

AI In the Atelier - A Proposed System for Craft Innovation in Haute Couture Hand Embroidery

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Abstract

This paper presents an in-development system designed to foster computational creativity and enhance digital pedagogy in haute couture hand embroidery. While haute couture practice remains predominantly analog, the number of artisans in the field has dwindled since the mid-20th century, and the potential for digital creative tools to support training and creativity is largely unexplored. This pilot study introduces a novel data recording tool that captures gestures and material touch data through sensor-embedded textiles and motion capture. Initial feedback from artisans, collected from a small pilot study at an haute couture embroidery atelier has informed the design of a conceptual three-component system aimed at computationally augmenting traditional craftsmanship in these contexts. This system proposes a generative 'Draw Function', allowing users to co-create patterns interactively with AI; an 'Embroidery Generator' that suggests stitches and techniques; and a 'Gesture Recognition and Coaching' feature that provides an interactive, educational guide for executing techniques based on captured motion data. This conceptual system envisages an atelier where the intricacies of haute couture embroidery are archived and taught, as well as creatively expanded upon through computational means.

Introduction

Haute couture is seen as a custodian of unique skills, protecting them from the commodification prevalent in the mass-produced, ready-to-wear sector (Liucci-Gputnikov 2011). Despite its importance in maintaining rare skills the sector has seen a decline in the breadth and scale of its specialized craftsmanship, with the number of couture houses and their associated ateliers numbering significantly less than the mid-20th-century peak (Majima 2008), when ready-to-wear and mass market fashion began to grow exponentially (Liucci-Gputnikov 2011). Many contemporary ateliers are dependent on the limited, albeit economically powerful remaining couture houses (Gwilt 2012).

This situation highlights the fragility of the craft skill bases essential to haute couture craftsmanship where the traditional methods of haute couture have remained largely unchanged since the early 1900's (Gwilt 2012),

apprenticeship is still at the heart of skill transmission, underscoring the enduring importance of tactile learning in the field (Dimitrio 2016).

Sennett (2009) articulates the nonlinear nature of how such crafts are learned and mastered, where the inherent complexity transcends simple, rationalized pedagogies. Groth (2017) further accentuates this by addressing the difficulty of quantifying the tacit knowledge essential to a craft practitioner's expertise.

Montagna, Caruso, and Rampino (2018) highlight the challenge and opportunity of democratizing haute couture's methodologies, where broader access to the knowledge of haute couture could stimulate new opportunities for fashion practitioners. Although existing research casts a wide net over diverse crafts, direct inquiries into haute couture artisans and their methods are scarce. Through a pilot study involving haute couture artisans, we the potential of computationally augmented creativity in haute couture, we propose as system to aid in skill archiving and knowledge transfer as well as the opportunities for creative expansion through digitalization. We gather insights into the utility and application of such technologies within the atelier context to understand how such artisanal wisdom could be imparted and how creative exploration could be augmented in the sector.

Background and Related Work

Given the fragile skill base and the nascent stage of technological adoption in haute couture, this field is ripe for research exploring how digital technology might enhance educational and creative opportunities in embroidery handcraft and other craft bases in with wider haute couture sector. Efforts to explore haute couture craftsmanship and through digitalization and creative augmentation demand attention towards the nuances and values within the field.

Armitage (2023) raises concerns over simplified digital representations of haute couture practice in virtual fashion spaces, arguing that reducing rich artistry to alienating data points risks undermining the spiritual core of the field and calls for refinement and attention to digital methods that uphold the craft's core cultural and creative values.

Efforts to digitalize the bodily craft practices of haute couture can be seen in early works by Marfia, Rocchetti and Semprebene (2012), yet there has been scant subsequent research. Due to the limited engagement of digital data capture in haute couture craftsmanship, this research contends with the necessity of re-engaging with digital data capture in haute couture craft practices, without which, the capacity to explore creative artisanal acts digitally is muted. Outside of haute couture craft documentation Strand, Lindgren and Larsson (2016); and Flanagan and Fraietta (2019) highlight Motion Capture's potential in archiving the nuanced motions of human craftsmanship. Furthermore, Skublewska-Paszkowska, Milosz and Powroznik (2022) detail a spectrum of technologies adopted in craft research, encompassing VR and AR systems, highlighting the potential of tools like these to re-engage with haute couture craftsmanship.

