

# CALCULATING THE CURVATURE OF CROCHETED PETALS – A POST-MEDIA EXPLORATION OF DOMESTIC CRAFT-BASED TEXTILE PATTERNS

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This paper explores opportunities for extending the possibilities craft-based textile activities, through dedicated software tools to explore and interrogate textile processes. It reports findings from an experimental art project to produce software as tools for creativity in craft-based textile activities and advocates a rethinking of craft-based textiles beyond 'fixed media'.

Digital media and new technologies are ascribed a seminal role in the perceived increase of craft projects, do-it-yourself (DIY) culture, the production of user-generated media content, and user-led participatory practices (Gauntlett, 2011; Jenkins, 2006). The rapid development and accessibility of sophisticated audio visual technologies has reshaped media production and consumption enabling amateur photographers, film-makers, writers and musicians to utilise digital media not only in the production of their work, but also in its storage, dissemination and consumption (Jenkins, 2006). Digital media also offer the potential to extend and reconceptualise craft and DIY projects including domestic craft-based textile activities such as knitting, crochet, weaving and lace making that have been considered and seen as limited to physical 'hands on' activities.

Digital media and new technologies allow expansion and reconceptualisation of these types of craft activities in four ways. They facilitate the distribution and sharing of project templates, patterns, instructions and 'how to' information across geographic, social and cultural borders. They also enable users to display images, videos and information about completed projects. Third, digital media create audiences and communities through online forums and viewing spaces. Finally, and most importantly, they offer the potential for the development of tools, such as software applications to allow users to extend and explore their own creativity.

This paper shows how digital media can extend and reconceptualise domestic craft-based activities using experimentation enabled by the production of dedicated software tools for craft-based textile practitioners. It draws on an ongoing experimental art research project which interrogates domestic craft-based textile processes in an effort to examine the creative potential of craft-based textile pattern forms and argues that there are potential social and cultural benefits from the development of tools for creativity that aid experimentation and exploration.

The project advocates a rearticulation of craft-based textile activities beyond 'fixed media' and embraces the non-media specific nature of craft-based textiles which have operated as text, in diagrammatic form, as threads, and more recently as pixels, bio-materials, mathematic functions and computer code.

Craft-based textile activities have a long and complex history. The textile fragments that have survived inform our understanding of the development of techniques and pattern forms. In addition, woodcuts, booklets and magazines, paintings, photographs, and notebooks and journals reveal craft-based techniques, patterns and styles and attest to the longevity and importance of craft-based textile activities as a creative practice (Shepherd 2009).

The mass media play a role in promoting craft activities and DIY projects in relation to fashion and trends through magazines, pattern booklets and 'how to' styled TV and radio programmes (Greenhalgh, 1997; Johnson, 2005; Schofield-Tomschin, 2001). In observing that "both the amateur arts and crafts are undergoing what has been described as a 'boom time'" (2004, p269). Turney suggests that this renewed popularity is due to increased levels of education, participation by women, an ageing population, and

more access to leisure time as a result of the changing nature of societies and their workforces (Turney 2004).

These activities are what David Gauntlett (2011) describes as acts of 'everyday creativity' and are important to both individual participants and society as a whole. Jenkins (2006) suggests that they bring about "a changed sense of community, a greater sense of participation, less dependence on official expertise and a greater trust in collaborative problem solving". Craft activities and DIY projects fulfil a desire to make or be involved in a creative process (Gauntlett, 2011, Turney, 2004). They may be seen as expressions of symbolic creativity: of the drive to create. Turney (2004, p276) argues that "symbolic creation is an essential part of everyday life and a demonstration of the real and ideal self" (2004, p276). Certainly in relation to domestic craft based activities, there are many reasons for promoting the continuation of these activities at a grassroots level. Craft-based textile activities have been cited as being important in the continuation of tradition, the development of creativity, in providing a sense of community, in the construction of personal identity and for healthy ageing (Schofield-Tomschin, 2001; Johnson, 2005; Minahan, 2007; Turney, 2004). These acts of 'everyday creativity' are self-driven, self-directed and self-fulfilling activities (Atkinson, 2006). The number of practitioners, the level of commitment, enthusiasm and labour invested in 'everyday creativity' without tangible reward suggest that these activities are driven by intrinsic motivation – that is "for its inherent satisfaction rather than for some separable consequence ... for the fun or challenge entailed rather than because of external prods, pressures or rewards" (Ryan 2000, p56).

However, while these acts of 'everyday creativity' are in abundance, the level of creativity involved has been subject to criticism. Craft-based activities, including textile activities, are accused of being 'low', repetitive, manual, non-creative, non-challenging, requiring little or no skill, and of little value in relation to the arts (Atkinson, 2006, Greenhalgh, 1997, Turney, 2004). Turney suggests that "the marginalization of home crafts from academic discourse is largely based on an understanding that both practices and objects are 'uncreative', repetitive and mundane, existing outside the world of the innovative, creative, challenging avant-garde" (2004, p268). These activities draw criticism because of their seeming culture of duplicating, copying, and the recycling of pre-existing forms, and their reliance on pre-designed kits, patterns, and templates (Turney, 2004, Atkinson 2006) suggests that kits patterns and templates are in effect 'dumbing down' craft, which he suggests is part of their attraction.

