IASDR 2019

International Association of Societies of
Design Research Conference 2019
DESIGN REVOLUTIONS

Manchester School of Art
Manchester Metropolitan University
02-05 September 2019

Creativity assessment in design: an experimental study

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This research study presents an investigation of creativity assessment in design education. 50 years of research in field seemed to have lead to more questions than answers, as despite a theoretically rich body of knowledge, it is yet to be determined what is creativity and how is this assessed in design education. The gaps in the literature which ranged from not having a clear, universally agreed upon assessment criteria to not knowing who should assess creativity, exposed an opportunity for contribution to creativity in general, and creativity in design academia, in particular. Set as experimental study, this research proposed a theoretically underpinned method of investigation, the Creativity Genoplore that implied a two-stage study: design product generation (geno) followed by design product assessment exploration (plore). Following the development of a simple creativity problem (CBoard), 68 design students produced design outcomes, which were consequently assessed by 47 design academics. Upon the analysis of the results, it was found that while from a theoretical point of view, a universal understanding of creativity does not exist, within the remits of this experiment the academics agreed with each other on the creativity of the design outcomes. The results of the study also found that there might be value in centring further investigations on what does not constitute a creative design outcome.

Keywords: creativity, creativity assessment, creativity in education, design creativity

1.Introduction

The following document has at its centre the study of creativity assessment in design higher education. The investigation emerged after an anecdotal observation promised a research project, which had the potential to enable contributions to the field of creativity and design education. The observation was a simple one: within the academic environment, both students and academics often used the word creativity, but they seemed to struggle to articulate its meaning. On one hand, creativity seemed to fit comfortably in everyday academic vocabulary, while on the other hand, clear explanations on what is creativity and particularly how is this assessed in design academia, became polarising.

Set as an experimental study, the investigation aimed to isolate the assessment of creativity by following a theoretically underpinned method of investigation: The Creativity Genoplore (CG). This implied a two-stage study design: design product generation (geno) followed by design product assessment and exploration (plore). The CG model was proposed as the

literature exposed a methodological gap, which was caused, by the limited number of creativity studies conducted at the cross between design and education. 50 years of research in field seemed to have lead to more questions than answers as despite a theoretically rich body of knowledge, a universally agreed upon understanding of creativity is yet to be established.

While gaining momentum since 2009, creativity and the creative economy, are only now on the global agenda, as experts urge that academia cannot afford any longer to only vaguely understand creativity. The gaps in the literature, which ranged from: **(a)** The absence of a clear definition of creativity in design education; **(b)** a fragmented understanding of assessment criteria; **(c)** The ambiguity around how should the assessment of a design product be carried out. These gaps showed that creativity and its assessment are yet to be fully understood.

2. Research Background

An initial review of the available material in creativity education was made possible by looking into the findings of a project published by Williams, Runco and Berlow (2016) who mapped out creativity as a research field. Employing a content and trend analysis on 1891 articles published between 1965 and 2012, Williams, Runco and Berlow (2016) reported amongst other findings that creativity in education has been previously investigated. While the number of documents published around creativity in education was low 98/1891 the review did show that the topic has been explored. According to Williams, Runco and Berlow (2016) design was researched in creativity in combination or in context with other keywords such as:

> *design, chance discovery, drawing, human-computer interaction, methodology, outcomes, craft, learning, examples, creative product, constraints, teaching (P.390)*

Looking beyond this review, it was found that 2009 was a year of significance within the field of creativity, as efforts to identify practical ways to understanding it in education have been reported since then. According to Villlalba (2012) the Joint Research Centre of European Commission together with the Creativity Research Journal initiated in 2009 a debate on the importance of understanding creativity from a policy maker perspective. European Commission researchers urged that creativity should be included when making decisions on educational systems (European Commission, 2011). The results of this initiative lead the European Council to conclude that education can no longer afford to ignore creativity within their curriculum. These findings, showed that while creativity in education was not necessarily on the global research agenda before 2009 and comparatively not much had been published around the topic within the last 25 years, efforts to draw attention towards it are proactively made. The 2009 spike in the research trends was also interpreted as evidence that globally creativity is becoming relevant. Despite this, in the European Journal of Education, Collard and Looney (2014) stated:

> *There is no widely shared definition of creativity in education policy or in school curricula (Cachia et al., 2010). Nor are there any clear reference standards for judging the quality of learners' creative products (…) At the same time, learners receive*

little guidance on how they might improve or deepen their work. Neither teachers nor learners are encouraged to develop their own sense of what counts as high-quality creative work (P.351)

Further looking into the literature, it was found that while a sense of urgency to understand creativity exists, globally, when filtered through to education, creativity as research topic is even more ambiguous and vague (Perry and Collier, 2007). While this was a less comfortable finding to accept, it appeared that creativity is not understood in education, meaning that its assessment is as expressed by Plucker, Beghetto and Dow (2004) done following a 'know it when you see it' approach. Furthermore, atheoretical tension was also observed in the literature. On one hand globally, creativity was seen as economic currency, which possibly caused a rise in its research, while education was answering to this need somewhat blindly. In an editorial published in the London Review of Education (2012) the authors Coate and Bolous (2012) commented on this imbalance by stating that:

> *universities are called upon becoming centres for creativity and innovation at the heart of knowledge economy, but they are expected to do so without a shared understanding of what creativity is (p.135)*

These findings showed that education is perhaps taking a reactive approach to understanding creativity as opposed to looking at this proactively. As such, opportunities to make contributions to this area seemed possible.

3. A proposed answer: The Creativity Genoplore study design model

In an attempt to pin down how the assessment of creativity in design education was being carried out, the research project followed, as previously stated, an experimental methodological approach by proposing a Creativity Genoplore model (*Genoplore is a notion which is defined as methodological approach which implies two stages: generation and exploration*).

In this particular case, the proposed Creativity Genoplore model implied the generation of a designed product, in order to explore its assessment implications. The Creativity Genoplore model was based on a review of creativity as a field of research and included areas such as past and present creativity assessment techniques in the context of controlled experimental research. This in turn, meant that in stage one: generation stage, a creativity problem had to be put together in order to produce new design products; while in the exploration stage the assessment of the objects was considered.

Literature on the fundamentals of design such as: shape, colour, size and structure informed the proposed creativity problem, which was named the Creativity Board Problem (CBoard©). Consequently, design students were recruited to answer the problem and generate a design product (as per the stage one of the Genoplore study design). The design problem consisted in asking students from a variety of design disciplines to generate a creative composition by using 16 shapes (eight quarter of circles and squares black and blue) in a predefined space (40x40cm). To complete the problem, the students were given three minutes.

Upon responding, individually, to the CBoard© creativity problem, 68 design products were generated (please refer to the image below).
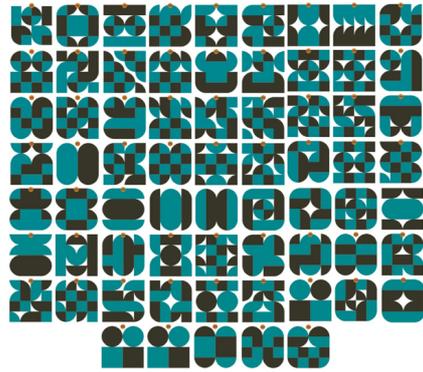
Fig. 1: CBoard responses

In line with the methodology and the Creativity Genoplore study design model, the second stage was to explore the assessment of the 68 newly generated design products. Within this stage, 47 design academics, mostly from De Montfort University, were asked to judge the CBoard© responses generated by the students.

The experiment hoped to mimic the assessment process in design education, however this had to accomplished in controlled settings. As such, the protocols for assessing the newly generated CBoard© responses were set according to literature findings and implied the application of an existing technique: Consensual Assessment Technique (CAT) (Amabile, 1996). According to the CAT, the assessment of the products had to be made independently and agreement must be achieved without the opportunity to influence one another. Another essential condition expressed by Amabile (1996) indicated relative judgement; as the academics were to rate products relative to each other and not against an absolute standard. Lastly, the products had to be always presented to the assessors in a different random order (Amabile, 1996). As a result, following the CAT protocols the design academics were asked to sort the 68 products on a Likert scale as follows: very uncreative (1), rather creative (2), undecided (3), rather creative (4) and very creative (5). During the individual judging process, the academics were also asked to 'think aloud' in order to externalise their thinking process. The judging activity concluded with an open question in an attempt to find out what do the design academics think creativity means in the given context.

