Digital Learning Tools to Enhance Student Learning

Marcia Weiss
Kanbar College of Design, Engineering and Commerce
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Project Overview: What Was Done

Background Information

At Philadelphia University, Jacquard and Advanced Jacquard are courses that are part of the Textile Design Bachelor of Science (BSTD) and Textile Design Master of Science (MSTD) programs. These are upper-level courses taken by juniors, seniors and second-year graduate students. The term jacquard refers to complex, image-based weaving. For example, using jacquard technology, a watercolor design may be turned into a decorative, repeating upholstery fabric (*Figure 1* below).

Figure 1: Kayla Jagusch, original watercolor and resultant fabric from (Egg)cellent Collection.

In Jacquard and Advanced Jacquard, aesthetic and structural considerations are married to form image-based or other complex woven textiles. In these courses, students: create a targeted design collection, integrate industry-standard constructions, master a computer-aided design program to translate artwork into finished textiles and iterate to develop a resolved collection. This process involves integration of previous knowledge and a high-level of commitment to the pace and engagement with the content to be successful.

Process

Students in Jacquard and Advanced Jacquard begin by creating a series of designs around a conceptual theme. These are original patterns, and may be created through drawing, painting, collage, photography, material exploration, etc. Please see the original concept board and the resultant watercolors below created by Kayla Jagusch, as the starting point for her collection *(Egg)cellent*.

Figure 2: Kayla Jagusch concept board.

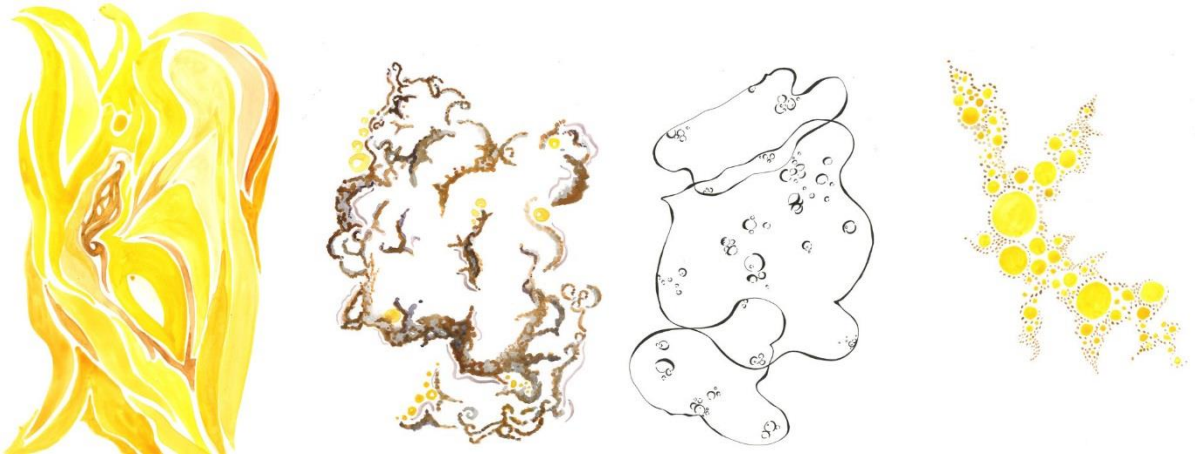


Figure 3: Kayla Jagusch original watercolors.

Students learn and master a computer-aided design platform to translate their ideas into repeating designs and jacquard loom files. For the purpose of this grant, the chosen CAD system was EAT; German software that is one of two primary platforms used in the textile design industry. Please see screen shots below that illustrate the EAT process of translating an image into a jacquard loom file.

