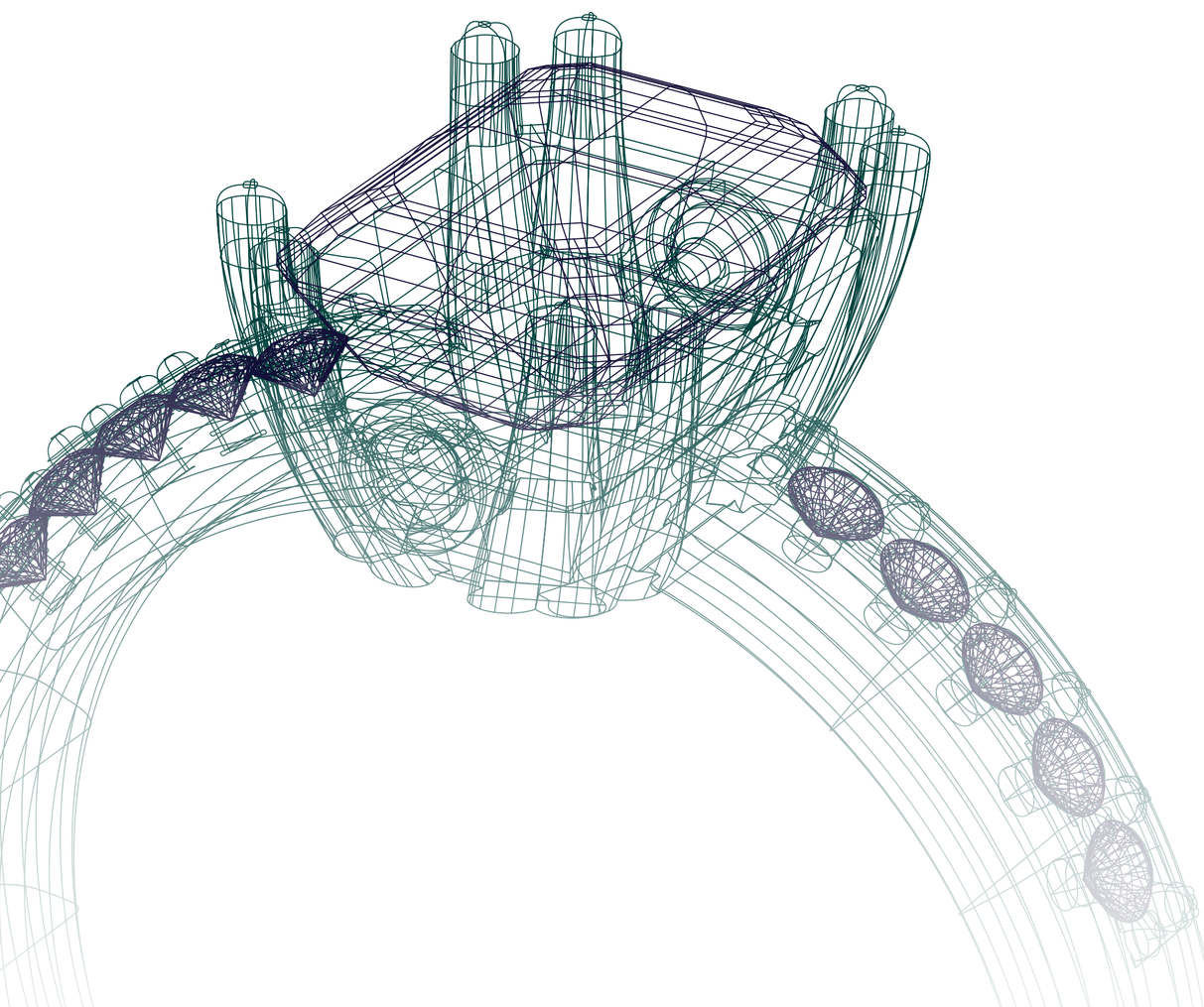
A review on the current use of digital technology in design



A new generation of digital design

Design and digital technology is currently a developing area of research, nonetheless, there is a distinct lack of questioning in regards to what influence digital technology has on the creativity of designers. As a design practitioner I have witnessed digitalization not only innovating the field of design, but also producing new tools which evidently have changed the rules within these domains. According to Brynjolfsson and McAfee (2012), digital technologies are one of the most important driving forces in the economy today, thus an understanding of these phenomena and a discussion of their influences has to be developed. A new generation of digital design specialists are emerging due to the digital revolution influencing all fields of design (Oxman 2006). This poster is a short review of the current use of digital technology and the effect this has in the field of design and specifically jewellery design.

