Creative design studios: converting vulnerability into creative intensity

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Abstract: Design studios play an important role in training future architects and designers, representing a key space for experimentation and creative practice in the education of architecture, landscape architecture and interior architecture students. Unlike other courses, design studios confront students with the concrete practical aspects of the design process, along with the more abstract poetic experiences of designing. This combination of practice with theory introduces students to the concept of creativity and creative design processes. While conceptually exciting, student engagement often comes with feelings of vulnerability and fear of 'exposure' that design practice brings, preventing them from experimentation. This paper explores various experiments designed to foster trust to aid in students' engagement in creative practices within studios. Several assignments follow where techniques are specifically designed to encourage creativity in the context of the architectural design studio. The paper further examines how architectural studio style teaching can foster a way of creating as well as researching through design and can provide a forum for both the sharing of knowledge as well as communication and collaboration between a wide range of stakeholders.

Keywords: design studios; creativity; pedagogy; education; architecture; interior architecture; landscape architecture.

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1 Introduction

While creativity is highly valued in our current social context and while cutting-edge solutions to real problems are actively sought at all levels and across all fields; design and creative arts disciplines still occupy an unusual niche within universities. They struggle to find a place within a standardised curricula and research. To meet the challenge for more creative thinking, many scholars and educators insist that to enhance creative outputs, a continuous process must be maintained (Lawson, 2006; Moore, 2010; Osborn, 2012; Parnes, 1967; Parnes and Brunelle, 1967; Portillo, 2002; Torrance, 2018; Zinker, 1978).

The development of a sequence of steps enabling creativity to happen is prevalent in both academic and popular literature (Armstrong, 1999; Eigbeonan, 2013; Elnokaly et al., 2008; Kowaltowski et al., 2010). However, attempts to standardise, or develop a formula for a methodology of creation has not always been met with success. Creativity has been inherently present in the practice of designing, however not as a specific knowledge but rather only as a hidden force. It is identifiable in its existence and effects, but never fully defined either as knowledge or method. In the disciplines of architecture, interior architecture and landscape architecture, as well as in design, attempts to systematise the design act and relate the rational with the creative are persistent and ongoing in the current context of the university.

Such problems relating to teaching creative design studios have remained fundamentally the same for decades (Armstrong, 1999; Arsenic et al., 2011; Kahvecioğlu, 2007; Sawyer, 2017). In addition to these, new challenges related to the technological achievements and rapid transformation of society, compound the complexity and require professionals to foster an increasingly diverse, flexible and mouldable profile (Kowaltowski et al., 2010). In an attempt to desperately fit in all of the new requirements of professional bodies, schools of architecture struggle to prepare students with the basic minimal knowledge resulting from curricula. As a result, ease of content delivery and assessment are prioritised. This blinkers students to the creative process and the relationships between different disciplines.

At the heart of the problem is that creativity is subjective, while the positivist university paradigm is focused on objective rationality (Wang, 2010). The university structure demands that most creative curricula be linear with regular sequential assessments, but in practice, a design project almost never develops in a predictable horizontal or linear way. The authors maintain that the progressive magic steps to creativity are instead a combination of statements and denials, an intensive process of self-criticism embodied in crossing paths, combinations, decisions, ruptures, discontinuities, with an ending never predicted initially. Similarly, the creative ‘moment’ is not an event generated by divine intervention, restricted only to someone’s touch,

an act that transfers the mundane to the sublime. Instead, it is here suggested that creativity is omnipresent. It relies on the fact of one seeing a problem from an unusual or innovative perspective; it is the possibility of intelligently perceiving the world differently from the 'common' sense, and the traditional values that define society (Moore, 2010).

Creativity is considered at the core of design processes and is the principal generator of new knowledge in architecture and other related design disciplines. As a result of the subjective nature of creativity and of its expressions, design disciplines (or disciples) find themselves often criticised for a lack of rigour in their processes and are encouraged to become more academically respectable through greater rationality (Barnett, 2000; Portillo, 2002; Sawyer, 2017). Accordingly, some leading design education scholars have argued for the sacrifice of intellectual rigour in order to achieve social relevance (Armstrong, 1999; Kristianova and Joklova, 2017); a trade-off that has arguably caused the marginalisation of design education in relation to most university models of education. More recent attempts to position studio projects, not as sources of problems for rational solutions, but as systems that need to be explored in order to discover their relational meanings and values (Cambel, 1993; Chua, 1998; Morin, 1992; Wang, 2010). Wang (2010) has defined design within the emerging paradigm of complexity, wherein "complexity provides alternative habits of explanation to those deriving from linear, objective, positivist accounts of the natural and social world" (p.175). Although, complexity "values subjectivity and creativity, it does not totally disregard objectivity and rationality" (p.175).

