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Textile notation as systematisation of craft practice.

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ABSTRACT

The below provides context for the exploration of craft-led textile techniques of warp manipulation with an aim of systematising and embedding them within a novel textile framework, which forms a part of my PhD project. It introduces the concepts of tacit knowledge and experiential learning as inherent to craft textile practice and considers them in the context of established modes of textile designing. It further proposes an alternative approach to textile notation as a way of systematising a craft process, aiming to improve its dissemination. It borrows from computational theories to establish an innovative approach to generation of freeform structures based on the principles of woven arrangements. As such, it utilises the intrinsic algorithmic nature of textiles and aims to widen their reach across disciplines. Theoretical in nature, this contribution serves as a foundation for further research and invites conversations on the roles of notation within creative practice.

Textile notation as systematisation of craft practice

Textile making has long been considered as a highly complex process bringing together artistic intuition and scientific acuity[1]. Scientific analyses of ancient and contemporary artisanal textile practices suggest an involvement of algorithmic and geometrical concepts in the construction and decoration of fabrics, while hand-making is concluded as a logical origin of numerical conventions [2]. Indeed, traditional hand-weaving techniques and corresponding tools are considered as early precursors to the automated looms of the Industrial Revolution and, ultimately, the first computers [3]. Thus, it was the process of methodical analysis and extraction of the rules of craft practice that, through the course of time, has led to advancements in the fields of textiles, manufacturing and computation [4].

In the case of craft textiles, the understanding of algorithmic rules is gained and applied tacitly, through hands-on engagement with one's practice, materials and tools [5]. The personal know-how of a textile practitioner cannot be fully expressed through conventional textual means and sections of it escape translation [6]. Still, its transmission to other craftspeople, but especially to specialists in other fields, is considered crucial to achieving comprehensive innovation. Craft methods should therefore be made available for application across disciplines. One way of accomplishing this is through embedding the specific craft knowledge in generic design systems [7].

Current modes of manufacture rely on such creative frameworks as they contribute to increasing certainty of workmanship and removal of human involvement [8]. This, however, is prone to negligence as the craft process is often simplified and generalised to suit the common notational method. Thus, its analysis, systematisation and translation require careful consideration of all the implicit and explicit aspects of a craft process to prove successful (Figure 1).

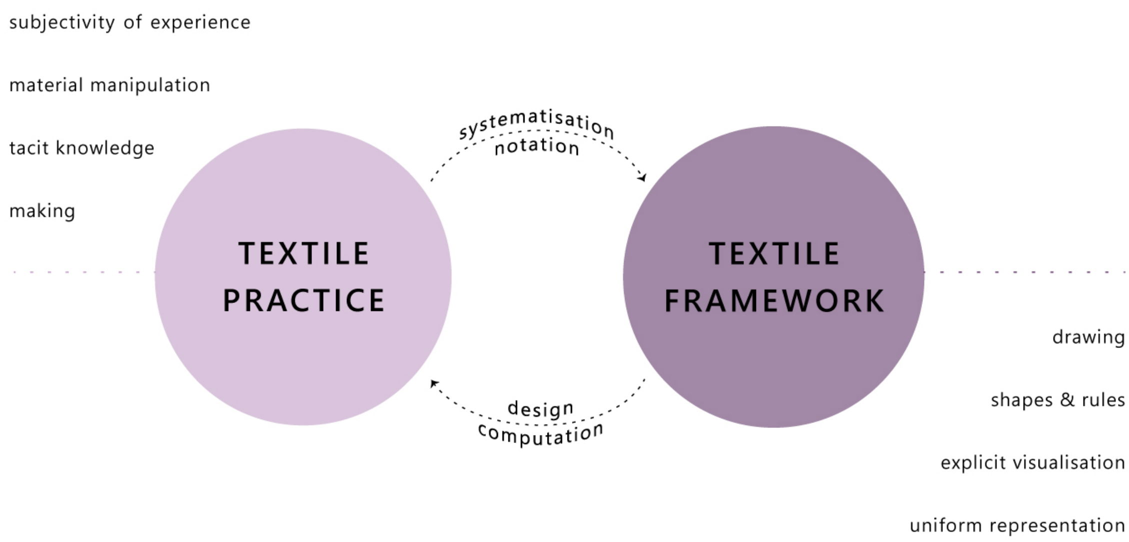

Figure 1
Framework for notation of a craft textile practice

Craft-led weave notation

Similarly, conventional weaving drafts are aimed at mechanised production, rather than craft-led design and making. The diagrams represent the rules of textile manufacturing algorithmically; yet they do not resemble the real-life practice of hand-weaving. Ideation and movement execution within a craft process are often intertwined and spontaneous, based on earlier transformations, sensorial perception and reflection on emergent forms [9]. In comparison, weaving drafts seem simplistic and can distort the performative quality of textile making; they are better suited for presentation of final results than exploration of potential designs. To truly support craft-led approaches to design and making (Figure 2), a more intuitive system of notation should be considered in line with the mechanisms of a craft textile practice (Figure 3).