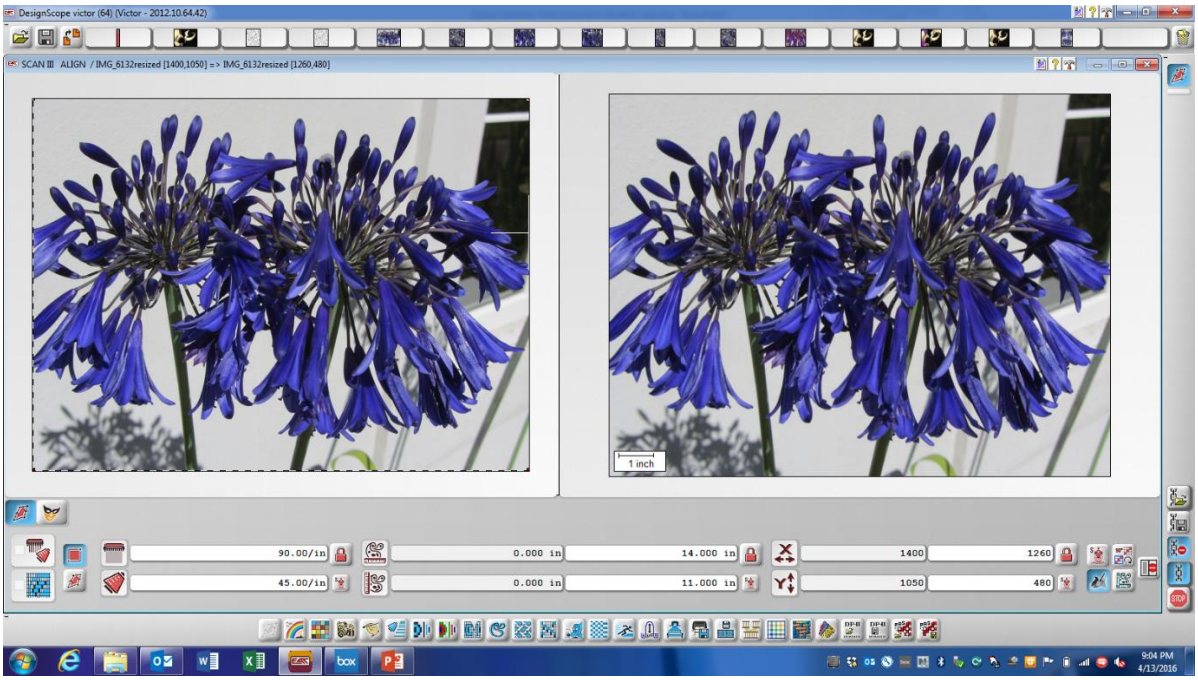


Figure 4: EAT Scan/Align

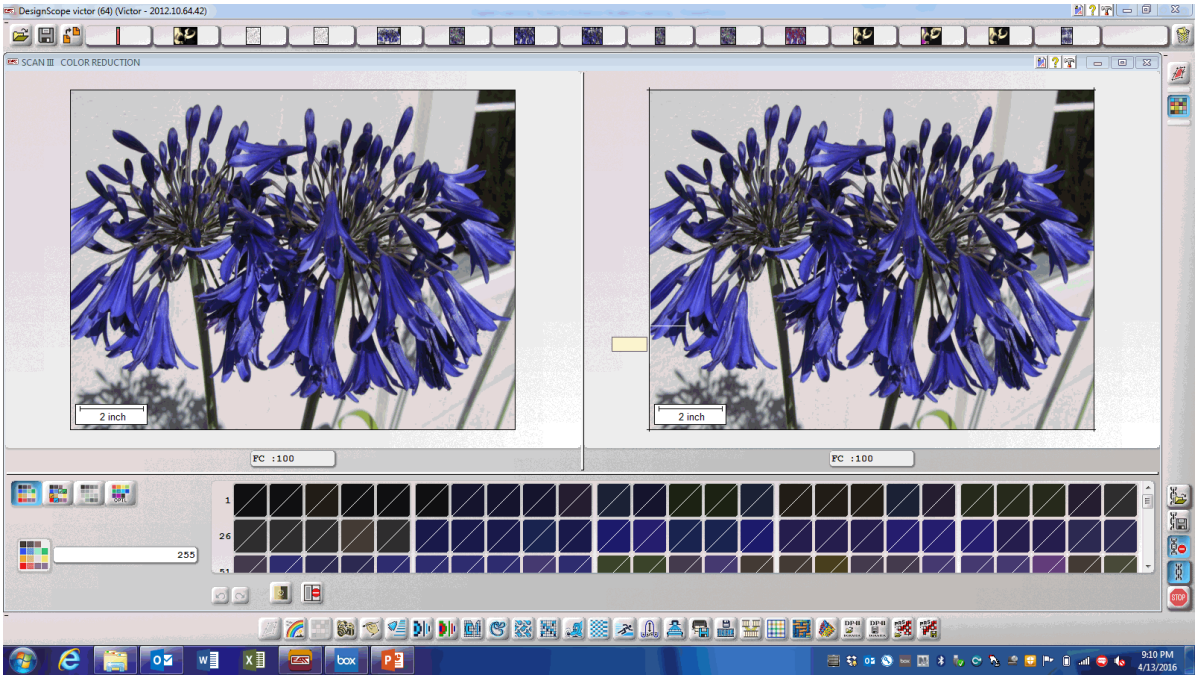


