Journal of Ethnology and Folkloristics 20 (1): 85–107
DOI: 10.2478/jef-2026-0006

MENDING KNOWLEDGE: COMMUNITY TRANSMISSION AND ITS CHALLENGES IN FORMAL EDUCATION*

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ABSTRACT
This paper examines how community-driven mending knowledge travels across time and into contemporary schooling, and what conditions allow it to persist. We pair a concise historical backdrop through a timeline called "How Mending Survives", with a practice-led, design-ethnographic case study in a New York City

* The authors are grateful to Repair Shop's workshop and survey participants, the high school students who learned to mend in all sorts of ways with their supportive teachers, the Sustainability in Practice: DIY Reuse, Repair and Innovation conference (2024) at the Estonian National Museum where we first presented a version of this paper, Laura Novich and Tessa Maffucci who encouraged the collaboration between the Garment District and fashion high school, and Vita Wells from The Culture of Repair for funding the ReGenerational Repair Program.

Sam Bennett and Rachel Meade Smith researched and wrote about Repair Shop's workshops and surveys and the historical mending section together, with Sam Bennett creating the visual timeline based on our mutual research. Sam Bennett designed, analysed, and wrote about the the ReGenerational Repair Program case study. Gabriele Ferri acted as an advisor and contributed to the structure and conceptual framing of the paper, and to the methodology section.

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ISSN 1736-6518 (print), ISSN 2228-0987 (online)

public high school titled the ReGenerational Repair Program. Using a Value-Sensitive Design lens, we compare a spring after-school class series and autumn in-class intensive study and find that transmission flourishes where learners share time, table, tools and conversation, and falters where those conditions are scarce. Rather than adding a repair unit, we argue for designing classrooms as sociotechnical environments that provide the temporal, spatial and relational fabrics that mending requires, positioning schools as credible co-sites of transmission alongside community venues. The paper clarifies how historical dynamics are re-enacted in the present and why community remains not a supplement to education but a reciprocal site of transmission.

KEYWORDS: mending • informal learning • repair pedagogy • community • sociotechnical environments

INTRODUCTION

Mending knowledge has long circulated through informal, communal and intergenerational channels (Meißner 2021; König 2023). Today, however, this knowledge is increasingly fragile; mending is rarely taught in school, leaving no curricular structures or cultural norms to ensure that future generations learn these skills. At the same time, the environmental and social impacts of fast fashion have renewed public interest in repair (Bick et al. 2018), making mending a meaningful site for rethinking consumption, care and sustainability. Since 2021, our United States-based learning studio Repair Shop[1] has taught over 1,000 people to mend through online and in-person workshops. These experiences prompted the central questions of this paper: how is community-driven mending knowledge transmitted and sustained, and what would it take to integrate these practices more equitably and systematically into formal education?

To address these questions, we combine historical tracing with a design ethnography, practice-oriented approach common in design research. We situate our study within a 300-year view of how mending has been taught across domestic, civic, print, school, alternative and digital channels, using this as context for the present study rather than as a full historical analysis. We then analyse a contemporary case study from our own teaching practice, the ReGenerational Repair Program, a 2024 initiative in a US public high school. Using Value-Sensitive Design (VSD) (Friedman et al. 2013) as an interpretative framework, we consider how classroom tools, institutional constraints and pedagogical norms influence students' ability to engage in slow, attentive, embodied repair. The case examines what occurs when a historically communal, tactile practice enters a time-scarce, machine-centred school system, and identifies some conditions required for equitable, sustained transmission. By bringing these two strands together, we argue that mending survives when communities create space for shared, hands-on learning, and that integrating mending into formal education requires rethinking the temporal, material and value structures of the classroom. Our findings contribute to design education, repair studies, and circularity research by suggesting how endangered mending knowledge can be sustained through pedagogies grounded in care, slowness and collective practice.

NOTES ON METHODOLOGIES

We employed a design ethnographic (Pink et al. 2022), practice-oriented mode of enquiry common in design research (Kuijer 2017), integrating VSD analysis to connect historical and field insights with a contemporary classroom intervention. Because this project emerges directly from our ongoing teaching practice through Repair Shop, our methods are grounded in making, observing and reflecting in situ. As US-based, middle-class educators with backgrounds in learning design and college-level design instruction, our positionalities shape both our access to repair resources and our assumptions about their pedagogical value. We draw on workshop notes, photographs, videos, social media documentation and post-workshop reflections generated through our teaching to understand how participants learn, adapt, and share mending skills. This practice-led orientation aligns with traditions in design research that generate knowledge through making and doing (Mäkelä and Nimkulrat 2011), resonates with ethnographic traditions through its attention to situated practice and lived experience (Ingold 2013), and with reflective practitioner models in education (Schön 2017 [1992]), treating the workshop as both a site of instruction and a site of enquiry. Table 1 summarises each method, its purpose, the data and artifacts produced, and its link to the research question.

Table 1. Research methods used and their purposes.