This culture of copying causes concern in relation to the standardising effect it has. For instance, Pen Dalton says "the encouraging of dependence on projects from women's magazines, patterns and pre-designed kits, however well designed and demanding of the patience and skill of the housewife, has had a standardising and largely detrimental effect on craft practice" (as cited in Atkinson, 2006). My PhD thesis argued that the continual recycling of crochet lace patterns and the focus on the production of an object had seemingly resulted in a stasis in the pattern form and that the creative potential of the activity is yet to be fulfilled (Kenning, 2007). While mainstream radio, TV and magazines contribute to the seeming renewal of popularity, there are concerns that they also contribute to the standardisation of these activities as a result of the scale of production and distribution of kits, patterns, magazines, books that encourage the construction of similar popular patterns and projects (Beegan, 2008). Websites, blogs, television programs, books, and magazines encourage and promote craft activities by providing 'how to' articles, templates and patterns, and instructions for 'personalised' rather than experimental or self-explorative craft projects. Such projects equate creativity with the customisation or individualisation of prescribed forms.

This paper proposes that it is to digital media and new technologies that we might look for new tools for creativity, and that they may offer the potential to extend these forms of activities and reveal a form of 'everyday creativity' uninhibited by the strictures of the template, the pattern, and the seductions of the mass media.

Before examining how experimentation can be introduced through the use of digital media, it is useful

to explore why there is a seeming lack of experimentation and acceptance of this culture of copying in 'everyday creativity'. Jenkins (2006) suggests that these activities emerge at a grassroots level, are learned through informal education, and arise out of shared traditions (Jenkins, 2006). This gives rise to a sense of responsibility in relation to the continuity of these traditions which inhibits experimentation. In addition, both Jenkins and Turney suggest that the lack of innovation and experimentation may be due, in part, to many 'everyday' craft practitioners being educated to primary and secondary level and having an institutionalised view of what constitutes art, design and craft and what is considered acceptable experimentation within those fields (Turney, 2004). Such participants often need to be given 'licence' to extend their creativity beyond the conforms and confines of their formal or informal teaching, pattern books and kits.

Recent developments in craft-based textile activities have resulted in young participants applying innovative approaches to craft activities in the form of guerrilla crafts, S&M knitting and yarn bombing (Kenning, 2009). However, for the most part, these experimental approaches remain in the minority. The impact of digital media on acts of 'everyday creativity' involving filmmaking, photography, video, music, and so on, has been discussed at length and is evident on websites and social media sites across the Internet (Jenkins, 2006). However as previously discussed, domestic craft-based textile activities have until recently primarily used digital media as communication tools, and it is only now that we are beginning to see the development of software applications that may be used in the production, rather than distribution, of domestic craft-based textile activities. Developers of these software applications and digital media tools, include craft-based textile practitioners who want to speed up the design process; craft product suppliers who wish to extend their range of products or increase sales; software developers that have recognised a growing market for applications that can visualize craft forms; and open source developers who are interested in sharing both craft instruction and code.

Examples of digital media developments include mobile applications that are being used as aggregators of news, information and videos about craft projects and techniques. Another software application, Knit Visualizer represents text instructions in diagrammatic form to enable quick referencing during physical construction of textile objects (Foundry, 2010). Some applications translate text instructions into computer code to visualise and modify patterns online (<http://stitchworkssoftware.com/>). One open source project knitml aims to standardise knitting instructions and create a mark up language for knitting to enable any knitting pattern to be rendered and visualised. However, many applications continue to act as communication tools or visual design aids. In these examples the media (code, algorithms, pixels) used do not manipulate or influence the pattern outcomes unlike in the physical environment where the media, the choice of threads, hooks, technique etc impact on the final form produced. In addition, these software applications neglect the processual and procedural aspect of domestic craft-based textile activities and do not engage with the processes inherent in both craft-based textile activities and digital media. Thus they do not provide a platform for true experimentation.

With limited approaches to experimentation the risk remains that domestic craft-based textile activities will continue to copy and recycle pre-existing patterns forms and projects, and will fail to escape the ongoing criticism regarding their lack of creativity and not achieve their creative potential. Whereas the digital environment can offer valuable insight into the making process, and the potential to provide a greater understanding of how craft-based textile activities and patterns can develop, and how creative possibilities can be extended (Kenning, 2007).

In discussion of textile activities in relation to digital media, domestic craft-based textile activities are frequently positioned as physical, material and tactile and contrasted with digital media which often cited as lacking physicality, materiality and tactility. While this view is contested and arguments have been made for the materiality and tactility of digital media, it is not within the scope of this paper to explore these arguments in detail (Munster, 2006).