With the expansion of digital means of engagement with data, new approaches to such storing and sharing of craft knowledge have been proposed [10]. Interestingly, a preference for visual means of presentation and communication can be observed, supporting more creative, sensorial experiences of complex information [11]. Embedding the tacit understanding of textile techniques in design systems has the potential to not only improve its distribution, but also establish a foundation for exploration and generation of new forms [12].

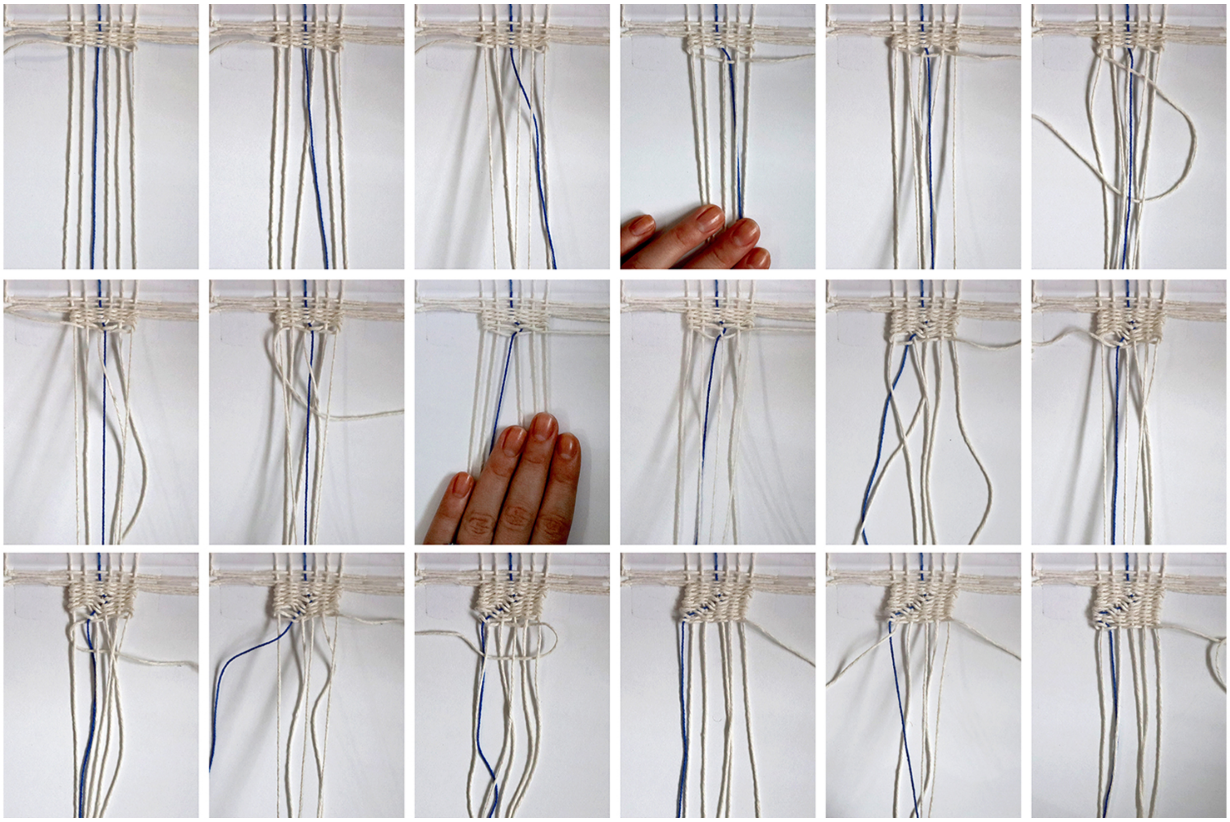

Figure 2
Hand-weaving practice: sequence of emergence

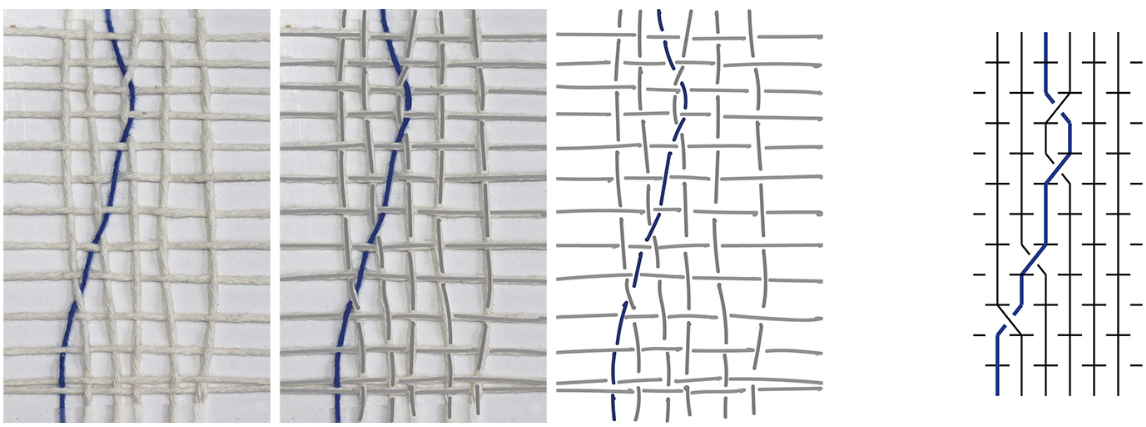

Figure 3
Craft textile notation: from hand-weaving to weave grammar

Computational notation with shape grammars

One visual computational framework capable of serving both analytical and synthetic purposes is shape grammars, a method of designing with shapes developed by Stiny [13]. Based on a simple format of **A -> B**, grammars compliment creative processes by supporting intuitive selection and manipulation of emergent shapes (Figure 4). Indeed, they've been successfully applied to the systematisation of craft practices such as