Loss of tactility and physical engagement in advanced creative software platforms is seen as a shortcoming in craftspeople's receptivity to digital technologies (Scotto 2022). Tactile sensing, as explored through computational textile research offers avenues to quantify this interplay and bring tactility towards digital craft interactions for users (Jewitt, Price and Mackley 2020; Rumon and Shahariar 2021). Yet, comprehensive and simultaneous capture of both body and material interaction remains underexplored, a challenge this research addresses within the framework of a proposed computational creative system.

Fashion practice confronts challenges marrying the precision and nuance of handcraft with digital fidelity (Casciani and Vandi 2023; Frey and Osborne 2013). Beyond digitalization, Samakari and Vanska (2022) explore algorithmically assisted fashion design through case studies, arguing that the lack of data assimilation of embodied acts in the space still allows for high levels of distinctive authorship, but that the lack of digitalization of embodied acts oversimplifies the complexity of fashion design work in contemporary algorithmic explorations.



Figure 1: Hand embroidery data capture device in the atelier.

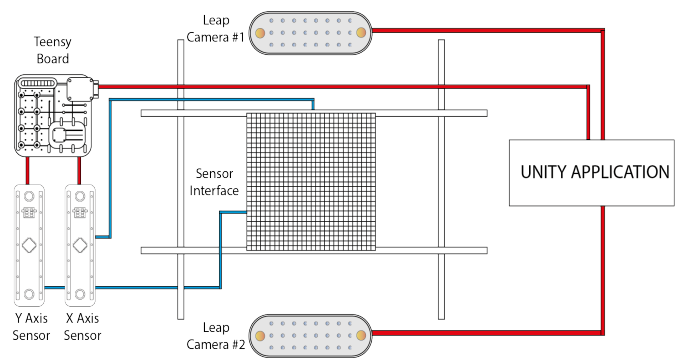


Figure 2: Schematic of the digital hand embroidery capture tool

The expansion of digital capture and archiving in haute couture could offer greater opportunities for imparting skills in the field. Such datasets could be utilized in augmented reality contexts. In broader fashion pedagogical research, Elfeky and Elbyaly (2021) demonstrated that AR technologies significantly enhance the functional, aesthetic, and creative skills of fashion design students compared to traditional teaching methods supported by educational videos. This research underscores a deeper engagement in digitalization in fields like haute couture could have substantial benefits in how knowledge is imparted in the space, facilitated through tools like AR and digital platforms.

Digital Hand Embroidery Platform

Acknowledging the specificities of haute couture practice, this paper presents a considered multimodal strategy that blends the artisan's skilled touch with digital technology's evolving capabilities. We have developed a data capture system that pairs infrared hand motion detection (Leap Motion) with a capacitive touch embroidery interface (Figure 1 and 2). This interface records the pressure applied by artisans through conductive threads embedded in embroidery scrim and hand motion data from above and below the embroidery surface simultaneously.

This setup serves as a foundational concept for in-atelier process archiving and digital pedagogy via interactive environments. Integrated within a Unity-built user interface, it includes a recording feature that captures animation (Alembic) data alongside a playback function.

Pilot Testing Within the Embroidery Atelier

Four expert artisans participated in a user study in November 2023. Activities, designed to record the embroidery process under various conditions included executing simple and leaf stitches, replicating a sample from the participants' archives ('Decoding'), to a freestyle embroidery session. Each activity was captured using GoPro cameras in MP4 format, with simultaneous recordings incorporating Leap Motion data and tactile feedback from a sensor cloth in Alembic (abc) motion format.

The focus of this paper is to explore the application and experience of users of the developed tool within the context of an haute couture atelier, therefore an in-depth analysis of this data will be described in a further paper.

This paper adheres to the Royal College of Art's ethical guidelines. Participants were informed about the study's objectives and gave voluntary consent to participate. Data was anonymized and securely stored on RCA servers, accessible only to the research team.

Data Collection and Methodology Semi-structured interviews were conducted with the artisans. These interviews and the specific questions, detailed in Appendix, were transcribed and translated to facilitate analysis. We employed a two-tiered interview structure: the first tier addressed broader themes such as craft heritage and digital technology; the second focused on specific practices within haute couture embroidery. This approach allowed for a thematic synthesis, providing an initial overview of the artisans' perspectives on the integration of digital technology within haute couture.