Research method	**Purpose**	**Data and Artefacts**	**Connection to research question**
Historical analysis	Identify historical knowledge channels	Archival material, communal timeline	Mending is inherently communal
Practice-led enquiry	Understand making–teaching dynamics	Fieldnotes, demos, reflections on our own teaching/mending practice	Mending is embodied and relational
Design ethnographic observation	Capture classroom and workshop interactions	Observation notes, photos, quotes	Documents how values appear in practice
Surveys with students and public educators	Elicit experience and constraints	48 Repair Shop workshop participants; 44 high school students; 67 public educators	Time, budget, motivation as constraints on transmission
VSD analysis	Identify value tensions and enablers	Value-tension codes, tool/layout mapping	Identifies design changes needed

We use situated observation, reflective documentation and interpretive synthesis to examine design-relevant insights and, following Paul Dourish (2006), treat ethnography's contribution as interpretative judgment rather than linear "implications for design". In this spirit, we combine field observation with historical and organisational context, akin to Dourish and Genevieve Bell's (2011) blending of design ethnography with broader sociotechnical analysis. We position this work within contemporary design ethnography (Pink et al. 2022) as interventional and ethical enquiry that helps

configure learning environments. This includes attending to the rhythms of classroom interaction, the materiality of tools and textiles, and the tacit, embodied knowledge that emerges through hands-on engagement. These methods help us understand how learners navigate the tensions between slow, tactile craft and the fast, efficiency-driven norms of contemporary education environments. As educators and menders embedded in the local repair scene, we are probably predisposed to interpret slowness and hand-tool use as pedagogically valuable. We mitigated this by distinguishing observation from interpretation and by triangulating fieldnotes with student artefacts and teacher feedback. We also note limitations: a single-site pilot over approximately six months, without long-term retention checks, and with teacher and class constraints outside our control.

The historical component of this research was assembled iteratively as part of our own teaching practice, shaped by questions that arose during workshops and collaborations. Rather than beginning with a fixed corpus, we built a 300-year timeline of mending instruction by following bibliographic leads, examining institutional archives, and integrating examples shared by practitioners in the United States, United Kingdom and the Netherlands (Repair Shop 2024b). This situated, pragmatic process mirrors the communal and distributed nature of mending knowledge itself. At the same time, we are aware of the limitations intrinsic in our approach, as we relied primarily on English language, Western sources due to the context of our practice.

We define *informal learning* as knowledge acquisition outside formal curricula through participation, observation and tacit apprenticeship. *Relational learning* foregrounds interdependence, such as peers, mentors, family, and community networks co-producing understanding in situ. *Repair pedagogy* refers to teaching approaches that centre embodied judgment, slowness, iterative problem-solving, and care, treating repair not merely as technique but as a way of learning and valuing.

We use VSD as both a conceptual and analytical framework to examine how human values are embedded in, and shaped by, educational ecologies (Friedman et al. 2013). VSD consists of a tripartite methodology: conceptual, empirical and technical investigations. The conceptual work clarifies the ideas and constructs at stake, empirical work examines people and practices in context using qualitative or quantitative methods, and technical work treats technologies and configurations themselves as units of analysis, retrospectively or through proactive design (Value Sensitive Design Lab, n.d.). In our case, we use:

- conceptual investigations to analyse the historical landscape of mending-related concepts and pedagogy;
- empirical investigations to analyse classroom dynamics, as documented in our field notes, and participant reflections, as emerging in the moment and through follow-up surveys;
- technical investigations to analyse infrastructural conditions, including how tool ecologies, room layouts, and institutional constraints influence whether slow, embodied repair practices can take root in formal education.

Analytically, we first conducted descriptive coding of events, tools and interactions, then applied a second-cycle value-tension coding aligned to VSD, specifically care, attention, autonomy, calmness, and speed and efficiency, linking codes to material and infrastructural conditions such as tools, layouts, duration, and to learning outcomes

like task completion, peer exchange and tutorial production. Together, these methods examine how mending knowledge is transmitted in communal versus institutional settings and identify the education configurations required for equitable, systematic integration.

BACKGROUND: MENDING KNOWLEDGE TRANSMISSION

To situate our contemporary teaching practice within a longer lineage of repair education, we created a 300-year chronology titled "How Mending Survives", focused specifically on darning (Repair Shop 2024b). We use our timeline not to reconstruct an exhaustive history, but to trace how infrastructures for learning mending have shifted, and to identify the learning conditions including temporal, spatial, material and social, that recur throughout different periods. Across this long arc, community-based learning has consistently emerged during moments when materials or resources were limited, while periods of abundance and disposability have weakened communal infrastructures for repair. Under conditions of limited resources, communities generate collective infrastructures to teach, circulate and sustain repair practices. When industrial production makes textiles inexpensive and disposable, repair becomes more precarious, surviving unevenly through informal, intergenerational and alternative learning networks rather than through formal institutions. This pattern helps explain the current resurgence of interest in mending, as ecological precarity renews the need for community-based spaces such as workshops, circles, online groups that support shared learning. This is an in-progress chronology, to which we enthusiastically welcome contributions on these missing pieces.[2]

The timeline aligns with contemporary scholarship in repair studies, craft pedagogy and sociomaterial learning, highlighting that mending knowledge has always circulated across multiple, shifting channels such as homes, community groups, printed manuals, schools, civic campaigns, alternative learning spaces and, more recently, digital platforms. Across these contexts, community has played a central role in sustaining textile repair skills. For example, in the 18th and early 19th centuries, young girls in the US, UK and parts of Europe such as The Netherlands learned to darn through hands-on guidance from women in their households, producing samplers that recorded their lineage of learning (Metropolitan Museum of Art n.d.; Smithsonian Institution n.d.). In the early 19th century, groups such as the African Dorcas Association in New York (1928) functioned as early mutual-aid infrastructures where mending was taught, shared and socially reinforced, while missionary-led textile work simultaneously obscured Indigenous repair traditions (Sinclair 2015). These early forms reveal that mending thrived when shared need, material scarcity and embodied relationships created space for person-to-person teaching.