Celtic knotwork [14], bamboo weaving [15] or wire-bending [16]. The resulting frameworks have since been used to generate and produce novel structures rooted in the specific craft construction techniques and, hence, expanding the reach of the tacit knowledge embedded within them.

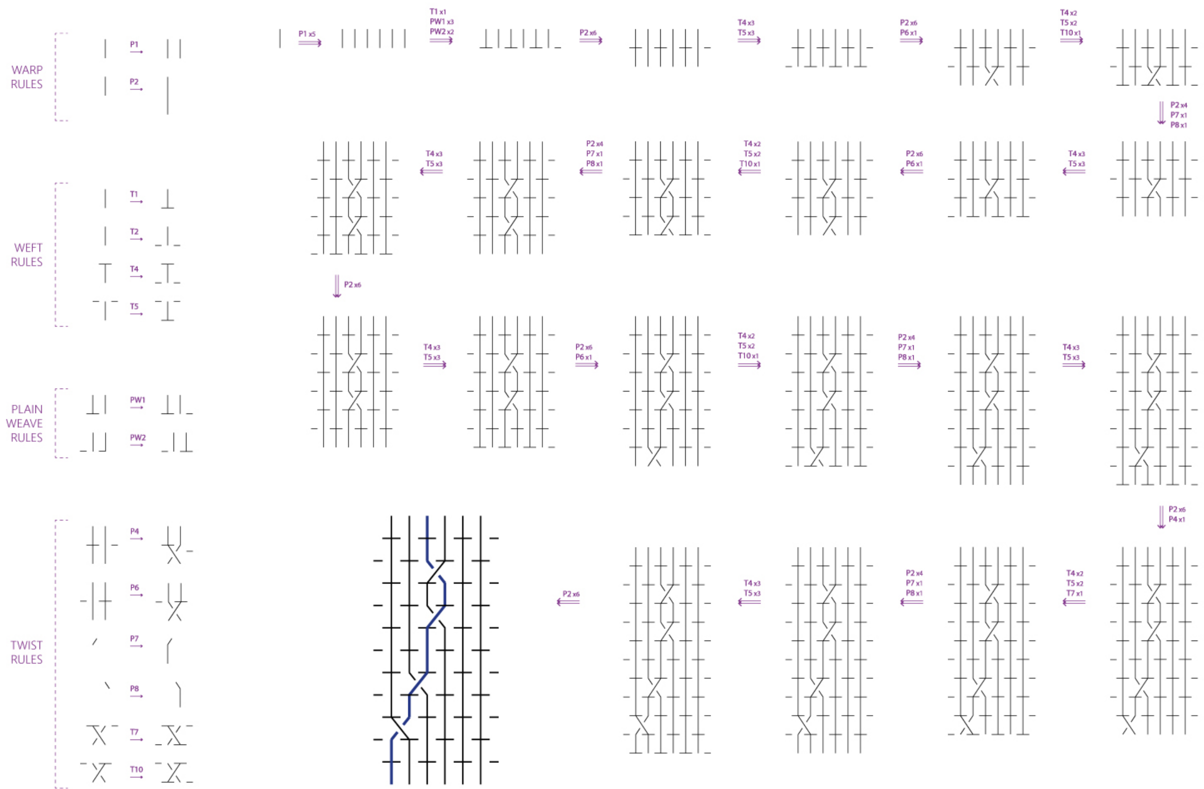

Figure 4
Example grammar-based computation of the hand-woven structure

As such, it is important to consider the ways in which such computational formalisms could provide support to the craft communities, particularly by improving the communicability and accessibility of technical, yet often implicit knowledge [17]. They could aid in the analysis and systematisation of ancient or contemporary craft techniques overlooked by the industry, expanding our view of social and material cultures [18]. It has been argued that craft processes are open-ended in nature, capable of building upon previous findings to generate new outcomes [19]. Correspondingly, an in-depth understanding of how weavers identify and transform emergent textile forms could enable creation of a design system, which allows for a less restricted investigation and synthesis of complex, freeform architectures [20]. If developed in line with the mechanics of a craft process, digital modelling and production tools could equip the maker with new, sustainable means of engagement with their materials [21]. The recognition of rules present in craft textiles and their notation through computational means could facilitate the switch to the hybrid, cross-disciplinary practices made possible by the digital era [22].

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