Figure 5: EAT Color Reduction

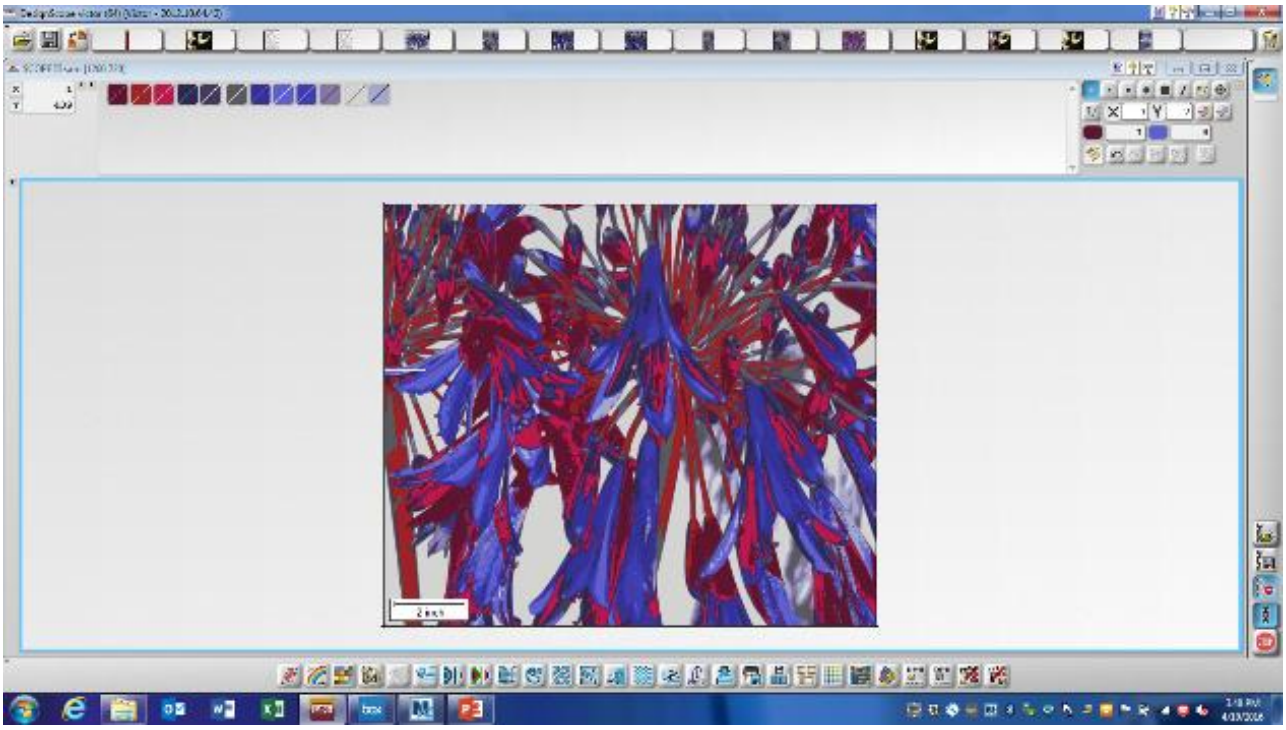


Figure 6: EAT Design Scope

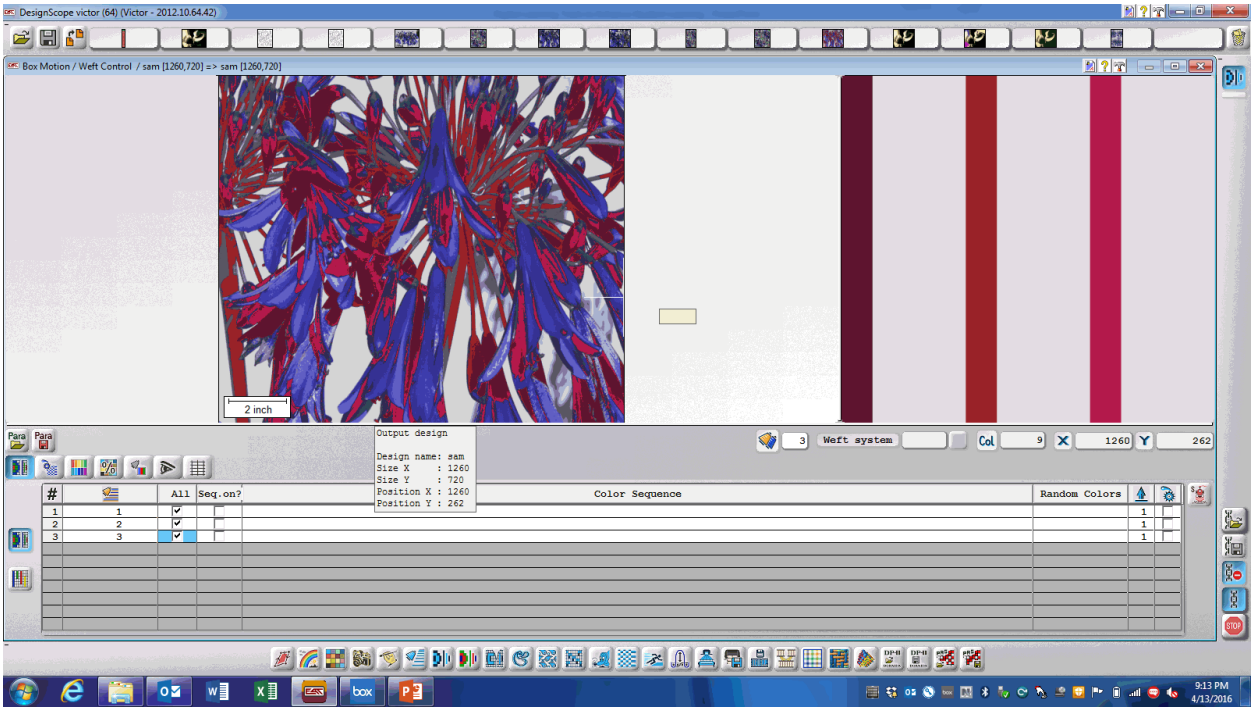