The authors maintain that teaching creativity is as an abstract and impossible task as for example is to try to teach intelligence. It cannot be traditionally taught, it can only be fostered and nurtured by providing enriched environments and removing specific obstacles. Such proposition has significant implications for both the 'what' and the 'how' of teaching creative practice. Frustration and the lack of patience and persistence from students in the face of obstacles is notably an issue that arises in design studios. Often students find it preferable to abandon certain unconventional ideas as soon as the first challenges are encountered. It is nearly always easier and safer to come up with simple or 'safe' solutions. Failure to resolve these difficulties can curtail freedom in creativity. However, the challenge is born in addressing fear, where students feel exposed and vulnerable in exploring the unknown, particularly when it feels personal and when they are in an open forum. Protecting vulnerability is more easily achieved when students' self-confidence in skills has been developed. When students feel safe, initial frustrations can lead the way to alternative strategies and options, confidently promoting further experimentation and development.

The aim of this paper is to create a general, descriptive and reflective discussion of creativity through case-study examples of practices in design studio education. These exemplified applications and experiences are based on the authors' practices and observations in undergraduate and graduate design studio instruction in architecture, interior architecture and landscape architecture. In terms of the methodology for our research, we adopted a qualitative insider-research approach using a multi-case study method, where the authors directly obtained a qualitative experience of the activities as they occurred, in their own context and in the particular situation (Stake, 2006).

The defining characteristics of this method are its holistic approach where the interrelationships between the phenomenon and its context are considered; its empirical nature where the observations are made in the field; and its interpretative analysis which relies on the researcher's intuition, taking the perspective which sees research basically as researcher-subject interaction. Following the work of Stake (1995, 2006), who conceives of qualitative case study researchers as interpreters and gatherers of interpretation, and who must construct the reality or knowledge which they gained through their investigation, we adopted the position where "analysis essentially means taking … our impressions, our observations apart" (Stake, 1995, p.71) and data collection and analysis processes occur simultaneously. With respect to validation, we followed an investigative triangulation approach where the three authors considered and discussed both accuracy and alternative explanations to gain necessary confirmation and increase the credence in the interpretation and the commonality of any assertions.

The paper is organised by first describing a series of experiments each followed by a short reflection, then identifies how these provide a scaffolding for assessed work. The subsequent discussion contributes to the discourse on creative design studios through an exploration of ways to enrich the design environments and methods to remove the most critical obstacles to creative design. Throughout the text, we explore how the creative design studio in our curricula can also be used as a tool for research for instructors and a link between several creative arts. It aims to improve the profile of the students, increase awareness of the public and other external stakeholders, in addition to proposing new ways of thinking and doing.

2 The creative design studio: an overview

A creative design studio has been described as both a place (real or virtual) and an organisational structure or method of teaching (Eigbeonan, 2013). Two methodologies are generally adopted while teaching creative design studios: the first involves students to record and explain creative ideas; and the second entails the analysis of images and gestures to describe the different stages of a creative process (Soliman, 2017). Unlike most other forms of teaching, it is personal and time intensive with high contact hours between students and educators. It is fundamentally about cycles of experimentation, failure, reflection then modification and repetition. In this sequence, the presence of failure is arguably key, as it is the only process that brings about change. If an idea succeeds in the absence of failure in its developmental process, it only serves to reinforce what is already known. Unfortunately, in most societies, failure is traditionally seen as a negative occurrence and is often defined as a lack of success or the neglect or omission of expected or required action (Kowaltowski et al., 2010). The Oxford dictionary lists synonyms such as 'fiasco, flop, loser, inadequacy' and offers defining words including "miscarriage, defeat, frustration, collapse, foundering, misfiring, coming to nothing, falling through, fizzling out, debacle, catastrophe, disaster, blunder, vain attempt", etc. (Stevenson, 2010, p.408). Hence, while arguably failure is more important to the creative process than 'success', if similar defining words are any measure of meaning, the social consequences of failure appear out of balance with those for success.

Not surprisingly one of the main issues affecting both instructors and students in design studios is the fear of failure and perhaps as a consequence of it, social ridicule. In design studios, most of the students initially prefer to stay in a safe zone, where the right thing to do is to have an accepted project and not to venture into unknown paths. This is problematic when the prerequisite of creativity is that it necessarily implies change, above all, in attitude. The authors believe that at the onset of a design studio, it is essential to set up a culture of creative exploration and expression without judgement or preconception of outcomes or expectations. In our creative design studios, the first stage of the process is to change default attitudes and to break rigid patterns of thinking. As instructors we try to develop mostly, the self-confidence of students in their abilities in being creative and exploring strategies of dealing with perceived failure in a safe environment. We then begin to build resilience. Techniques such as experimental and experiential learning, site visits, sketching and modelling, group discussions, among others, are adopted in isolation or simultaneously to overcome some of the obstacles firstly experienced.

It has been observed that some of the most successful examples of setting design studio culture occur in the first week of classes, when students are still trying to understand the emerging structure and processes of their new creative studio. The occasion where students and instructors first meet generates a synergy for introductions. Unless otherwise structured, generally, when students are invited to first talk to the group, the information they provide about themselves remains principally modest. They (the students) experience direct exposure to others (known or unknown peers and instructors) and may feel confronted and afraid of being criticised. In order to reduce this anxiety from happening, an ice-breaker exercise must be introduced to the class.