By the mid-19th century, printed manuals in the US (Mattern 2024) and sample books in the UK (Wyld 2022) began standardising mending instruction, making techniques more widely accessible but less tactile and contextual. These publications helped usher repair into schools (König 2023: 118) through the Home Economics movement (Dreilinger 2021), where millions of students learned sewing and mending as formal curricular content in the United States. Wartime efforts such as the British Make Do

and Mend campaign (Berthon 2017) expanded communal learning again, mobilising women to teach repair as part of broader civic responsibility campaigns. After World War II, however, repair in the United States declined sharply as mass-produced clothing became cheaper and consumption-oriented values took hold (Dreilinger 2021: 132). Mending became less visible in American daily life and was less emphasised in schools, where Home Economics shifted toward consumer education (Johnson 2018). Repair persisted informally, but without strong communal or institutional structures, opportunities for learning became uneven and often dependent on individual access to time, tools or family knowledge. And in the present day, social media platforms have enabled a resurgence of visible mending through menders like Celia Pym, Hikaru Noguchi, Kate Sekules, Tom Van Deiknen, Marlen Meiners and Arounna Khounnoraj, extending discovery globally even as the most durable learning still occurs around shared tables. This mirrors earlier periods in which community proximity, not just access, was essential to developing repair judgment and skill.

Recent scholarship in repair studies helps illuminate why these communal formations matter. Design ethnographic work shows that communal mending workshops operate as sociomaterial learning sites where knowledge is distributed across bodies, tools, materials and talk, and where "vernacular menders" move between roles, such as "the restorer, the re-doer, the recruit and the reluctant" while producing informal design outcomes in practice (Durrani 2018: 1735). Using sensory ethnography, Marium Durrani (2021: 778) explores ideas of taste to specify that menders train the sensing body through repetition, group norms and material feedback; technique and aesthetic judgment co-develop and mending becomes an object of passion. At the design education interface, broken-world thinking (Jackson 2014) treats breakdown as a design departure point, with Durrani et al. (2021: 230–231) arguing for an integration of design-for-repair into the fashion design process. A generational, infrastructural perspective shows that formal settings such as schools and informal settings such as the home shape repair practices across cohorts, and contends that a robust repair infrastructure should combine professional services with school-based mending education (Kucher 2024; 2025). Beyond technique, editorial overviews position repair as a cultural and political practice enacted through networks of care (Aliabieva et al. 2025), while scholarship on visible and invisible mending clarifies how repair carries poetic, affective, and narrative force (Odabaşı 2025). Finally, transition design-oriented contributions foreground care as a design competency and identify barriers such as time, access and privilege, which condition who can repair and under what circumstances (Maione 2023). Together, this literature underscores that repair learning is inseparable from the environments – social, material, spatial and cultural – that make it possible.

While repair studies richly document why people mend and how communal spaces support skill-sharing, fewer studies examine what happens when historically communal practices try to enter formal education systems shaped by time scarcity, standardised curricula and machine-centred production logics. This gap motivates our research question. The long-term patterns and recent scholarship suggest that the conditions enabling repair learning, such as time, proximity, peer exchange, embodied practice and shared purpose, are abundant in informal and community-led settings but inconsistently supported in schools. Our case study seeks to examine how mending knowledge travels within a US public high school, where the sociotechnical structures of edu-

cation including classroom layouts, tools, schedules, norms and digital devices, shape and often limit the kinds of attention and relational engagement that repair requires.

It is within this landscape that our own teaching practice through Repair Shop emerged. Our work reflects contemporary conditions that echo earlier historical patterns: a reliance on informal networks, the need to rebuild community around endangered skills, and the challenge of transmitting hands-on practices in a world increasingly mediated by screens. By examining Repair Shop as a contemporary communal learning environment, we can better understand how repair skills circulate today and what this reveals about integrating such knowledge more equitably into formal education.

REPAIR SHOP, A LEARNING STUDIO FOR CONTEMPORARY MENDING

Since 2021, Repair Shop[3] has functioned as our primary site of practice-led enquiry, offering short-form visible mending workshops to more than 1,000 participants across online and in-person settings. These workshops were shaped by the conditions of their moment: the accessibility of video conferencing during the COVID-19 pandemic, growing public concern about fast fashion (Sekules 2020: 8–11), and the popularity of visible mending on social media platforms such as Instagram (rrepairsshop n.d.) and TikTok (i_d 2022). One participant, Kate, from the United States, wrote:

> I don't remember how I started following visible mending accounts, but I think they simply began popping up for me among other makers I follow. They felt inspiring aesthetically, and as someone who loves sweaters and warm socks and often deals with moths it felt like a great thing to learn how to do for myself. A zoom workshop almost 2 years ago made that possible, too! (FM: 2023)

Our participants often first encountered mending digitally, yet sought embodied instruction they could not easily find in formal education or local community networks. The consistent demand for our workshops underscored how repair knowledge today circulates in hybrid modes; knowledge may be digitally discovered, but learned most effectively through shared, tactile practice. Our workshop structure blended visual clarity with hands-on guidance. Each session introduced the history of mending and the environmental impacts of fast fashion, demonstrated plain-weave darning via overhead cameras, and guided participants through the repair of knitted and woven garments step by step. This multimodal format with slides for conceptual grounding, live demonstrations for embodied learning, and communal discussion for troubleshooting, sought to recreate the social and observational qualities present in historical in-person learning environments. Participants frequently described the workshops as offering rare opportunities for slow, attentive, peer-supported practice.