Figure 7: EAT Box Motion

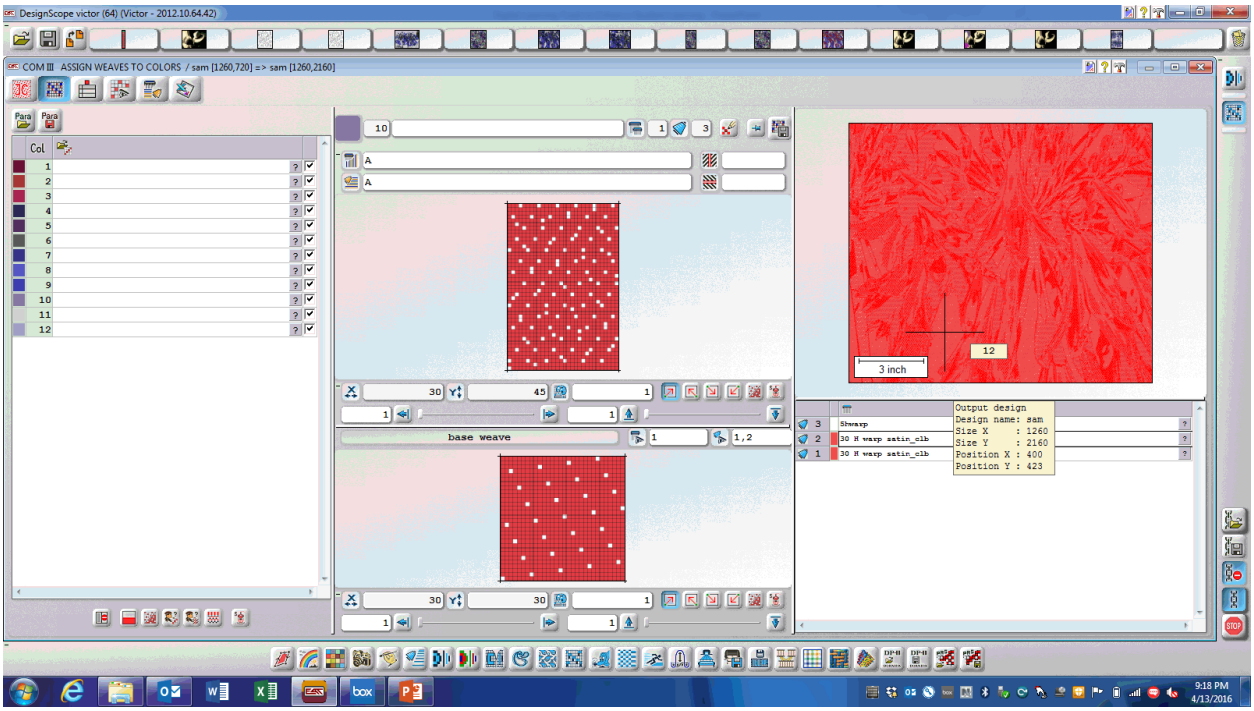


Figure 8: Assign Weaves

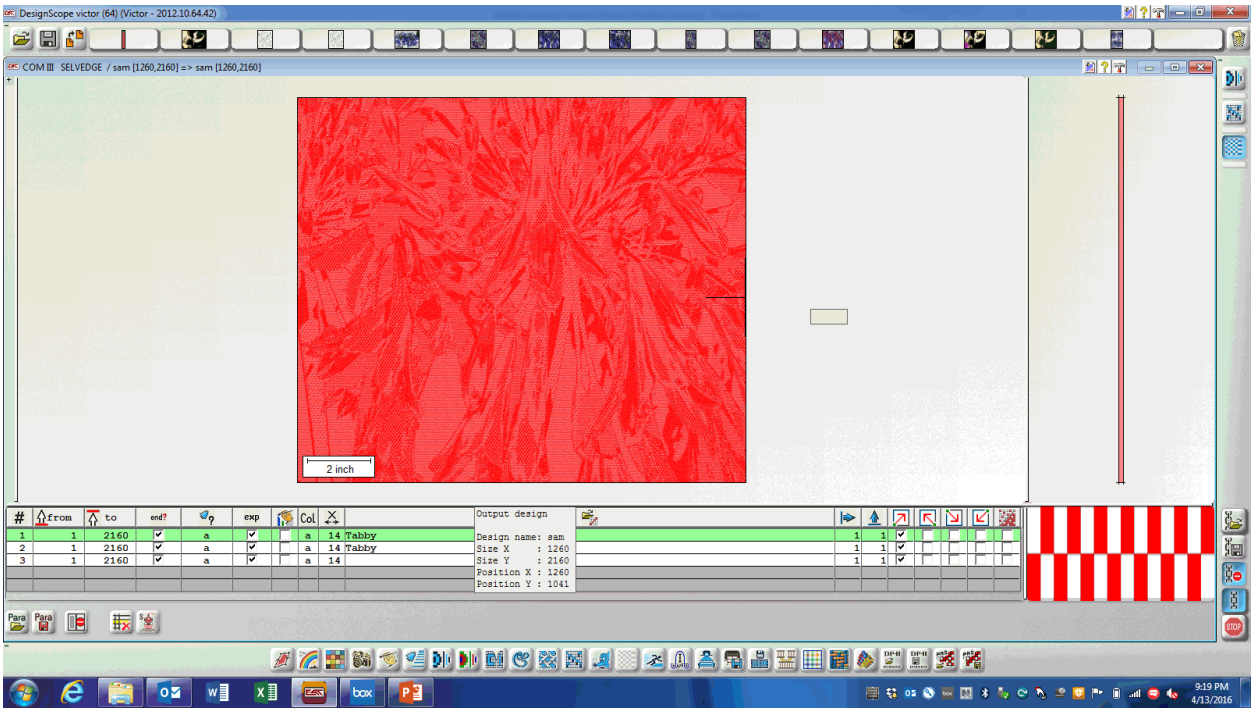