2.1 Experiment 1: DELVE – destabilising experimental learning and vivid experience

In one example, the instructor asked for the larger groups to break into smaller ones to create social spaces small enough where they could be invited to the unexpected situation of first lying on the floor. The students were asked to close their eyes, and silently meditate about their personalities, hobbies, what they like or dislike. When prepared and ready, they were asked individually to verbally express their thoughts while remaining with closed eyes. This was done with the knowledge that no one was looking directly at them and reduced the fear of being judged (Figure 1). This introductory exercise promoted bonding with each other and with the instructors and proved successful in reducing stress and anxiety.

This experiment confronts students' safety zones and their fear of designing by exploring abstract propositions through a range of innovative speculations embedded in randomness or collisions and grounded in critical disciplinary interrogation of current social and cultural issues. The combination of a lack of trust in skills and a fear of failure, resulted in designs that lacked innovation or excitement. With that basic concern at heart, creativity and creative processes were introduced, aiming to familiarise students to creative thinking and provide them with the means and the basic tools required to build competencies for creative practice. Nurturing self-confidence with innovative patterns of thinking, through a series of 'destabilising' exercises, students were introduced to key aspects such as collection, synthesis, translation and transformation.

Figure 1 The ice-breaking exercise where students are invited to drop their fears and express themselves without being judged. This exercise through the years has revealed a growth of self-confidence in students (see online version for colours)

2.2 Experiment 2: engaging the body – putting on a MASK

In this experiment, students were required to design a research clinic for a specific impairment. Clinics for sensory impairment (deafness and blindness), mental impairment (eating disorders and dementia) and physical impairments (stroke recovery, cancer recovery, spinal injury and mobility) were all explored in groups of 5–6 students. To encourage empathetic design and to engage with the stigma and discomfort of disability, they were asked to create a mask to be worn while explaining the aspects of design that were critical for the impairment. A mask is an object normally worn on the face for protection, disguise, performance or entertainment. Contrary to its expected use for covering and hiding, students were asked to use it for revealing, to dig deeply within themselves to connect with a disabled self and then design a mask that revealed their most powerful identity. In making the prototype of the mask through hands-on and process-driven design methods, they explored materials, joints, surfaces, form and positioning of the 'mask' on the face (Figure 2).

The objectives were to review basic methods of generating ideas and abstracting conceptual narratives for design; to draw attention to the subjective matters which play a major role in architecture, to produce objects to communicate ideas and to construct a representational piece of art. Individually, students dealt with the issue of disability-identity. 'Who am I' or "Who am I now?". They were given freedom to choose

techniques and materials and no limitations were posed for the dimension of the mask, as long as it could be worn properly – in contact with the face, head, neck or upper shoulders.

Figure 2 Mask prototypes developed by students (see online version for colours)

While engaging within the confines of their peers, students had to present their predesign research while wearing their mask, which introduced a level of individual discomfort and vulnerability similar to that when engaging as a group with the public. The key to the success of this experiment was fostering an experience of fear and pushing past it. This exercise was developed with the idea in mind that fear blocks creativity and that students can only learn to remove this block and release creativity to flow through direct personal experience.

2.3 Experiment 3: engaging the body – body trace

In this experiment, students were introduced to somatic ways of knowing before engaging in a formal assignment in interior architecture. The somatic basics considered included: witnessing body (part) dimensions; understanding the volumes of spatial occupation by the body (part); grasping the space described/formed by a movement and comparing it to the generating part's own space; and finally, viewing and translating the immediacy of the body and its notions of perceived intimacy and privacy. A collection of drawing based research looked at precedents in the domains of art installations and video works. Next, students were invited to leave a trace of one of their body parts on a surface. In order to do this, they applied paint to their skin in a colour they individually chose to represent themselves and then pressed against a paper surface pinned on the wall or flat on the floor. The synthesising work was to focus on a limb (please note that due to contemporary context, other body parts were discouraged) (Figure 3).

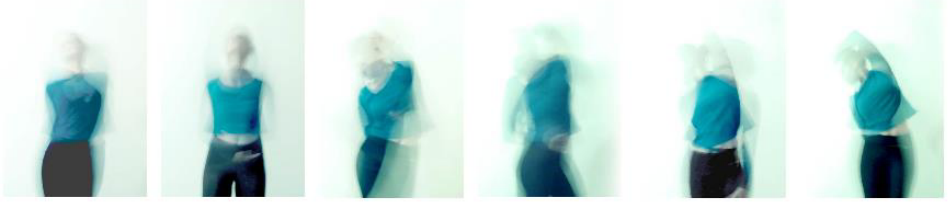
The precedents of Paul Klee's blue series were acknowledged to enable the students to be free in exploring various colours. The students were then invited to translate and to add dimensions to the 'trace/drawing' in millimetres to the entire body part that generated the trace. This was to invite the witnessing of one's dimensions and compare the generating limb and its trace. While the images were shared, the actual dimensions remained personal and private, with such record to be kept only in their own material.