Theme Development and Analysis: We organized these insights into a few broad themes reflective of the participants' experiences and perceptions. These themes were directly linked to the tool's current functionality and potential enhancements, providing a direction for future development. This approach reflects the study's aim to garner initial insights into the digital capture tool's application in an haute couture context. Instead of extensive coding, we pinpointed key insights directly from the interviews with the artisans were the following key themes emerged:

Preservation of Manual Skills and Craftsmanship: Artisans uniformly express a deep respect for the tactile and intricate nature of haute couture embroidery. Artisans are worried about the potential decline of traditional crafts due to the greater incorporation of digital technology and stress the importance of initiatives to preserve and archive these practices.

The Role of Digital Technology in Education and Knowledge Transfer: There is a cautious optimism about the role of digital technologies in enhancing educational processes and facilitating the transfer of knowledge within this context, concerns persist about maintaining the essence of traditional techniques through digitalization, however the more junior atelier hands expressed greater interest in digital learning methods in conjunction with more formal apprenticeship learning methods.

Future Prospects and Integration of Digital Technologies: Despite recognizing the potential benefits of digital tools for design and communication, there is a prevalent skepticism among the artisans about the capability of these technologies to replicate the nuanced touch and creativity of human artisans. The future of haute couture

embroidery is envisioned as one where digital technology serves a supportive rather than automated role, enhancing rather than replacing the human element of craftsmanship.

A synthesis of these interviews suggests a nuanced approach to the integration of digital technologies in haute couture atelier contexts and the need to work closely with artisans in the development of them, this is to ensure a balance that preserves the heritage and uniqueness of traditional craftsmanship and human hand skills, whilst being cautiously welcoming to potential beneficial innovations that are assistive of their craft rather than aiming to replace it.

A Proposed System for Digitally Augmented Haute Couture Hand Embroidery

This pilot study has informed the proposal for a three-component digital tool designed for use within haute couture embroidery ateliers. This comprises a 'Creative Draw Function,' an 'Embroidery Archive and Technique Generator,' and a 'Gesture Recognition and Coaching' function. Together, these components aim to integrate digital technology with traditional craftsmanship within these atelier contexts to act as a system for recording and archiving of hand processes as well as more speculative creative applications.

In the next iteration, the tool will focus on enhancing industry-specific applications by capturing creative habits and augmenting agent capabilities to generate images and instructions, which is designed to understand and enhance human creativity by automating repetitive tasks and fostering collaboration and inspiration through advanced agent functionalities. The study will involve two participant groups: general users in the fashion and textile industry, and experts in embroidery and related fields. General user testing will collect usability feedback, while expert evaluations, conducted through focus groups, will assess the precision and relevance of AI generated content, identifying discrepancies between generated outputs and industry standards.

Creative Draw Function: This feature expands on our prior research conducted with fashion and textile practitioners in co-creative pattern creation activities with computer agents (Alderson-Bythell, Geaney, Carter, Toomey, and Broach, 2024). Focusing on computational creativity, the research studied user behavior to identify creative styles and refine personalized content. It combines quantitative metrics—like thinking and drawing times—with qualitative insights from interviews to perform cluster analyses. These analyses will harness both data types to distill perceptual understanding of embroidery, prioritizing attributes like flexibility, originality, and user preferences.

We will use insights from this prior work to enhance the tool developed in this paper, providing a co-creative pattern development feature that allow artisans to directly sketch

designs on the capacitive interface and augment artwork development with generative functions.

Embroidery Archive and Technique Generator: While the actual development of this component is planned for future research, we envision it being trained on a specialist archive of embroidery imagery and associated technique notations used by artisans. Leveraging embroidery archive imagery, this generator suggests optimal methods and applications, enhancing the creative process by providing tailored embroidery suggestions. This function would use this information to propose stitch types and techniques, tailored to the user's design. This predictive function serves as an educational tool and a creative catalyst.