Figure 9: EAT Selvedge

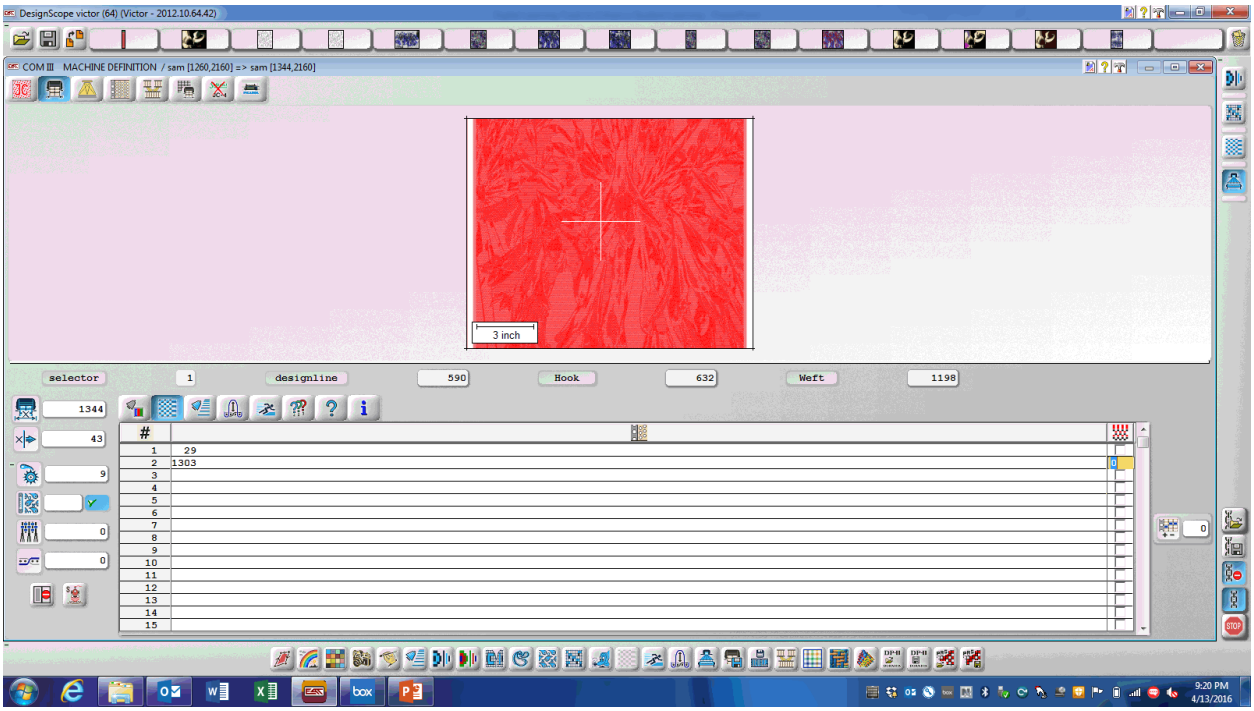


Figure 10: EAT Machine Definition (loom file)