Following this experiment, students were invited to explore precedents of photographer Shinichi Maruyama and artist Heather Hansen. To transform their previous

experiments, students then had the choice to either follow the direction of photography or of ink/paint printing, allowing some to choose to take photographs of one of their movements, and digitally process it to obtain a volumetric rendering; or draw a record of a movement with charcoal or black ink/paint on one large sheet of paper, pinned on the wall or flat on the floor. Both exercises invited students to grasp the space taken by a body (or a body part) in movement. Many students were surprised by the amount of space one movement takes, especially when compared to the previously noticed smallness of the body part (Figure 4). While the students had an 'augmented' view of their bodies, they had a 'reduced' perception of the space making of their movements.

Figure 3 Trace of a body part (see online version for colours)

Figure 4 Photographing movement (see online version for colours)



This experiment was grounded in the fear of exposure, the judgement of others and the intensively personal feelings about their body as well as the intimacy entailed by engaging with it. Combining the energy generated by discomfort with an artistic expression, transformation occurred, exciting new revelations and opportunities.

2.4 Experiment 4: observe and interpret

This experiment involved close observation with knowledge in time, forming a narrative. Working from the premise that our life unfolds in places with different natures and different configurations, we acknowledge that our perceptions and experiences are directly connected with different aspects of place. Students were given a set of questions for guidance to explore the city, such as: Do you know any place like that? Which? Explain briefly, using diagrams to support your ideas. How do you feel in space? What feelings are you experiencing now? How do the natural elements shape the place right now? (Is it windy, wet, muffled, cold...) Through signs or traces can you perceive the history of the place? Describe the signs and/or make a brief survey. Which artificial elements help to characterise this place? And so forth.

This experiment forced students to pay close attention, to reflect and then to creatively find a narrative to make sense of their design process. For example, Student B used doors to tell the story of her journey. She maintained that each door that she passed on her way home from school had a story to tell, developing a creative way of interpreting the city in which she lives (Figure 5). Students were required to break from the traditional linearity of a chronologically-based journey to a *kairo*-logically grounded narrative.

Figure 5 The work of student B (see online version for colours)

2.5 Experiment 5: engaging the body – stop and freeze

This experiment seeks to catapult students from their comfort zones. Staged in a public plaza at lunchtime, it engaged with performativity, first individually and then as a group. This experiment was so successful, the students were joined by members of the public

who participated in the event. A particularly short time frame for introduction ensured students did not have time to develop fear but instead accessed their adrenaline as excitement to reach a creative idea. Students were required to silently perform an activity that allowed for public display or interaction. For example, some recreated activities from daily life, such as doing the laundry or taking a shower or even preparing and eating lunch; others sought to attract members of the public for a date and some enacted childhood games. The purpose of this experiment was for them to learn the challenges and opportunities present in working with the public.

Following this performance, students were then required to form as a collective, rehearse to obtain a clear communication of an idea, then freeze in place for 15 minutes. Seeking to make a statement on consumerism, one student packaged the others in plastic film that vibrated and flapped in the wind, creating both a visual and aural sensation (Figure 6). Between local residents and tourists, many pictures were taken and some even ended up being 'wrapped in the process'. Any students concerned with their lack of acting or performance skills soon lost their fears and engaged with the fun.

Figure 6 Freeze in public (see online version for colours)

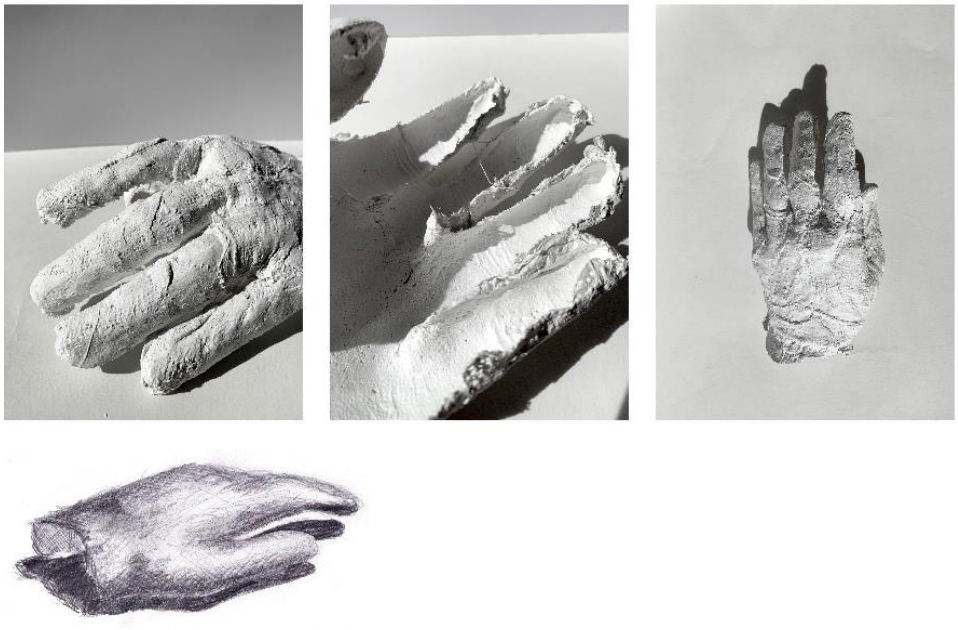
2.6 Experiment 6: engaging the body – body space