Gesture Recognition and Coaching: Building on collected motion capture data, this component provides real-time feedback and guidance on the specific hand gestures and techniques required for executing chosen stitches. It aims to analyze and interpret these gestures, providing users with real-time feedback and guidance as they work on their embroidery projects. In the future, machine learning algorithms could be developed to classify these gestures and associate them with specific embroidery stitches, creating an intelligent coaching system that guides users through complex techniques, enhancing both learning and creative practice.

These components are designed to foster a holistic link between digital innovation and the artisanal heritage of haute couture, enhancing both creative expression and technical execution in embroidery practices (as illustrated in Figure 3).

Future Work: Enhancing Digital Integration in Haute Couture Embroidery

Currently, our efforts have culminated in the development of the hand and touch point data recording system, laying the groundwork for the subsequent components. The forthcoming phase seeks to develop the embroidery imagery archive and devise a machine learning schema for gesture analysis. Further development will involve integrating the collaborative draw functions within the existing Unity application, based on the foundational

work from our previous user interaction research with fashion and textiles practitioners.

We plan to construct a comprehensive digital archive of embroidery techniques and develop machine learning algorithms to analyze this data, enabling the system to suggest embroidery techniques that innovate with users.

Other work involves the development of computer vision processes to analyze the captured hand data from artisans and review the capture accuracy of the leap motion cameras in comparison with the captured video data. Insights from this work are intended to be integrated into the gesture and stitch coaching proposal within the developing system.

This ongoing work aims to not only preserve but also propagate the rich heritage of haute couture through innovative digital pedagogical tools through user-centered studies artisans and within working atelier contexts

Conclusion

This paper underscores that while creative computational tools potentially offer useful ways to augment human creativity and pedagogy within atelier contexts, we must also contend with the critical lack of digitalization in the field. Without such datasets, imaginaries for creative computational tools are limited in haute couture.

Our system proposes a novel approach by integrating data capture technologies within a system framework that proposes to expand the sophisticated artistry of haute couture with creative applications of AI informed by direct testing within atelier contexts, serving as a springboard for the development of new atelier practices that merge digital craft processes with the deeply human aspects of haute couture, suggesting a dynamic, co-creative approach to digitally augmented hand embroidery.

At this stage in our research, we invite the computational creativity community to engage with this work, offering feedback and insight that will refine and expand the capabilities of our system. Through such collaborative efforts, we aim to push the creative applications of what can be achieved at the intersection of technology and traditional craftsmanship, ensuring that haute couture continues to thrive in an increasingly digital future.

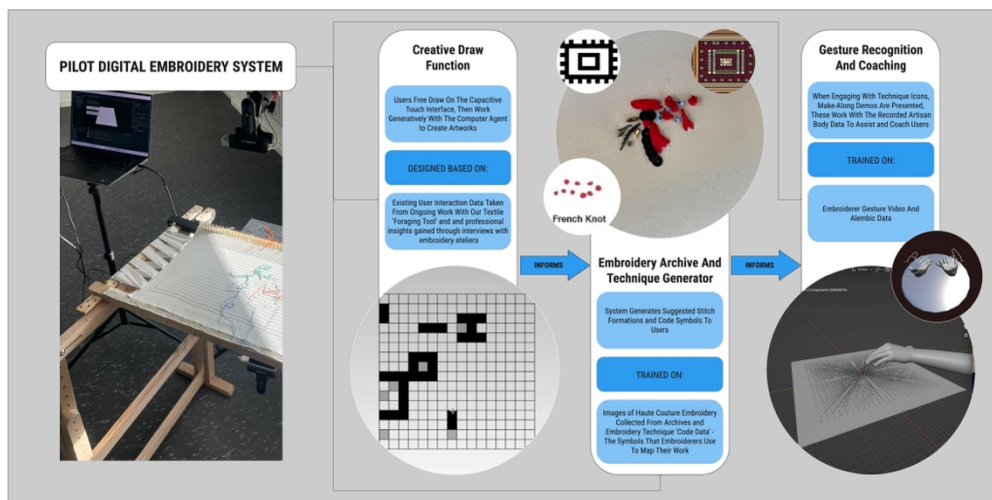


Figure 3: Diagram of the proposed 3-component system describing the creative draw, the embroidery archive and technique generator and the gesture recognition and coaching functions.