To understand how knowledge circulates beyond the workshop itself, we surveyed 48 former participants in 2023 (FM: 2023). Over half reported teaching at least one other person to mend, and 64% had repaired something for someone else. Many described organising small mending circles or informal one-to-one lessons, echoing earlier communal learning structures. These findings suggest that even in a context dominated by individual online consumption, learners actively re-create the interpersonal networks

historically responsible for sustaining mending knowledge. Participants' motivations ranged from environmental concern to sentimental attachment to clothing, but their practices revealed a shared investment in passing knowledge forward, a necessary condition for sustaining repair culture. In other words, former workshop participants are re-creating the infrastructures the literature identifies as critical for transmission, everyday networks, spaces, and practices organised around care that extend garment lifecycles and redistribute know-how beyond the workshop (Aliabieva et al. 2025).

At the same time, the demographics of our participants highlight persistent inequities in access. Most attendees were adults with internet access, discretionary time and relative economic stability; 81% identified as women, and the majority were between 25 and 44 years old. These patterns align with historical trends in which mending networks were shaped by gender, class and time availability. Absent from our participant pool, however, were youth in formal schooling, an age group deeply affected by fast fashion yet with few institutional opportunities to learn repair. One survey respondent, Jennifer, stated, "I think it's important to learn the skill young if possible because it gives you a better understanding of how things are made and therefore how they can be repaired. It demystifies the making process." (FM: 2023) This gap underscored the need to explore how mending could be taught in educational settings where time is structured differently, attention is shaped by digital environments, and learning is mediated by institutional constraints. This gap makes visible how strongly repair relies on informal, opt-in infrastructures, and how unevenly those infrastructures distribute access by age, time and socioeconomic status.

Together, our experiences running Repair Shop as a practice-led enquiry illuminated both the potential and limits of contemporary communal mending education. These experiences revealed strong desire and motivation among learners, evidence of peer-to-peer skill transmission, and the importance of embodied, relational instruction. They also made clear that without supportive infrastructures, mending knowledge remains unevenly distributed and dependent on opt-in, informal environments. These realisations directly informed the design of our next phase of research: the ReGenerational Repair Program, a case study that examines what happens when we attempt to bring a historically communal, slow and tactile practice into the accelerated, standardised environment of a US public school classroom. In short, Repair Shop showed us what robust communal transmission looks like and highlighted what is conspicuously missing in formal education.

ReGenerational Repair Program Overview

In what follows, we will present how the ReGenerational Repair Program unfolded, followed by our observations and analysis. To understand what it might take to integrate mending back into formal education, in 2024 we partnered with a specialised fashion high school in New York City to pilot the ReGenerational Repair Program through a multi-part couture repair series co-taught with industry experts from the Garment District.[4] Over the last 20 years, the Garment District has rapidly shrunk due to gentrification, shifts in overseas labour (Berger 2004), and the devaluing of handwork in the United States. As a result, apparel repair knowledge and skills face the threat of

extinction. Drawing on VSD, we approached the school as a sociotechnical environment, attending to how human behaviours, institutional norms, tools, schedules and physical layouts shaped what forms of repair learning could take hold. This initiative extended our practice-led work into a structured educational environment where tools, schedules, expectations and norms differ sharply from the opt-in workshops of Repair Shop. We first present the structure of the program we organised and taught, then we dive more deeply into the field observations we collected. Specifically, we focus on the differences between the spring after-school program and the autumn in-class intensive settings, and use those contrasts to tease out different educational configurations that brought forward different values in the teaching and learning of mending. In the Discussion section, we integrate these interpretations into the broader historical perspective introduced earlier.

Program Structure and Participant Profile

The Regenerational Repair Program unfolded in two main parts: the after-school program in the spring, followed by the autumn in-class week-long intensive program. In between the two parts, we developed an open-access repair reference collection for public educators. We also facilitated a New York City Department of Education professional development workshop in the autumn. Students in the spring after-school program and autumn in-class intensive program were predominantly people of colour and a mix of genders. Table 2 summarises the timeline of our programming, facilitators and participants.

Table 2. The ReGenerational Repair Program timeline.

Time Period	Program/Output	Facilitators	Participants
April–June 2024	Spring after-school program which included six two-hour mending workshops	One expert per workshop from the NYC Garment District and Repair Shop	Four to six students per workshop, ages 14 to 18
July–August 2024	The ReGenerational Repair Program reference collection	Repair Shop	Open access to public educators
November 7, 2024	Climate Action Day Professional Development (online) to share the ReGenerational Repair toolkit and teaching plain-weave darning	Repair Shop and the New York City Department of Education – Office of Energy and Sustainability	141 New York City public school teachers
November 11–15, 2024	Autumn week-long intensive program which included a sophomore denim repair workshop and a senior student darning workshop	Repair Shop	25 sophomore students ages 14 to 15 and 24 senior students ages 17 to 18

The spring after-school series ran from April to June of 2024 and was our first entry point into the school community. It included six two-hour workshops, spread throughout three months, co-designed with five experts from the Garment District, framed

around circularity and fashion.[5] Each two-hour session introduced one endangered mending technique with a cohort of 12 students, ages 14 to 18. Together with the expert, we created detailed lesson plans, visual slides and specialised supply kits. The workshops included chain stitch embroidery on t-shirts, denim repair, skirt alterations, fabric scrap rework, plain-weave darning on sweaters and a sewing machine maintenance session. Students gathered around one large table, sharing tools, examining examples and watching slow, close-up demonstrations via an overhead camera. Our goal was for students to leave each workshop with a completed mend and the resources to continue learning independently, supported by follow-up materials featuring advanced tutorials and inspiration via YouTube, Instagram and Pinterest. Notably, the spatial and temporal conditions of the after-school program, small groups, ample time, shared table and proximity to the expert resembled the communal learning environments documented in both historical and contemporary repair studies.