This experiment asked the students to encase a body part (for example, neck to shoulder, foot sole, hip, side of forearm, knee/part leg, etc.) within plaster cast to form a sculpture. The exercise was to invite an understanding of the space taken by the body in its volume but also its texture (skin rendering on the plaster) (Figure 7). The presence of the limb through its absence was considered by most students. Several of them were surprised by the smallness of the space taken by their body parts. They hinted that they had an augmented view of the size of their own limbs.

Then they were asked to sketch the plaster work from different distances and at different scales. The 'sketch artist' gradually changed scale and dimensions to arrive at an inhabitable sculpture at a building scale. This exercise sought to trigger a witnessing and inhabiting of the space of a limb. Once again at completion of the drawing stage the

students were asked to measure the artefact plaster and add dimensions to their drawings. Building from experiment 3 above, this exercise developed student understanding of space created by a body (or a body part).

Figure 7 Plaster mould (see online version for colours)



2.7 Reflection

The previous experiments were designed to expose students to creative means of observation, engagement and understanding followed by interpretation and reflection. This was creatively achieved through the manipulation of emotion. Traditional methods of selected observation and interpretation, engagement with and recording of observations of others, was made transformative through the emotional response elicited to unpredicted events. The process of discomfort associated with vulnerability and exposure, was initiated in each experiment to provoke a shift in the mindset of students in order to develop confidence in exploring creativity.

While experiments discussed were diverse in nature, they all focused on understanding the importance of creativity and its use in creative arts and they all freed students, allowing them to reach a stable level of creative development. The practicability of these experiments encouraged students to work through a set of practical exercises, helping them to understand the theoretical framework through the processes of collection, synthesis, translation and transformation. The practical exercises tested creative thinking by finding outstanding solutions for problems, exploring artistic skills and self-expression.

Transposing this experimental learning with the formal university assessment requirement was undertaken in a number of ways. The design experiments formed useful strategies for preparing students for work that would be examined. The assignments then

build from the confidence developed in the experiments and extends students' capabilities in thinking creatively as well as developing their confidence.

3 Assignments

To foster creativity within the confines of the structured linear teaching learning systems inherent in the University, a series of experiments were introduced to break the ice and address the fear of evaluation/judgement/assessment and the risk adverse behaviours that result. The experiments scaffolded the learning objectives and created an alternative assessment, that of the group. Examples of assessments which were used effectively to re-enforce design experiments follow.

3.1 Assignment 1: concept of creativity

One first assignment asks students to reflect on the idea of creativity (following definitions provided in the course material), by searching for something that truly reflects the concept of creativity in their opinion. This assignment helped to define creativity at early stages and to identify the most common misunderstandings by translating, interpreting and transforming. For example (Figure 8), Student A's exploration of creativity involved a metaphorical way of looking at landscape by abstracting out a personal journey through time and space, represented by the four points, each one symbolising a crucial part of life: mind, body, spirit and community. These constructs are intertwined and joined together in a wide landscape through the floating mesh.