Throughout the semester, students create a collection of textiles that marry their conceptual theme with market requirements. These textiles are created in five industry-standard constructions. Each has a unique set of technical and aesthetic considerations and requirements. Please see the examples below of Kayla Jagusch's jacquard collection

Figure 11: Kayla Jagusch (Egg)cellent.

In addition to mastering a new CAD system through the iterative design process, while exploring industry-standard constructions, there is the expectation of knowledge application from previous courses. These courses include: Survey of the Textile Industry (fiber, yarn and textile finishing knowledge), Weave Technology I (weave structures), Textile Design Research (design, trend and color

research and narrative), Weave Design Studio I (woven constructions and concept boards), Print Design Studio I (repeat pattern creation and repeat style variations) and Textile Materials (fitness for use).

This inherent complexity illustrates the need to provide appropriate support. As such, approximately six years ago, I began employing a flipped classroom model. I utilized Captivate software to create video demonstrations that married structural concepts with software applications. Students watched the demos and applied the process to their designs through homework assignments. This work allowed me to assess comprehension and address challenges in class. I found these demos to be a highly-successful learning tool, one on which students relied throughout the semester. This hybrid model, utilizing technology to provide tools with real world content, allowed students to work more independently, learning at their own pace.

Project Goals

This goal of this project was to expand the support of individualized approaches to learning and to the iterative design process (essentially, supporting the decision making process through the myriad of possibilities). This project was designed to create a scaffold that engaged students; allowing them to learn/work at their own pace with sufficient, ongoing support. This project worked to optimize opportunities for students to actively participate in their learning, apply knowledge and skills, and connect their learning experiences to the real world and to their future profession. This is of course the essence of Philadelphia University Nexus Learning and of a Philadelphia University Textile Design degree.

The overarching goal for the project was to assess the impact of technology integration in a flipped classroom model as a technique to enhance individualized learning. Please see the table below for the primary goals and associated learning outcomes.

Primary Goals	**Learning Outcomes**
Develop scaffold of digital learning tools to enhance student learning	To determine if increased integration of technology enhances the pacing and depth of upper-level design courses. To determine if the scaffold allows students to learn at their own pace, mastering complex and varied concepts.
Create interactive learning modules	To determine if this model supports students as active, engaged learners.
Revise videos to model industry best practices	To determine if students are able to make better informed design and structural decisions through use of the scaffold.

Activities and Time Frame

The chart below shows the planned and actual grant activities.

Time Frame	Planned Activities	Actual Activities
Summer 2015	Creation of 12-15 video demos, searchable data fields and hyperlinks. Student focus group convened to test new scaffold.	Analysis of current tools (videos, documents, swatches).
Fall 2015	Implement enhanced flipped model in Jacquard/Advanced Jacquard. Mid-semester and end-of-semester surveys to assess effectiveness of model. Blackboard data analyzed to determine usage.	Started creating new video demos. Creation of searchable data fields and hyperlinks. Student surveys in Jacquard/Advanced Jacquard regarding desired tools/ learning model.
Winter 2015-16	Analyze Fall 2015 data to determine necessary revisions.	Continued creation of new video demos. Creation of new survey for start, midpoint and end of semester implementation in S16.
Spring 2016	Implement revised model. Administer surveys. Analyze Blackboard data. Revise for further implementation in future semesters.	Implementation of new video demos (audio); used in parallel with previously existing video demos (text). Implementation of survey tool in both sections. Implementation of searchable data fields, hyperlinks, new swatch resources. Analysis of survey data.

The original plan was full completion of the revised model during Summer 2015 to allow two semesters of assessment. This was altered to permit increased student feedback in Fall 2015. It was necessary to engage students who had previously taken Jacquard or Advanced Jacquard. As these students were not fully available during Summer 2015, the time table was altered as indicated above.

