the latest workshop with the Departure Lounge project some key differences emerge: the students who joined Departure Lounge had very diverse backgrounds and during the course of the projects different kind of miscommunications occurred and clashed with each other to unexpectedly trigger an extremely disruptive, challenging, controversial and yet constructive creative process. Whereas the level of miscommunications among the students involved in the Missing Mis-Communications workshop was not as deep and intricate as in the previous project. The students had been working together in the same educational vision for a few months and therefore had more experience of each other's outlooks and working habits and had begun developing a common language.
In conclusion the findings of our research reinforced the authors' belief that miscommunications can be a driving force for design innovation if exploited at the very early stages of an interdisciplinary creative process. In today's environment increasingly complex challenges and design scenarios require the collaboration of professionals with diverse backgrounds who are prepared to successfully use and address the inevitable chaos, conflicts and noise of sophisticated interdisciplinary processes.
The authors conclude that a forward looking academic design environment should focus more on educating successful designers to exploit miscommunications as part of idea generation methods and to creatively explore the differences of understanding in interdisciplinary teams as tools to inspire cutting edge design innovations.

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