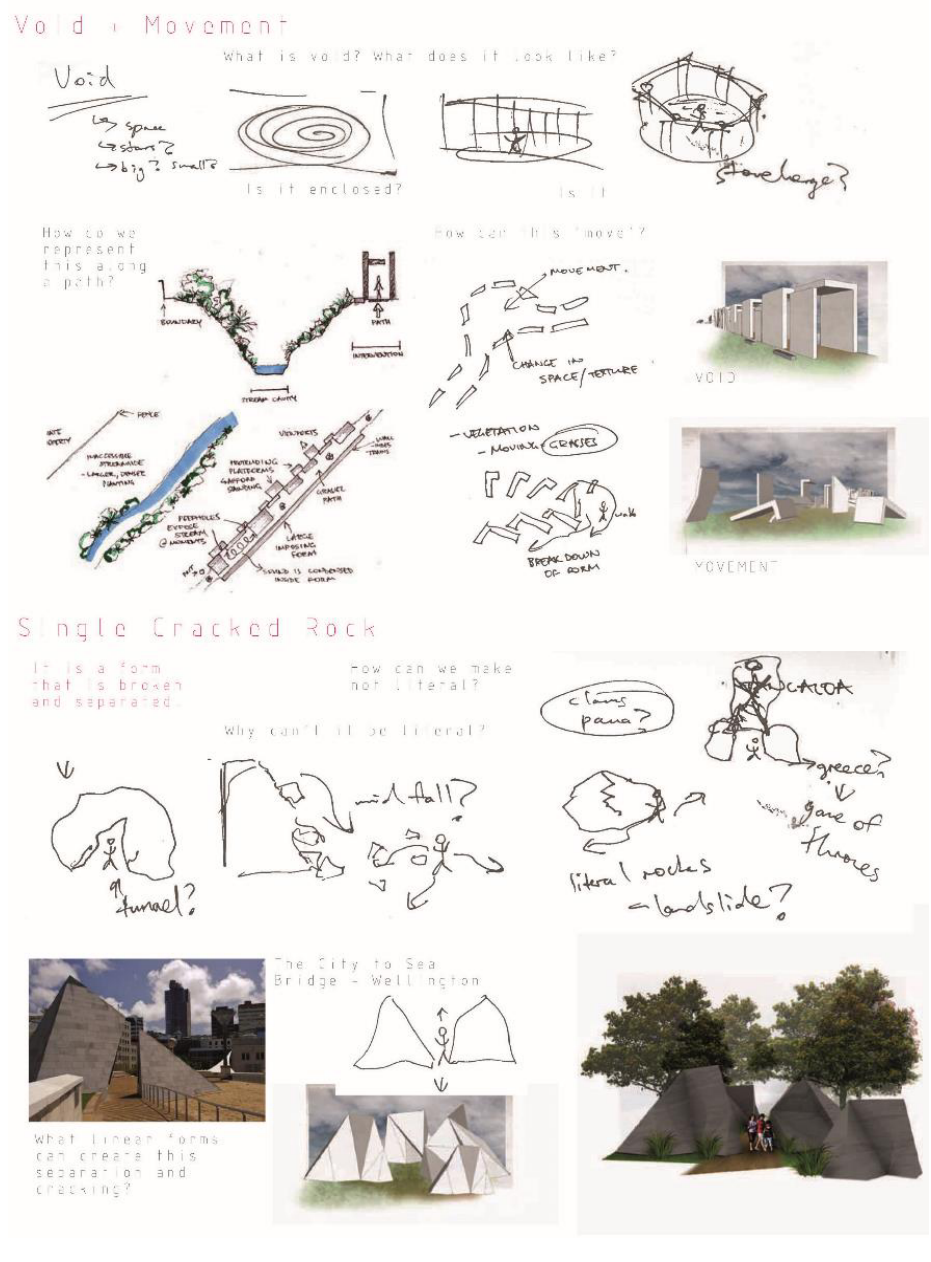
Figure 8 Floating self (see online version for colours)

3.2 Assignment 2: visual creative diaries

Developing visual diaries can help students to connect with their own creativity through a collection of ideas, thoughts, images and drawings (Figure 9). This process is based on the following interrogations: what sort of creative day did I have? Was it a fantastic one,

an okay one, or somewhere in between? Where this assignment differs from the many creative/visual diary assignments, is that it examines both success and failure as it requires reflection on the creative processes used. Having experienced self-exposure in the experiments, the reflection illustrates that to express something on paper, the creative process must be already initiated. Self-examination and self-awareness provide insights into the creative methods that fit best with a student's style.

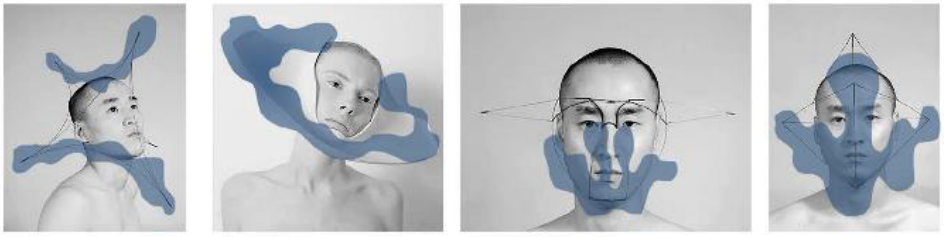
Figure 9 The evolution process of an idea, the several options containing the failures and success (see online version for colours)



3.3 Assignment 3: through making and installation

In an interior architecture assignment advancing ideas of the relationships between body and space, students were asked to research the precedents of Olafur Eliason's installation work, Rei Kawakubo's prosthetics and to revisit Heather Hansen's movement work. The students were required to translate the body and space relationship through these authors ideas by either making an art installation at a scale of 1 : 15 or 1 : 10 of a body movement in space or making a body prosthetic at scale of 1 : 1 that were to be worn (Figure 10). Both options were crafted to simulate and stimulate a viewing of a 'sphere in the immediacy to the body', and a translation of the perception of intimacy, and privacy as described in Hall's proxemics. Self-awareness provides insights into the necessity to confront the reality of the body in the design process of interior architecture.

Figure 10 Forming the concept of prosthetic (see online version for colours)



3.4 Assignment 4: applying creative techniques

This assignment has a strong theoretical component, exploring techniques used in creative arts, such as thinking hats, mind maps, metaphorical thinking, ideatoons, among others. Key questions were asked of students: how should you look, how should you see what you are looking at, how do you make sense of what you see, what different understandings might you have and how might you transform what you see into an output or an action. By matching tools with questions, students were asked to draw parallels to architecture and to trace the use of those techniques in design. The outcome of the assignment was to find practical examples in architectural design, and in this case landscape architecture, where each technique had been used successfully. A critical approach was fostered by identifying the strengths and weaknesses of each technique. The intended outcome was to understand the working methods applied by the profession and the development of a critical approach to assessing it. This process enabled the students to reflect and obtain insights into their own design and creative processes.