The Fall 2015 and Spring 2016 class sections utilized the following support structures:

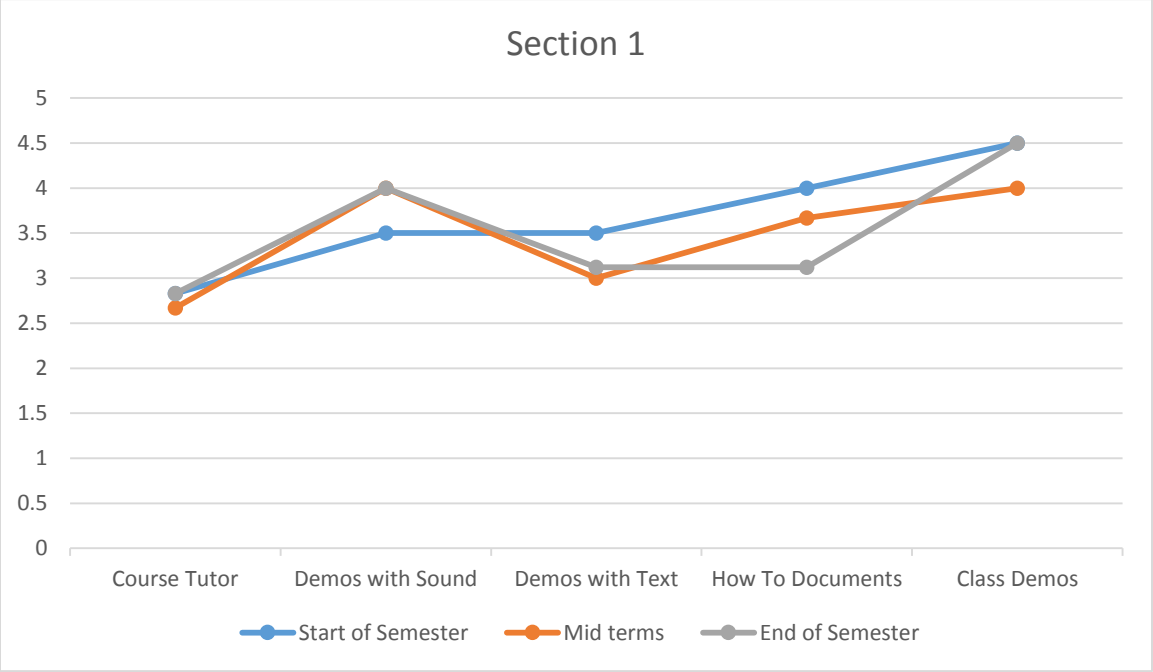
Fall 2015	Spring 2016
Hard copies of “how to” information	PDF with hyperlinks of “how to” information
Captivate demos with text bubbles	Captivate demos with text bubbles
Student-made videos of class demonstrations	Camtasia demos with audio
Verbal feedback regarding desired support systems	Likert scale survey administered at beginning, middle and end point of semester
Course tutor	Course tutor
	New course tools illustrating fabric constructions

Project Assessment: What Was Learned

A major assessment tool employed was an in-class survey administered at three points throughout the semester. This was a Likert-scale survey that asked students to rate their use of five key learning tools on a scale ranging from "Not at all" to "Extensively". The survey was administered: on the first day of the semester, during midterm week and at the end of semester. Students responded to the following:

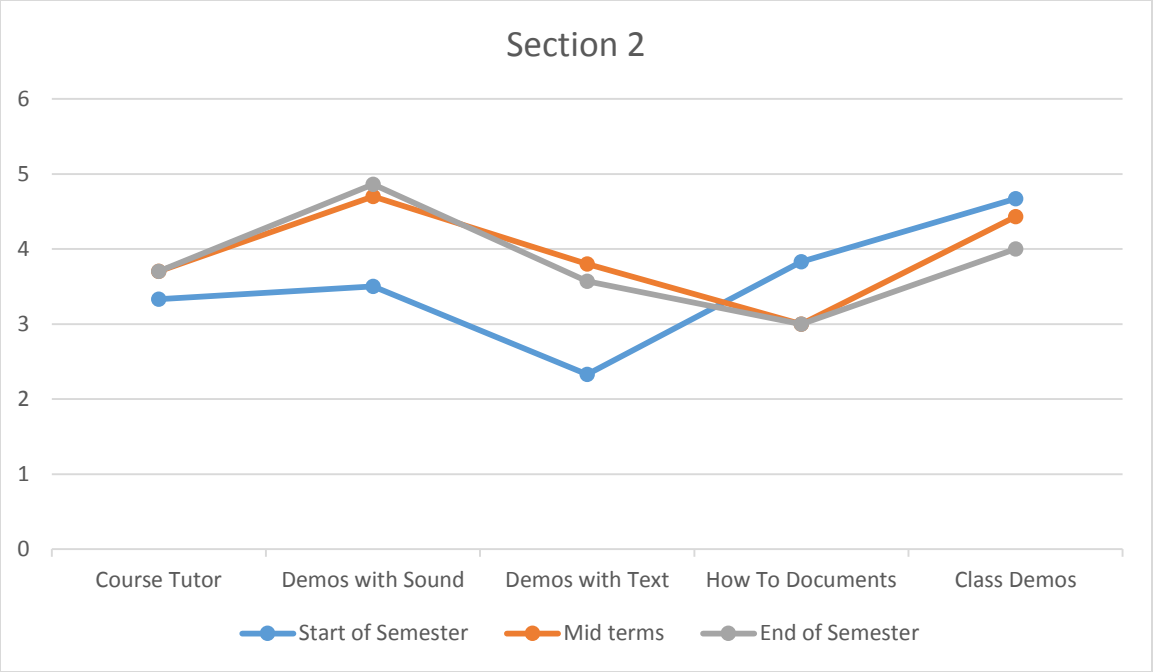
"To enhance your mastering of Jacquard/Advanced Jacquard, please rate (on a scale of 1 to 5, 1 being "not at all" and 5 being "extensively") how much you have used the following support systems." The five systems listed were: course tutor, EAT demos with sound, EAT demos with text, "how to" documents and class demonstrations.

