

Teaching Machine Knitting During a Pandemic and Beyond: The Bond Secret

Mary Ruppert-Stroescu, Washington University in St. Louis, USA

Jeremy M. Bernardoni, Louisiana State University, USA

Amanda Casarez, Washington University in St. Louis, USA

Innovative Strategy to Teach for a Growing Need

The global knit fabric market was estimated at USD 23.8 billion in 2018 and the knitwear industry is anticipated to witness significant growth (*Knitted fabric market Size, SHARE: Global Industry Report, 2019-2025*, 2019), implying a need for the education of skilled knitwear designers and technicians. University knitwear courses often neglect important principles and techniques of knitwear design and manufacture (Yao & Li, 2018). In addition, lack of knitwear industry knowledge is recognized as a possible reason for limiting the scope of design creativity (Affinito et. al, 2017). The theoretical framework of the whole-part-whole learning model contextualizes learning as a whole by disassembling and teaching all the components (Swanson, 1993) resulting in scaffolding. This paper addresses the gap between traditional hand knitting techniques and the industrial machine knitting processes by teaching knitwear design and production through scaffolding from an industry perspective, during the Covid-19 pandemic, with limited budget and space. Students gained the broad picture of designing and producing knitwear and learned specific knitting skills that grounded design ideas in feasible techniques.

Course Teaching a knitwear design and production course during the fall of 2020 was a program goal established two years prior. The course was an elective with no prerequisite. No student had prior knowledge of machine knitting, and some had never taken a fashion course. When analyzing the course development strategy, the following themes emerged:

Pandemic-Induced Criteria and Machine Selection

Limited space and budget necessitated a knitting machine that could teach required skills, be mastered in a short timeframe and be dismounted for vertical storage. The pandemic imposed criteria such as limited student-to-room ratios and machine portability for transport to student's homes in case of quarantine or lock-down.

Based on prior experience, we chose the Bond Incredible Sweater Knitting Machine. This simple knitting machine was made in England and marketed in the 1980s (Maling, 2020). The Bond met the criteria above because the bed is modular plastic, it clamps to any square edged table, includes a tool kit, uses a transparent keyplate to change gauge size, and could be purchased on Ebay for approximately \$100, shipping included.

Teaching Support

A barrier to teaching new methods with new technology is the instructor's learning curve (Lawless & Pellegrino, 2007). The course instructor was a fashion designer with years of hand knitting experience, yet was inexperienced in translating hand knitting to the machine. During the summer of 2020, the instructor sought teaching support by shadowing the designers/technicians at XXXX who shared their varied knitwear educational experiences in Italy, England, and the US. In addition, they gave teaching recommendations based on their industry knowledge. While this valuable insight was essential to the course development, it was the online video series by Cheryl Brunette (Brunette, 2010) that enabled the instructor to master the knitting machine and accomplish the goals of the class.

Figure 1
Original knitwear designs

The Whole-Part-Whole Approach

The Bond knitting machine was an ideal medium through which to apply the whole-part-whole learning model. It simulates the machine knitting process, allowing students to engage with the machine to understand its function; a process comprising a "part." Another "part" was the development of a sample book for fundamental stitches. Those "parts" transitioned to a small whole: a child's 3T sweater. This first full garment was still a "part" because, while students chose color, stripe, and stitches, the garment pattern was the same for everyone. Having scaffolded the knitwear design and production process to this level, students were ready to design a whole garment. They toured the XXXX factory, some virtually and some in person, observing industrial knitting with Stoll 3D knitting machines and conferencing with one of the knitwear technicians/designers. She explained their process for design development, client interaction, and sample making and reviewed their sketches, making recommendations for the making process (Donofrio-Ferrezza, & Hefferen, 2017). All students completed an originally designed garment. See examples of student designs in Figure 1.



Challenges, Evaluation and Future Direction

The course posed several challenges, including lack of standardized pattern translation procedures, maintaining social distancing, and old machine part breaking. Regardless of the challenges, at the end of the semester some students requested to continue to use the Bond machines, implementing their newly-learned skills to create garments for other classes and themselves. At least one of the students in the class is considering knitwear design as a profession and obtained an internship at XXXX. This is key evidence of the overall success of the teaching

approach. The Bond machines will be further implemented throughout the curriculum in the basic textiles class, the fiber manipulation class, and in Senior Capstone.

Conclusion

The Bond Knitting machines are an affordable and easy way to learn how to machine knit by creating a foundation and understanding of knitwear. The machine allows for learning and experimentation of technique, which can be further implemented in the use of double bed knitting machines and electronic knitting machines.

References

- Affinito, L., Maria Conti, G., & Motta, M. (2017). New vision on Knitwear design. How the traditional craft methodologies are evolving into fashion international scenarios. *The Design Journal*, 20(sup1), S2760-S2770.
- Brunette, Cheryl. [Knitting with Cheryl Brunette]. (2010, December 28). *Meet Your BOND Knitting Machine 1-9* [Videos]. YouTube.
<https://www.youtube.com/watch?v=c6qNpsz8QTc&list=PL24C38EC1BABA93C0>
- Donofrio-Ferrezza, L., & Hefferen, M. (2017). *Designing a knitwear collection: from inspiration to finished garments*. Bloomsbury Publishing USA.
- Joseph-Armstrong, A. (2010). *Patternmaking for fashion design* (5th ed.). Pearson Education.
- Knitted fabric market Size, SHARE: Global Industry Report, 2019-2025. (2019, July). Retrieved April 15, 2021, from <https://www.grandviewresearch.com/industry-analysis/knitted-fabric-market>
- Lawless, K. A., & Pellegrino, J. W. (2007). Professional Development in Integrating Technology Into Teaching and Learning: Knowns, Unknowns, and Ways to Pursue Better Questions and Answers. *Journal of International Marketing*, 77(4), 52–71.
- Maling, M., (2020, October 30). The Ultimate Sweater Machine. Knitting for Profit. Retrieved April 14, 2021 from <https://knittingforprofitreview.com/ultimate-sweater-machine>
- Swanson, R. A., & Law, B. D. (1993). Whole-part-whole learning model. *Performance Improvement Quarterly*, 6(1), 43–53
- Yao, M. Y., & Li, L. (2018). Transition in Knitwear Design Education towards Professionalism: A Framework for Creative Knitwear Education Using Finger Knitting-Based System. *Trends in Textile & Fash Design*, 1(3).