3.5 Assignment 5: engaging the body and through making, retreating from the computer

Another important aspect of planning assignments is to strategically retreat from using the computer. A focus on digital drawing can limit creative thinking, by restricting solutions to those easily accessible in the software and by creating a standardised conventional output to the work that looks believable. This practice noticeably blocks creativity and visual thinking as well as the ability to convey concepts in early stages of the design process. In this assignment, students were asked to return to sketching.

Several studies have contributed to the conclusion that conceptual sketches, or random sketches, are valuable to support the phenomena of emergence and reinterpretation of ideas during design studios (Hargrove, 2012; Kvashny, 1982; Medina, 2019). Emergence here is related to the thoughts and ideas that cannot be planned or anticipated before the execution of the sketch and reinterpretation relates to the ability of transforming, developing and generating new images in the mind, while sketching (Lawson, 2006). The interaction between architect and sketch is generally called a 'way of talking' with our own ideas. These sketches are responsible for achieving the conceptual idea of the design project and they give support to the mental creativity necessary to reach new ideas. For most of the assignments, students were asked to sketch from the beginning and to show the sequence of how they reached the final idea. This attitude developed their ability to jump from visual thinking, to idea, to paper, refining the outcome as well as exploring new techniques on how to express an idea, without using a computer.

As a second example, in another (landscape architecture) design studio, students were re-focused on model making. A new assignment was introduced, whereby leftover materials from the design studio were recycled and students were asked to create a perceptive model for a specific street in the local community. This task was to be accomplished within 10 minutes and aimed to analyse the capability of students to talk with their ideas and express them (Figure 11). The model aimed to communicate the emotions experienced in a certain street. For the assignment, students were not permitted to use digital composition but instead were encouraged to explore their drawing and composition skills.

Figure 11 Perceptive model developed to summarise the experience of a site (see online version for colours)

The second part of the landscape architecture assignment aimed to capture the space-time relationship through drawing. Following their selection of the route – which might have something to do with the daily routine of the student, or a desire to explore the city, or based on a reference such as a pre-existing novel or a movie, notions of movement and rhythm, colour, texture, perspective and inhabitation were explored. On the chosen route, students performed synthetic drawing (sketches) considering factors such as orientation, location, references and characteristic elements, but also conducting a search at the historic, symbolic, poetic, and memory and identity of the place.

3.6 Assignment 6: offer and effect

In this creative studio, students were asked to explore four conceptual models. In order to encourage the students to take risks, it was agreed that to provoke or challenge, was successful and only a lack of engagement could be considered a failure. Three of the four models were selected by their peers for further development on the basis that the model would be most likely featured in a modern art museum. Following this exercise, students were asked to submit the selected models for assessment. Students found this assignment challenging and did not like the fact that they would spend time designing a sacrificial project. Many established one model that was clearly designed for rejection. Others developed all four models at the highest level of resolution without taking any design risks. This assignment was probably the least successful in fostering creativity and demonstrated how the tendency for design efficiency, where energy is expended for reward (e.g., grades) for each endeavour. Equally, the fear of deciding which of the models is the most suitable for development or exploration can generate anxiety. Vulnerability is fostered through the potential that the favourite model would be rejected by peers but also through the fear that the preferred model might be criticised. In this final assignment, a significant amount of effort was required to scaffold through experimentation in preparation for assessment.

4 Discussion

In architecture schools, students are expected to engage with knowledge, creativity, verbal enthusiasm, clear and critical thinking and respect for the ideas read, heard and studied in class. On completion, they are expected to understand creative thinking, use basic idea generation techniques to support creative practices; more specifically to develop new ideas and to apply critical thinking within the context of producing a well-reasoned architectural project. With foundations in experiential learning, these processes provide evidence that real-world experiences can offer opportunities to test, trial, revise and develop a student's subject knowledge. Direct experience was a crucial component of the assignments and experiments with this approach and often community engagement was used as a tool to enrich learning outcomes on a course or a module.

The need for comprehensive and profound change in the architectural education system has been widely debated (Annette, 2002; Arsenic et al., 2011; Fuão, 2008; Moore, 2010; Veloso and Elali, 2002). This debate is intensified by the emotional charge associated with fear in the face of 'creativity'. The design of a curriculum, process or assignment that places individuals in vulnerable positions requires careful and sensitive management (McIntosh et al., 2019; Medina, 2019). Leaders should be prepared to spend time clarifying and developing a shared understanding of creativity before commencing any activity, from class experiment to curriculum change. The transformation of fear to creative excitement can take time and can be met with resistance through initial tokenisms of response. For this reason, we found the use of experimentation extremely useful as a minimally threatening scaffolding exercise.