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Appendix

Precursory Interviews

Contextual

1. Can you please introduce yourself or if you wish to remain anonymous please indicate that to us here.
2. Please tell us a little bit about your background and experience that led you to your current work as a practitioner in haute couture.
3. What sort of education and/or training did you go through to learn your skills?
4. Did you encounter any forms of digital technology when learning your craft?
5. If so, what types/forms, and how did you feel they worked?
6. In terms of learning or practicing your craft, have you faced any challenges? Can you please describe them?
7. Are you concerned about these types of crafts disappearing over time? What could be done to help preserve them and/or encourage their knowledge transfer?
8. What do you see as the main challenges in learning heritage crafts?
9. Moving onto some more recent forms of digital technology, what are your overall thoughts on artificial intelligence?
10. Can you foresee how AI may be involved with or integrated into fashion and textiles?
11. Do you see the role of the artisan in these contexts (F&T) being affected by AI now or in the future?

Project specific

12. What kind of tools do you like to work with (needle types, sizes, etc.)? Which method(s) of embroidery are your favorite (right side up/ upside down)?
13. How do you generally transfer the artwork to your embroider bed/frame?
14. Do you have techniques specific to you that you have developed through practice?
15. How do you 'decrypt' or understand an existing embroidery design from a sample?
16. How do you go about teaching someone else one of your designs?
17. Shifting more to the future, can you envisage how these two processes could occur using any type of digital technology?
18. How might you see yourself in 5 or 10 years' time as an embroiderer and/or haute couture artisan? How do you see the profession changing in the future?
19. How might your interaction with other artisans shift?
20. How might your interaction with the tools and materials change?

Post Activity Feedback Form

Interface Interaction:

1. How intuitive did you find the interface of our digital embroidery capture tool?
2. In what ways did the interaction with the physical device differ from your usual work methods?
3. Did the interface design influence your working method or comfort level during the capture process?
4. Were you conscious of your actions being captured, and if so, did this awareness alter your crafting technique in any way?
5. Could you describe any particular moments during the capture process that felt significantly different from your typical crafting experience?
6. Upon reviewing the captured data, do you feel it accurately represents your craft process and what would you suggest could improve the digital recording technology?
7. How do you perceive the potential uses of this captured data in areas such as archiving and education?
8. Can you envision any innovative uses for this technology as a creative aid in designing new pieces?
9. Do you see potential for this technology to facilitate new forms of collaboration within the haute couture community? If so, how?
10. In your opinion, what are the potential benefits of this technology for the future of haute couture?
11. Are there any concerns you have regarding the technology, for example, in oversimplifying the complexity or intuition of your craft?
12. If you had complete control over the technology, what features or capabilities would you add or change?

Interview ID	Date	Location	Demographic	Sex	Employment Position
Interviewee 1	29/11/2023	Paris - Atelier	18-25	F	Junior Embroiderer
Interviewee 2	29/11/2023	Paris - Atelier	18-25	F	Junior Embroiderer
Interviewee 3	29/11/2023	Paris - Atelier	32-40	F	Senior Embroiderer/Director
Interviewee 4	29/11/2023	Paris - Atelier	32-40	M	Senior Embroiderer/Director

Figure 4: Interviewee Data

Codebook Feedback Forms - Codes ID	Code Name	Description
1	Intuitiveness and Usability	Ease of use/understanding of the technology
2	Impact on Creativity	In what way did the capture tool impact their regular working process
3	Potential for Improvement	Perspectives on how tools like these might be made more useful for embroidery artisans
4	Reflections on Technology Integration	Suggestions as to what ways these types of technology may have a role within an embroidery atelier and in what capacity