Creativity and the maker

The first step when designing a product is the formation of an idea; then an initial sketch is followed by a continuous research, modification and maximizing control over the final shape; thus during the design process, the shape is constantly evolving. Contrary, computer aided design gives the designer the option to change certain parameters during the initial sketch generation process, thus making creativity frameless (Hohkraut, 2010). In the jewellery design field, aspects such as creativity, analysis and development have to be balanced with beauty and function (Wannarumon et all. 2004). Creativity therefore depends on the knowledge, experience and perceptions of the designer. Baber, Chemero and Hall (2017) argue that creativity which could be constructed as a 'cognitive' activity per excellence, arises from the dynamic systems involved in jewellery making. The authors continue by stating that the manner in which an action is coordinated is influenced by the criteria by which the product is judged. Concluding their article on 'What the Jeweller's Hand Tells the Jeweller's Brain: Tool Use, Creativity and Embodied Cognition', the authors point out that in jewellery making, constrains imposed by the materials used, the tools, the design brief, the aesthetic considerations or historical considerations, are necessary in defining the boarders of the conceptual space in which creativity emerges.

Technology as a means to an end

Computer aided design (CAD), computer aided manufacturing (CAM), and rapid prototyping (RP) offer great benefits to the jewellery design industry; from the design stage up to the manufacturing stage. When CAD and RP are used collaboratively, the production time is significantly shortened (Wannarumon & Bohez 2014). Siu and Dilnot, (2001) suggest that CAD, CAM and RP designers and production professionals to overcome their conventional boundaries with the following advantages: a) storage of product data, b) ease of modifications through 'reversible /repeatabl'e process, c) high accuracy, d) time compretion in making master models, production moulds and tooling. Sass & Oxman (2006) suggest that beyond the design-related and material representation benefits within the design and fabrication process, there also appear to be significant pedagogical benefits deriving from the use of these technologies. Stephen Hoskins (2018) has set two interesting questions: a) is there a 'craft' of the digital? And b) how do we reconcile the craft persons tacit understanding of materials with a process that removes the union of hand and eye normally associated with the craftsman use of a tool? The author suggests that the adoption of new technology requires a new set of skills and materials knowledge inherent in all of the previous technologies, with the most innovative works being those created using the technology as a means to an end and not as a means to represent the technology. Thus, it is vital to have knowledge in the craft world in order to be able to design creatively and effectively with CAD (Shillito, 2013).

Human crafted jewellery – digital tools

As a field, jewellery design is heavily associated with traditional handcraft values such as labour, material and complexity. And such values are being challenged by digital technologies. MacLachlan, Earl and Eckert (2012) suggest that in the case of designer makers, tools are an embodiment of rules working alongside more conceptual rules and conventions, in order to transform a design problem towards a creative design solution. As Baber, Chemero and Hall (2017) also point out, creativity reflects a dynamic interplay between the craft worker and the material. The 'creative act' is inseparable from the 'physical act' in that not only they are intertwined but also influenced by each other (Ingold, 2010). Thus designer's knowledge of their tools is key to creative and successful outcomes. Jewellery making is an area of human activity in which cognition, creativity and physical performance meet (Baber, Chemero and Hall, 2017). The design process while using digital technology supports the creative process of designers by allowing them to produce variations of an artefact at various stages of the design/ manufacturing process (Sass, Oxman, 2006). When it comes to the fashion industry, Vanderlploeg et al (2016), suggest that many designers and retailers use 3D technologies not as means to duplicate current products, but to improve product design by offering unique and personalised products to consumers and potentially offer a more sustainable manufacturing process. The same can be said for jewellery design, although assessing the aesthetic quality of such products is of importance, appearance has a significant impact to consumer's perception of value.

Breaking the boundaries of handcrafted forms

Jewellery companies in the UK not only need to keep up with technological advances but more importantly they need to offer the market with highly innovative, creative and unique jewels (Propris and Wei, 2009). Additive manufacturing of precious metals is slowly gaining attraction in the global jewellery industry with many companies adopting or considering the technology, since it gives the freedom to explore unheard of geometries in jewellery along with various customizations (Fletcher, Cooper 2018). Lipson and Kurman (2013), state that bursts of innovation happen when new technology removes barriers such as cost, distance and time. Siu and Dilnot (2001) also support the idea that such new technology provides clear benefits in production and development, however it also gives rise to serious philosophical and practical challenges in terms of translation or encoding of handcraft sensibilities, skills and embodied features into computer-based design representations.

Conclusion

As evidenced in much of the literature, the possibilities for new approaches to the design process, changes in production methods and product types need to be addressed not only by design researchers but practitioners as well. Thus, in a rapidly changing technological environment, it is essential for design research to include not only how designing is currently conducted, but also how it might be conducted in the future (Cross, 1984).

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