Two key outcomes were produced from the spring after-school workshops. First was the creation of a comprehensive repair workshop reference collection (Repair Shop 2024a), which included how-to guides, expert contact information, lesson plans, supply lists, budget templates and more. This collection was introduced to New York City public school teachers during an online professional development workshop in November 2024, with the aim of equipping teachers to incorporate repair into their own classrooms. The second outcome was the foundation for an autumn weeklong repair intensive program, our most formal education endeavour yet. This iteration emphasised peer-to-peer knowledge exchange, assigning one mending technique per grade: denim repair with 25 sophomores, and darning with 24 senior students.

In preparation for the autumn in-class intensive program, each student voluntarily took a survey focused on their previous repair experience, their relationship to clothing, and their understanding of fast fashion. Of the 44 respondents, only 14% of students had no previous experience with repair, while 66% had repaired something themselves, usually clothing, and 39% had watched family members do so. One student stated, "I've repaired torn pants, shirts, broken jewellery, phones, iPads, laptops, and a Nintendo Switch." Students were also asked to rate the importance of their clothes on a scale of 1 to 10, with 10 being of most importance, averaging a score of 8.13 with one student proclaiming, "[Clothing is my] best friend if not my wife. I love clothes with all my heart, they can never do me dirty… unless it [doesn't] fit me right." Finally, 82% seemed to have a general understanding of issues related to fast fashion. (FM: 2024)

In the autumn 2024 week-long intensive program, the sophomore class, ages 14 to 15, learned denim repair and the senior class, ages 17 to 18, learned plain-weave darning repair. Both classes experienced the same learning format. On the first day, Repair Shop demonstrated the repair technique with a period of guided practice. On the second day, students continued to practice their newly learned technique with time for one-on-one guidance. On the third day, students communally shared their work with one another and were assigned in groups to design their own tutorial based on their newly learned skills. On the fourth day, students worked on their group's tutorials. On the final day, they shared these with the entire class, forming a reciprocal learning environment (McAllum 2014: 26–35) that disseminated the mending knowledge beyond the classroom and back into their communities. These two phases positioned us to compare, in detail, how mending knowledge circulates in a voluntary after-school context

versus a required in-class context, revealing the infrastructural, temporal and pedagogical constraints that shape whether communal and reciprocal learning can take root.

Contrasting Learning Conditions: Spring and Autumn

With the program structure established, we turn to workshop observations, focusing on how differences in space, tools and pacing across the spring after-school and autumn intensive programs created distinct conditions for learning, information that later informs our VSD analysis in the Discussion section.

Across the spring after-school workshops, students worked side-by-side around one large table, using a single overhead camera to view close-up demonstrations of each endangered technique (Photos 1, 2a and 2b). They watched one another's hands, asked face-to-face questions about techniques and the experts' career paths, and completed a mending task within the two-hour session. For instance, one expert talked about her visits to Japan, inheriting her grandmother's vintage kimono collection, and her experience working in well-known fashion ateliers before creating her own studio, which focused on underconsumption using scraps of damaged kimonos to create new garments (FM: 2024). At our end-of-semester feedback survey, one student mentioned "being able to ask experts questions on their career, real time slow demonstrations and having one small group learning method", were their favourite parts of the workshop (FM: 2024).



Photo 1. An example of a workshop set-up for the ReGenerational Repair Program's after-school program. An overhead camera with a light is placed above the demonstration so that participants can see the detailed handwork up close. Photo by Sam Bennett, 2024.



Photo 2a. During the ReGenerational Repair Program's Fabric Scrap Rework 2024 spring after-school workshop, the students and the repair expert were set up around a table to allow for easy conversation to take place and questions to be asked. Photo by Sam Bennett, 2024.



Photo 2b. During the ReGenerational Repair Program's "Fabric Scrap Rework" 2024 spring after-school workshop, the students and the repair expert were set up around a table to allow for easy conversation and questions to take place. Photo by Sam Bennett, 2024.

During the autumn in-class intensive program, the spatial and temporal dynamics were markedly different. The classroom was arranged in rows of desks with industrial sewing machines on top, with the demonstration table positioned several metres away at the front of the room, making it difficult for students to see one another's work or compare techniques (Photos 3a–d). One third of the senior students often arrived 30–45 minutes late, requiring repeated demonstrations, while sophomores entered in established social groups with bursts of play fighting, giggling, and interjections like "shut up!" and "you're annoying me" (FM: 2024). Phones and earbuds were present throughout instruction, with some students scrolling through TikTok or Instagram during demonstrations, and others putting on makeup at their desks (Photos 4a–c). When samples were eventually placed on a common table, students slowed down, compared stitches, and selected swatches they felt were "hard" or showed "nice craftsmanship", explaining their choices (FM: 2024). Most students reported little or no experience with hand sewing, including threading a needle. Denim repair was described as difficult and slow with exclamations like "I'm bored", "do I have to?" and "my fingers hurt" (ibid.).



Photo 3a. Repair Shop's Sam Bennett teaches senior students to darn during the ReGenerational Repair Program autumn 2024 in-class intensive program. Photo by Emma Cali, 2024.