Figure 5: Codebook - Feedback Forms

Excerpt ID	Feedback form ID	Code ID	Excerpt Text/Summary (Page number)	Filename
201	Interviewee 3	Code 1	I didn't find this device very intuitive (p1)	Interviewee 3 - Questionnaire (1)
202	Interviewee 3	Code 1	The job was not really adapted to be completely comfortable (lack of space). (p1)	Interviewee 3 - Questionnaire (1)
203	Interviewee 3	Code 2	Yes, knowing that you are being "observed" has an influence on gestures which I think are less natural/spontaneous, at least for my part. And the lack of comfort does not facilitate the fluidity of the gesture. (p1)	Interviewee 3 - Questionnaire (1)
204	Interviewee 3	Code 2	Yes, totally conscious (proximity to the tools, the camera -> difficult to ignore). And the exercises requested in any case "prevented" us from being in a form of creation.(p1)	Interviewee 3 - Questionnaire (1)
205	Interviewee 3	Code 4	It was more of a technical gesture disconnected from reflection (p1)	Interviewee 3 - Questionnaire (1)
206	Interviewee 3	Code 1	Mechanical gesture rather associated with a production process, we have an embroidery stitch to execute and we repeat it in a given time... Usually I make samples so it is a creative process which requires working with more material (iconographic, textiles, materials) We are also required to move around the space more, to discuss with the teams, obviously this experience was short and restricted on the job but as a result it does not reflect our daily creative process. (p2)	Interviewee 3 - Questionnaire (1)
207	Interviewee 3	Code 4	I think that for the technical practice of loom embroidery when everything is in place (meaning no creation but only production) this capture is quite simple and faithful = two hands moving with a needle. (p2)	Interviewee 3 - Questionnaire (1)
208	Interviewee 3	Code 2	On the other hand, for me it is totally disconnected from a creative process so the question does not seem to make sense to me...(p2)	Interviewee 3 - Questionnaire (1)
209	Interviewee 3	Code 3	Looking at this capture as it is, I have difficulty seeing the potential of this data... Filming an embroiderer in action would seem to me at this stage more interesting to train or keep a trace of this profession. I think it's impossible to train people with this data, there would be a lack of explanations, role-playing, concrete images of the job, and achievements. Simply the gestures I don't think it's very constructive (and as educational support almost useless without physical demonstration, without concrete examples - it's not precise enough). (p2)	Interviewee 3 - Questionnaire (1)
210	Interviewee 3	Code 4	Honestly no, as we discussed during the interview, I think that the sustainability and strength of this profession comes through physical practice, through transmission and exchange. (p2)	Interviewee 3 - Questionnaire (1)
211	Interviewee 3	Code 4	The result of this device is so dematerialized that we lose the strength and power of certain senses essential to the creative process (which are very important in our profession, touch for example). Furthermore, in a society where technology is taking up more and more space, I like to think that the challenge of our profession is to survive by promoting its fundamental particularities (specific to many artistic professions: intelligence of hand, manual craft, patient, imperfection linked to the unique character that cannot be reproduced, sensitivity, interpretation, capacity of each person to create a story and an imagination) and therefore to defend the artisanal, non-mechanical character. (p2)	Interviewee 3 - Questionnaire (1)
212	Interviewee 3	Code 3	No... and I don't understand this technology and the tools as they currently stand (p3)	Interviewee 3 - Questionnaire (1)
213	Interviewee 3	Code 4	Depending on what this technology will become perhaps some could succeed in implementing more productive practices (saving time, efficiency) (p3)	Interviewee 3 - Questionnaire (1)
214	Interviewee 3	Code 2	I hardly project a creative potential therefore for Haute Couture which wants to be a area of exploration is totally vague for me. (p3)	Interviewee 3 - Questionnaire (1)
215	Interviewee 3	Code 4	Instinctively I associate this experience (and the little I understand) with a simple descriptive, mechanical approach to our actions. I don't see where this is going, it seems reductive to me. Not really concerns because I don't see how this technology can take an important place in the practice of our know-how. (P3)	Interviewee 3 - Questionnaire (1)
216	Interviewee 3	Code 3	Difficult to answer this question because at this stage I do not understand this technology. (p3)	Interviewee 3 - Questionnaire (1)
217	Interviewee 3	Code 4	It was already a pleasure to meet you and welcome you to the workshop. It was very interesting to be able to engage in a first discussion with you on this very current subject (AI) and it allows us to think about it too. (p3)	Interviewee 3 - Questionnaire (1)