1.**Preliminary findings**
Following a statistical analysis of the assessment of the 68 CBoard© design objects, the formulation of the following conclusions was made possible.

Agreeing on the extremes
In the controlled settings of the experiment, the 47 academics agreed with each other on which are the very uncreative and very creative CBoard© responses. Employing a Cronbach Alpha statistical analysis, the agreement scores were 0.831 which was considered according to the literature good (Silvia et al, 2008). For example, 42 out of the 47 design academics scored the composition on the left 1 (very uncreative) while 43/47 scored the composition on

the left 5 (very creative). These agreement scores, indicated, in turn, that while there is no written agreement on what is creativity and how is this assessed, academics still know what they are looking for when it comes to the creativity of a design outcome. As such, it would appear that creativity is not assessed on a 'know it when you see it approach'.
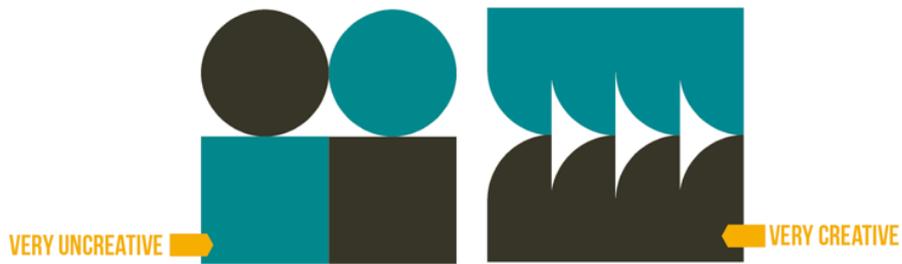
Fig. 2: CBoard© responses: very creative vs very uncreative

Easier to judge what is not creative
Based on the frequency of the very uncreative and rather creative scores; the academics appeared to be able to judge easier what was not creative. This conclusion was supported by averaging the 1-5 scores in relation to the agreement scores. The data showed that 39 out of the 68 responses generated by the students were placed by the academics in the very uncreative or rather uncreative categories. This further showed that academics might find it easier to pin point what is making a design response uncreative rather than creative. The 'know it when you see it approach' would therefore be reframed to ' know it when you don't
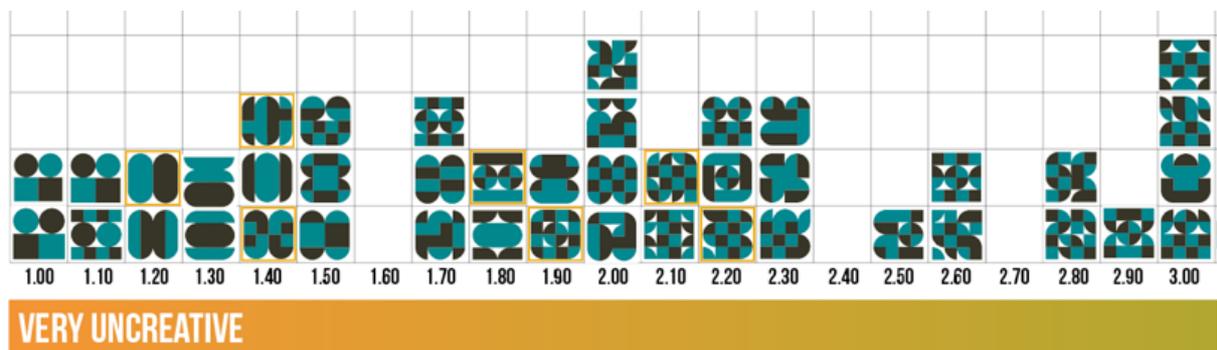
see it'.

Fig. 3: CBoard© responses: very uncreative

4. Preliminary Conclusions

While the findings of this investigation are more complex and the data is yet to be fully analysed, these preliminary results seem to show that there is a possibility to contribute to

the ongoing dialogue on assessing creativity in design higher education. The findings showed that reframing the research problem might provide some much-needed answers. Based on this and following the controlled experimental methodology, this investigation proposed to ask why design outcomes produced by the students are not creative instead of asking why these are. By doing so, perhaps education could take a proactive approach in the journey to finding a universal understanding of creativity; even if this means exploring what creativity is not.

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