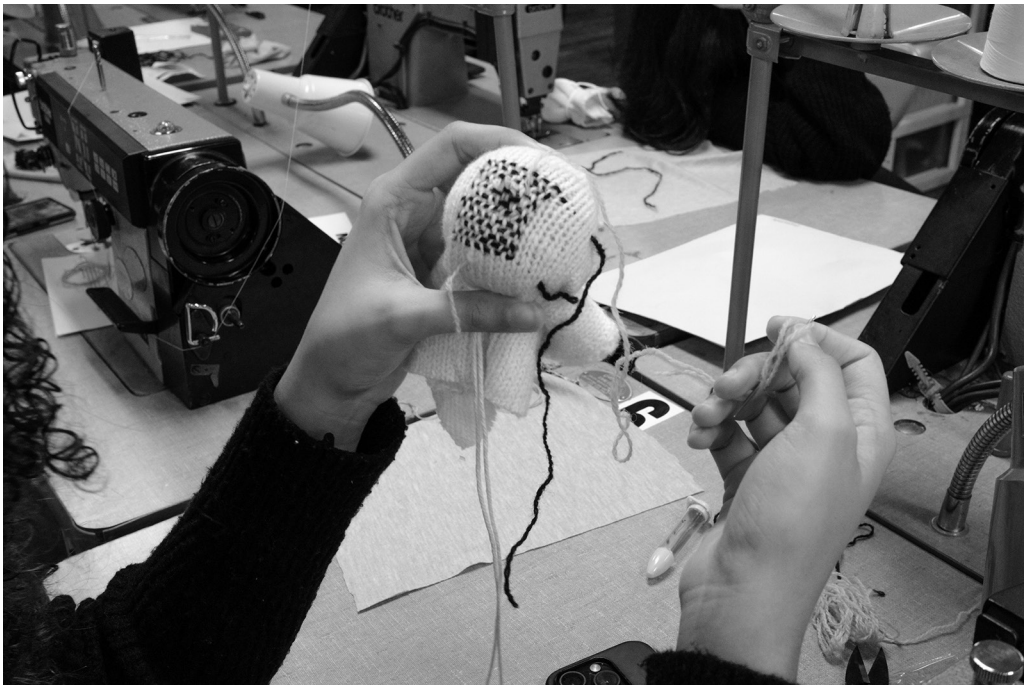


Photo 3b. A student shows their first darn during the ReGenerational Repair Program autumn 2024 in-class intensive program. Photo by Emma Cali, 2024.



*Photo 3c. Sophomores learn to repair denim using a technique called '*sashiko*' during the ReGenerational Repair Program autumn 2024 in-class intensive program. Photo by Emma Cali, 2024.*

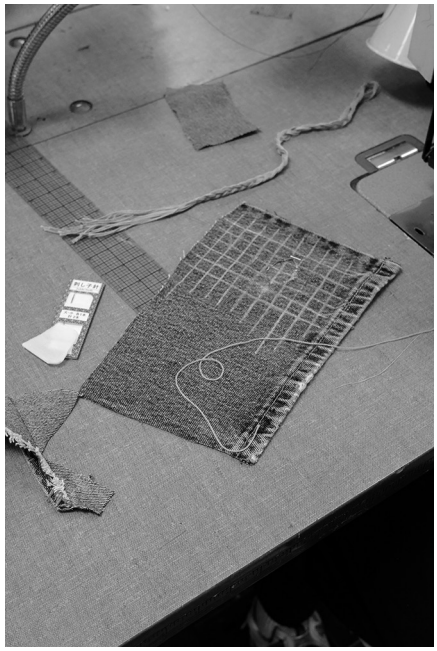


Photo 3d. A student's denim repair in progress during the ReGenerational Repair Program autumn 2024 in-class intensive program. Photo by Emma Cali, 2024.



Photo 4a. Students were often distracted by digital technology during the ReGenerational Repair Program's autumn in-class intensive program. Here, Instagram is displayed on a student's mobile phone. Photo by Emma Cali, 2024.



Photo 4b. Students were often distracted by digital technology during the ReGenerational Repair Program's autumn in-class intensive program. Here, many students wear headphones during class. Photo by Emma Cali, 2024.

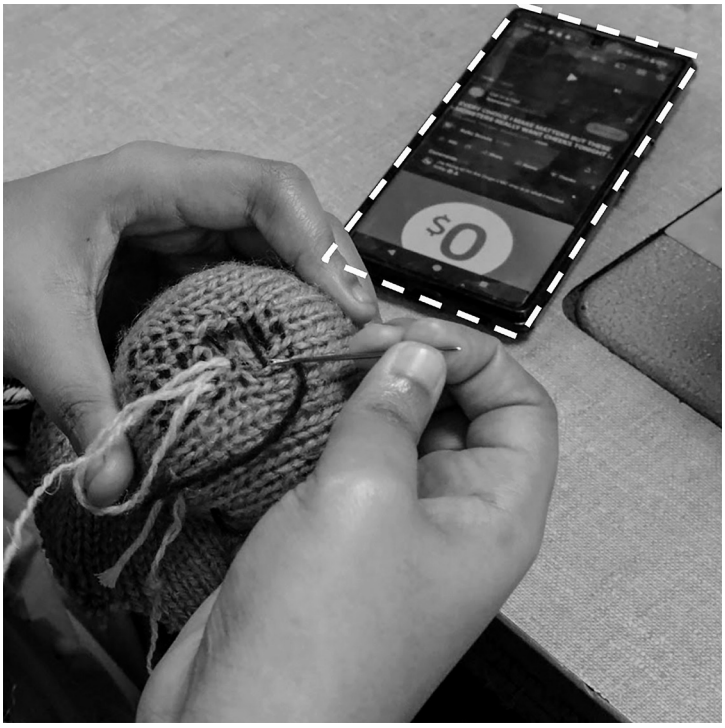


Photo 4c. Students were often distracted by digital technology during the ReGenerational Repair Program's autumn in-class intensive program. Here, Instagram is displayed on a student's mobile phone. Photo by Emma Cali, 2024.