The university workplace requires attention for relevance in the current context. Historically, universities have been isolated from urban public forums. Internally, instructors often work in isolation within their institutions and the institution rarely engages directly with the public. This affects the overall performance of the curricula by

hiding experimental explorations from the public which reduces risk but also reduces the excitement of an accountable creative response. Easily identifiable as experimentation, student work can foster community engagement and develop students' communication skills with their public. Our experiments with public engagement and awareness highlighted the important role of advanced preparation for design studios, increasing the rigour of the experiment. Public involvement can generate interest in the activities at universities, creating an understanding of what instructors and students do as well as an acknowledgement of the importance of creative work to society. This both raises the profile of the profession and develops self-confidence in the students.

An extension of participatory design, these kinds of interventions can be considered as a form of 'service learning', where students learn through engaging with and 'serving' a local community. These activities involve reflective learning and enable students to develop key skills and capabilities as well as a greater sense of civic awareness and active citizenship (Craggs et al., 2017; Marques et al., 2018; McKenna and Martin, 2014). Engagement with the public can also train their creativity and skills to better understand the work of the architect and of other creative professions. We maintain that universities should prepare students to be ready to deal with the public, particularly as the design of a place will affect the life of many citizens. We have found that, with few exceptions, society is eager to help in the education of our students.

Creative design studios have been widely ignored as generators of new knowledge in architecture disciplines. Similarly, design research methods, such as researching through design have been criticised for perceived lack of rigour. A critical reflection on the teaching and learning of architectural design as process related to the know-how of architecture, finds very little space in the scientific community which is most frequently focused on quantifiable research (Petrović et al., 2018). Taking this approach, built spaces are based in measurable data and devoid of creative matter (Marques and McIntosh, 2018; Portillo, 2002; Soliman, 2017). This hampers the incorporation of creative processes into teaching and design research and encourages engagement with research areas and topics that do little to advance creativity. Teaching in design studios, empowers students to interpret, to introduce new tools and to experiment by presenting multiple angles for exploration.

5 Conclusion

> "Whoever creates, adopts a very personal way of seeing things, where consistency and contradiction coexist simultaneously." (Fuão, 2008, p.2)

This paper explored the experiences of teaching creativity and creative processes for architecture, interior architecture and landscape architecture students. To connect concepts of creativity within the architectural disciplines, a series of experiments were used first to facilitate observation and help students to access their knowledge and creativity. Second, after their gain of confidence and diminished fear of unsuccessful experimentation, students progressed to designing works that were formally assessed. Assessment forms an important element of student learning as it demonstrates how success can be evaluated. Some of the lessons learned were that risk taking, so essential to creativity, can be fostered through non-assessed experimentation by creating a formative platform for the summation to follow with the assignment. We also found that

the design of an assignment that places people in vulnerable positions requires careful and sensitive management. In our experiments, engagement was often physical: lying on the floor, putting on a mask, colour printing a portion of the body, casting limbs in plaster, or moving and stopping. Creative excitement was fostered by combining fear with a protective environment. We learned that the transformation of fear to creative excitement can take time and can be met with resistance in the form of initial tokenism. It is important to remain patient and change focus from the delivery of a curriculum to student experience.

In the bureaucracy of a large university institution, linear process and progressive development are more easily defensible with regards to assessment. Fear of criticism minimises risk and constraints creativity. In addition, means of fostering creativity are still not widely understood, particularly in relation to creative arts. Engagement that involves an emotional connection in addition to intellectual pursuit, rarely occurs in predictable manner. Agility and flexibility are required to obtain a creative output. There is a need for greater understanding of the instructors' role as an 'educational/tutoring coach' in studio teaching and in nurturing creativity. This would help to address the sensitivities involved with transforming fear into creative energy and consolidating that which is established in the practice of studio and the learning of architecture. Creativity cannot be taught, only cultivated and nurtured. Often this is cause for criticism from other disciplines where personal exposure does not play a role in student learning. For those in creative areas, the experience of and the subsequent removal of fear is essential to allow creativity to flow.

A related issue concerns the need for greater multi-disciplinarity. By promoting student work, both within the university and externally within the community, linkages with other disciplines and with the full range of the public is both possible and even easy. Assignments that offer the opportunity of public engagement, create awareness of what the university does. At the scale of the institution, exposure to other disciplines creates awareness of architecture and fosters creativity at the university level. In this manner, engagement with the community is a useful way of generating fear which has knock on benefits for the university, the profession and the community. However, the fear of criticism and disapproval is also real. We maintain that suppressing creative ideas and processes at the expense of general approval is a price too high. What is often forgotten is that the educational system is preparing students for both 'life' and engagement with the labour market. A 'safe' approach does not consider how to increase the competitiveness of the future professionals with a mouldable profile to challenge societal expectations.

Transforming fear into creative energy is not a task for the faint hearted. It involves risk and as such requires greater attention to preparation and to the protection of the individual. This is a collective endeavour. The research undertaken in this study offers suggestions for how to navigate and negotiate creative endeavours within the classroom, within the university and within the community. It finds that due diligence can still be achieved when taking chances if the endeavour is adequately curated. It further finds a win-win for creativity for all involved.

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