When participating in domestic craft-based textile activities engaging with the media, that is physical

threads and fabrics, is often assumed to be the motivation. However, research suggests that the issue is more complex, and while engaging in a process is important the construction of a physical artefact is not the primary reason (Atkinson, 2006; Johnson, 2005; Minahan, 2007; Schofield-Tomschin, 2001).

This tension between what we might consider the creative process and the output occurs in other activities. Activities manifest in a range of media other than what would be their expected material form. For example, materiality produced using chemicals and paper is no longer required for photography. For many, only the skeumorphic click of digital cameras and Photoshop icons remain as clues to past physical processes. Similarly, architecture such as Liquid Architecture has no intention of realising the architectural forms as physical structures. In addition, we might also think of the relationship of the musical score and the written play to the performance. The score and the play can and do undergo rigorous critique in absentia of the performance. These examples point to potential for creative opportunities beyond a single medium.

Freed from the constraints of being manifest in physical threads, domestic craft-based textile activities participants are free to explore not only the processes of domestic craft-based textile activities but also computational processes of the digital environment to exploit algorithmic variation and explore mathematical functions. My PhD thesis identified that craft activities can draw on computational possibilities for AI and explore potentially evolutionary and emergent possibilities in the digital environment and in the physical realm. This enables new forms, patterns and shapes that have been difficult to make, imagine or understand before sophisticated computational possibilities to be modelled in a range of digital media applications and realised physically through hardware and peripherals such as 3D prototyping. This ongoing experimental art research project to explore creative possibilities for domestic craft-based textile activities has undertaken a variety of approaches. A range of findings from the project have been presented at the Textile Society of America Symposium, ISEA 2009 in Belfast and, more recently, at the Subtle Technologies festival in Toronto.

Initially the project took the form of a software application to mate and mutate domestic craft-based textile activities patterns. However, limitations were imposed, not by the media itself, but because of the teams' understanding of what constituted craft-based textile patterns and their expectations. The application enabled users to mate and mutate patterns, but the parameters were restrictive because they initially focussed on the appearance of the pattern forms. In addition, aesthetic judgement was applied too early in the process and prevented patterns developing beyond conventional forms.

The second stage involved aligning the algorithm in digital media with the decision-making process undertaken in physical construction of the patterns. This involved, in effect, neglecting the final form and focussing on the placement of individual stitches or motifs in relation to the last stitch or motif made whether the position was correct or not. Thus, glitches and errors in any part of the process were embraced and often became exaggerated in subsequent rounds, leading to the creation of seemingly random forms. It allowed for the creation of pattern forms that could not be created without the use of digital media.

Both of these areas of investigation are ongoing. However, the more recent developments have focussed on the construction of motifs in order to reveal the unacknowledged mathematical formulae that underlie many of the shapes used in Irish crochet lace. The work identified mathematical formulae that create visually similar forms and then used these functions to manipulate the motifs and extend the form. A crochet lace collar from the Powerhouse Museum lace collection in Sydney was used as the source material. The lace collar, which was crocheted in 1850, consisted of four primary motifs repeated at intervals. The motifs were representations of nature, the daisy; shamrock; rose; and spiral form, and can also be described using mathematical formulae such as  $y=n^{1.4}$ . As simple mathematical formulae, the variables can easily be changed allowing for the overall patterns to be manipulated quickly and effectively. The pattern becomes a product of the design of the maker and computational processes.

Thus, pattern-making in the digital environment allows for a range of systems to impact, interact, intertwine and intervene with each other and can harness generative possibilities, mathematical systems computer code, and craft-based textile techniques to stimulate domestic craft-based textile activities and create new possibilities.

A post-media approach opens up new possibilities, affording potential for experimentation in a form of creativity that has not been previously examined in this way (Manovich, 2002). It allows for the discovery of new forms and new ways of making and creates new sites of 'everyday creativity'. For those not familiar with digital media or computers, digital media allow exploration from a position of strength by focussing on DCBT processes already learned. For those familiar with digital media, experimentation enables users to explore new ways of making and may stimulate interest in making new pattern forms in the physical realm. As well as its implications for creativity, development of craft-activities beyond the manifestation of physical objects also has potential health and welfare benefits as it frees users from the requirements of materials and physical dexterity, affording whole new ways of working which can be particularly important for the elderly and those with injuries or disabilities.

These creative processes can be made readily available to older participants who have an in-depth knowledge and understanding of craft-based activities both in terms of a tactile engagement with materials and in the construction of textual instructions and diagrams, but have limited dexterity. For them it offers ways of stimulating the mind and hands through ongoing making processes through for example patterns generated through voice recognition or sound. These participants are often keen to remain both physically and mentally active. Therefore, digital media tools for creativity present opportunities to prolong involvement with pattern making activities promoting both physical and mental stimulation. In addition, digital media offer the potential for work in groups through networked activities and for example interactive table-top.

Digital media tools for creativity may provide benefits both physically and mentally. This is particularly advantageous when we find that people are increasingly identifying themselves in terms of their creative outputs, and symbolic creativity rather than their job (Castells, 2000).

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