On the final two days of the autumn in-class intensive program, groups of five produced tutorials of their choice, which featured short videos, illustrated guides, and posters. Students self-assigned roles, such as repairer, stylist, director, copywriter, videographer/photographer. They 'knolled' their supplies to start, and most used phones to record videos and voiceovers and edit. Many students took on the repairer role and took turns repairing in front of the camera, creating a collaborative darn or denim repair. Although many were not proficient in their repair technique, all groups created a tutorial. Some outcomes included a poster of denim repair steps, while another added applause sound effects to the moment of threading a needle and completing their repair. Students mentioned as a group they could get a lot more done, but the teaching was challenging. One student taught a friend and mentioned, "it was way harder to teach her how to do it rather than me just watching it being repaired and repeating the same steps" (FM: 2024). The last day was also Parents' Day, with families observing. One parent asked about sweater repair and practiced darning with us while his daughter watched. The classroom teacher remarked that students who "don't talk to each other in class" collaborated and "became friends" (ibid.). In a post-workshop survey of 24 students, 83% described their experience positively, stating "It felt good" and "I feel accomplished", and one senior student writing: "Thinking through the process, I'd feel a sense of patience, because repairing textiles is often a slow, meticulous job…

I felt reli[e]ved after completing my first repair because it gives me the confidence for repairing more clothing in the future." (Ibid.) The most common reason for not continuing mending was that it is "too time consuming" (ibid.).

Constraints also emerged through professional development interactions with teachers. In the two-hour online professional development workshop with 141 NYC public school teachers, of the 67 who completed feedback forms, 36% identified the materials budget and 19% identified lack of time as their primary barriers to integrating mending into their own classrooms. Even when designing lesson plans, one teacher explained, "No activity should be longer than 10 minutes; between two to five minutes is ideal" (ibid.). Yet, when darning a small hole, creating the warp alone takes 10 minutes, if not more. This echoed the autumn in-class intensive program, where late arrivals compressed practice time and required restarts, and where 90-minute class periods and large cohorts contrasted sharply with the spring's extended, small-group sessions.

Taken together, these observations show that the spring context provided uninterrupted time, close proximity to experts, and visible collective progress toward a completed mend, conditions that students described as calming and satisfying (Photos 1, 2a–b). The autumn setting, shaped by rows of sewing machines, late arrivals, short periods and digital devices, produced fragmented attention and rapid oscillation between demonstrations, screens and conversations (Photos 3a–d and 4a–c). Across both settings, hand work required slow, steady concentration that exceeded typical classroom windows; both students and teachers highlighted time and budget as practical constraints. When authorship was introduced through tutorial creation, students collaborated energetically and circulated mending knowledge among peers and families, even when technique proficiency varied and attention remained fragile.

The workshop observations establish a consistent pattern across settings. In the Discussion, we use VSD to explain that pattern, focusing on how time, space and tools, and participation structured the transmission of mending knowledge.

DISCUSSION: DESIGNING FOR THE TRANSMISSION OF MENDING KNOWLEDGE

Existing scholarship also situates mending within longer-standing conversations in design about care, attention and maintenance. Leah Maestri and Ron Wakkary (2011) frame maintenance as a creative and situated practice, while Steven J. Jackson and Laewoo Kang (2014) argue that breakdown and obsolescence are central sites through which design work unfolds. More recent studies show how practices of mending and maintenance challenge dominant narratives of speed, innovation, and disposability, foregrounding instead the ethical and relational dimensions of care (Houston et al. 2016; Meißner 2021). Additionally, Daniela Rosner and Morgan Ames (2014) demonstrate that repair and care are always entangled with material, infrastructural and political conditions. With this theoretical context, and after having presented our study and observations, we return to our research question: how is community-driven mending knowledge transmitted and sustained, and what would it take to integrate these practices more equitably and systematically into formal education? If mending travels through slow, shared, situated practice, then integration calls for designing the environ-

ment, not merely adding content. Read alongside the historical landscape we earlier outlined where community-based learning in households, mutual-aid groups, wartime campaigns and social platforms consistently emerge during moments of precarity, our case study shows the same present-day pattern: transmission flourishes where learners share extended time, tables, tools and conversation, and falters where those conditions are scarce. In what follows, we adopt a VSD framework and treat the classroom as a sociotechnical environment that materialises values, tracing three interlocking structures that differentiated the spring after-school program and the fall in-class intensive.

To orient the analysis, three structures emerge as especially salient: arrangements of time, arrangements of space and tools, and participation structures. Together they explain how the environment organised what practices and values were feasible across the two settings.

We first consider how time affected our experience. The spring after-school program afforded long, continuous intervals in which students could dwell with a single task, watch each other's hands, ask questions and receive side-by-side advice. Whereas, the autumn week-long intensive program proceeded with 25% shorter classes and frequent restarts prompted by late arrivals, and was accomplished at a pace that pushed demonstrations to finish before the end of class. In VSD terms, time functioned as a sociotechnical constraint on care and attention. Richard Sennett's (2008: 295) reflections on craft and time also offer a valuable insight: "Craftsmen take pride most in skills that mature", he writes, and such maturity demands time, "slow craft time ... enables the work of reflection and imagination which the push for quick results cannot". In the after-school series, the elastic time supported the slow noticing through which tacit judgment travels, while in the autumn, the compressed time was a barrier to collective engagement.