218	Interviewee 3	Code 3	For the moment it's confusing for me, perhaps we should have started with an analysis of our know-how to perhaps consider more appropriate tools. Better understand our profession to perhaps identify gaps, needs or additional avenues. At this stage, I have the impression that it is very abstract and that it does not take into account the problems/issues of our daily profession or more simply our functioning. (Code 218) We have a creation process (with a method which is deployed in different stages) and this term comes up a lot in your questions but the experience which was carried out at the workshop was too far from this method. To dig it! (p3)	Interviewee 3 - Questionnaire (1)
219	Interviewee 4	Code 1	I did not find the tool very intuitive (p1)	Interviewee 4 - Questionnaire (1)
220	Interviewee 4	Code 1	The embroidery loom was quite small compared to the loom we use , in terms of comfort seat it was also positioned too low compared to our usual professions . (p1)	Interviewee 4 - Questionnaire (1)
221	Interviewee 4	Code 1	The interface has not influenced my method but the comfort level has dropped. (p1)	Interviewee 4 - Questionnaire (1)
222	Interviewee 4	Code 1	No I didn't feel that my actions were captured , however the metal threads in the fabric offered both a frame which allowed me to embroider along the line (p1)	Interviewee 4 - Questionnaire (1)
223	Interviewee 4	Code 2	and at the same time prevented me from embroidering where I wanted because I born didn't want to make a needle hole in the electrical wire. (p1)	Interviewee 4 - Questionnaire (1)
224	Interviewee 4	Code 1	In terms of comfort , the surface area was too small to be comfortable , and to be able to put as I usually make my materials , threads and scissors on my embroidery loom (p2)	Interviewee 4 - Questionnaire (1)
225	Interviewee 4	Code 2	We also had to do the testing quickly , choose an embroidery to reproduce without having really have the time to think about the implementation , which is not my habit. But I born didn't know we had to reproduce an experience of "creation". (p2)	Interviewee 4 - Questionnaire (1)
226	Interviewee 4	Code 2	I do not would not say "creative process" , for me it would not it is not a "creative" but a "technical" experience. (p2)	Interviewee 4 - Questionnaire (1)
227	Interviewee 4	Code 3	On the video you see me doing a straight line with a cotton thread ... I think that he would have necessary take more time and think first of all about selecting different materials (threads, beads , sequins, tubes, etc.) and naming them . Then observe how the embroiderers interact differently with these same materials , the different techniques that they choose to use and combine, in order to truly enter into an observation of the "creative process" . Does the rendering ... is the same from one embroiderer to another ? What materials are chosen by the embroiderers , who are put aside? With what technique are the materials associated with? How the techniques are worked from one hand to one other ? And draw hypotheses from it. (p2)	Interviewee 4 - Questionnaire (1)
228	Interviewee 4	Code 3	I have the feeling that this makes it more complex in terms of training... so that when I see myself doing one wire line as in the video. It would be a matter of explaining it with words or diagrams like in an embroidery explanation book : (p2)	Interviewee 4 - Questionnaire (1)
229	Interviewee 4	Code 3	" Pass your thread in the cat of a needle, tie a knot at the end of the thread, pass your needle through your fabric on the wrong side and pull it onto the right side , At this stage there, I fear that no ...	Interviewee 4 - Questionnaire (1)
230	Interviewee 4	Code 3	After I born don't know but when we used this technology , we had to pretend to embroider ... so there was a technical problem perhaps ? In any case I born don't see the help that that could bring us on a daily	Interviewee 4 - Questionnaire (1)
231	Interviewee 4	Code 3	No I born I don't see how, finally I born don't understand what could be the forms of collaboration (p3)	Interviewee 4 - Questionnaire (1)
232	Interviewee 4	Code 4	Keep a trace of " gestures " without having to go through transmission and learning from craftsmen to craftsmen	Interviewee 4 - Questionnaire (1)
233	Interviewee 4	Code 2	In fact it's safe that that simplifies but at this stage there technology does not not allowed to transcribe This what is our job really ? (p3)	Interviewee 4 - Questionnaire (1)
234	Interviewee 4	Code 3	Sorry but I born don't understand this that YOU name " technology " today I have the impression that the tool developed is a tool for capturing " movement " during a technical embroidery exercise ...	Interviewee 4 - Questionnaire (1)
235	Interviewee 4	Code 3	I was delighted to meet the whole team, but I believe that he The hypotheses relating to AI should have been communicated upstream. (p3)	Interviewee 4 - Questionnaire (1)
236	Interviewee 4	Code 3	I do not I don't really see the relationship today between the capture that we did at the workshop and the idea that artificial intelligence had a role to lead with haute couture...	Interviewee 4 - Questionnaire (1)

Figure 6: Coded Data - Feedback Forms