A second contrast lies in space and tools. In the spring after-school program, a single shared table brought bodies, samples and narratives into close proximity, enabling co-presence, quick peer-to-peer checks, reciprocal troubleshooting and flattening of power dynamics. During the autumn in-class intensive program, rows of industrial sewing machines, by contrast, oriented students toward individual output and raised both physical and social barriers to communal learning. Requesting help or glancing at a peer's hands became effortful rather than natural. The machine-centric layout carried values of speed and standardisation established in public schools during the Industrial Revolution (Cohen 1968), while hand work carried values of slowness, material "backtalk" (Schön 2017 [1992]: 271), and care. From a VSD perspective, the tool ecology, the combination of tools, layout and tempos selectively materialised institutional priorities. Without proximity for hand work, communal transmission became episodic rather than sustained.

A third difference concerns participation. The voluntary, small-scale after-school format afforded calmness, autonomy and trust between students, teachers and Repair Shop allowing us to develop a deep rapport across three months. Students could guide their own pacing and solicit help, and compare work freely. This level of intimacy and quietness encouraged focused attention and created a calm environment. In contrast, in the autumn class sizes were six times larger and the in-class context framed participation as compliance and task completion. Additionally, digital devices were pervasive and a paradox. On one hand, smart phones distracted students from their mending practice, and on the other, they were commonly used to create their tutorials. The

tutorial-making exercise briefly restored autonomy and reciprocity as students shifted from recipients of knowledge to teachers, but the surrounding constraints of short time periods, sewing machine rows and personal devices limited how deeply communal attention could be. Collaborative authorship helped, but the infrastructure ultimately dominated.

These findings revisit the practical question that opened our study. If mending knowledge is transmitted through slow, shared, situated practice, then adding repair as a content unit is insufficient. The environment must be configured so that the values that sustain transmission, such as care, attention, autonomy, trust, can be enacted. Put differently, the question is not whether repair belongs in school, but what arrangements of time, space and tools, and participation would make school a credible co-site of transmission alongside community venues.

The historical landscape helps clarify why this matters. Across periods, communal infrastructures surged when scarcity made time and materials precious. They thinned when abundance and disposability displaced the rationale for repair. Our present case reprises that arc in a small scale: after-school conditions briefly rebuilt the communal infrastructure with shared table, longer time periods, stories that make technique meaningful, while the regular classroom reintroduced familiar modern constraints such as short periods, rows of desks and device-mediated attention that fragmented the very practices through which repair knowledge travels. In this light, community venues remain fundamental rather than ancillary. They routinely provide the temporal, spatial and relational fabrics that allow endangered skills to persist and circulate.

To answer the research question succinctly: mending knowledge is transmitted where environments afford slow, proximal practice with appropriate tools, and reciprocal engagement, and it is sustained by infrastructures, often community-based, that keep those affordances available over time. For integration into formal education to be equitable and systematic, classrooms must be treated as sociotechnical environments to be designed, not merely as containers for additional content, but as learning environments whose temporal, spatial, material and participatory configurations make communal transmission possible rather than impeding it.

CONCLUSION

This study examined how community-driven mending knowledge travels across time and into contemporary schooling. Through a history perspective we trace where households, mutual-aid groups, manuals, schools, wartime campaigns and today's platforms alternately carried and restricted repair education. The ReGenerational Repair Program shows the same pattern in miniature: transmission flourishes where learners share time, table, tools and conversation; it falters where those conditions are scarce. In the spring, the after-school program briefly recreated the communal infrastructures that have long sustained repair: reciprocity around a shared table, slow demonstrations, peer comparison of hands and samples, and stories that make technique meaningful. In the autumn, the regular classroom reintroduced familiar modern constraints, such as rows of desks, short periods and open use of personal devices, which fragment attention. These contrasts do not indict students or teachers. They reprise a historical

lesson: mending persists where communities can maintain the temporal, spatial and relational fabrics that skill requires. The broader implication is about infrastructures of care more than instructional units. When schools cannot provide the conditions under which repair knowledge has historically circulated, community venues like workshops, libraries, mending circles, repair cafés and intergenerational networks continue to hold the thread, linking everyday practice to memory, meaning and reciprocity. Our contribution is to show how those historical dynamics are re-enacted in the present and to clarify why community remains not a supplement to education but a reciprocal site of transmission.

NOTES

1 Repair Shop is a research and learning studio focused on maintenance, craft and design composed of Sam Bennett and Rachel Meade Smith, two authors of this paper. Gabriele Ferri, the third author, participated in writing this paper but is not part of Repair Shop.

2 We welcome mending knowledge to be added to our online survey form (see Smith and Bennett 2024).

3 Repair Shop is a learning studio focused on maintenance and repair, and specialises in textile repair methods; it partners with other experts to share repair knowledge in other mediums. Repair Shop has partnered with a variety of public institutes such as the New York Public Library and the Brooklyn Public Library, and has hosted events in public parks.

4 The Garment District is a New York City neighborhood in Midtown Manhattan known for its fashion manufacturing industry.

5 Chain stitch embroidery with Carla Bellisio, denim repair with Ketch the Tailor, alterations with Nazanin Ramezani, fabric creation with Sarah Sakanaka, and sewing machine maintenance with Michael Seymour.

SOURCES

FM = Authors' fieldwork materials from 2021 to 2023 were collected at online workshops and through anonymous online surveys. Authors' fieldwork materials from 2024 were collected in New York City, New York, USA through online and in-person workshops, anonymous online surveys and interviews with public school teachers. Materials are kept in the authors' personal collections and permission has been obtained to disclose the informants' names and images in the article.

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