The following two charts illustrate the responses from the three points during the semester. Each chart reflects one course section of Jacquard/Advanced Jacquard.



In the chart above (Section 1), students at the start of the semester anticipated using "how to" documents (PDF format with hyperlinks) and in-class demonstrations most extensively. At the end of the semester, the two most highly rated support systems were in-class demos and the newly created video demonstrations with sound.

In Section 2 (chart below), at the start of the semester, students again expected the "how to" documents and in-class demonstrations to be most important to enhance their learning in the course. At the end of the semester, the video demonstrations with sound and in-class demos were most highly rated. These are the same learning tools selected in Section 1.



In addition to the Likert-scale questions, students provided feedback both in writing and verbally during class discussions regarding learning tools. These responses included:

- Majority of students preferred video demonstrations with audio
    - Easier to take notes while listening
    - Visual learners; watch, listen and work along
    - Shorter, targeted segments (than in previously created videos with text bubbles)
- International students preferred video demonstrations with text
    - Clarified word usage
    - Reinforced lecture/in-class demos
    - Text demos most important at start of semester
    - Both formats (with sound, with text) used as semester continued
- Tutor—although not all students scheduled time with the course tutor, those who did rated her knowledge and helpfulness very highly.
- Fabric swatch examples of each technical construction—this was not a surveyed support tool, but was one that students noted was important to their learning/understanding.

The primary goals for the grant were to: develop a scaffold of digital learning tools to enhance student learning, create interactive learning modules and revise videos to model industry best practices. All of these goals were met. The following chart addresses the associated learning outcomes.

Learning Outcomes	Outcome Assessment
To determine if increased integration of technology enhances the pacing and depth of upper-level design courses. To determine if the scaffold allows students to learn at their own pace, mastering complex and varied concepts.	Both of these learning outcomes will be assessed over multiple semesters, to better evaluate technology integration as a means to enhanced pacing, depth and mastery of complex concepts. Multiple semesters will balance the variation within class sections.
To determine if this model supports students as active, engaged learners.	Yes, this model supports students as active, engaged learners as determined by the survey results.
To determine if students are able to make better informed design and structural decisions through use of the scaffold.	Although this will also be an area of ongoing assessment, the results of both sections from Spring 2016 indicated that students are making more informed decisions.

It was anticipated that Blackboard data would provide an assessment tool to review actual student usage of demonstrations, "how to" documents, etc. Unfortunately, the data accessible through the course Blackboard sites was not accurate. This highlights the opportunity to find other electronic means to evaluate student access to digital scaffolds.

Additional opportunities that have arisen as a result of this project:

- Continued creation/expansion of video demonstrations of targeted topics
- Creation of a swatch library with direct connection to the video demonstrations
- Utilization of analytics software to track student usage.

Deliverables and Dissemination: Getting the Word Out

The Nexus Learning Grant Project "Digital Learning Tools to Enhance Student Learning" illustrated the importance of continued integration and expansion of technology to support individualized student learning in upper level design courses. Students utilized all of the digital resources presented to them, expressing interest in even greater support systems. Their feedback was very positive and illustrated that rather than there being one "best" support structure, students appreciated the entire scaffold of choices. This truly allowed each student to customize their learning: pace, timing, technical considerations, aesthetic decisions, market requirements, etc.

The project was presented at Philadelphia University during the Center for Teaching, Innovation and Nexus Learning Edu Series on April 14, 2016.

Additional opportunities for dissemination include the possibility of paper presentations at pedagogical conferences including the Conference on Higher Education Pedagogy, The Teaching Professor Conference and the Lilly Conference on College and University Teaching and Learning.

These opportunities will be explored going forward, as the goal is to have the project act as a model to advance Nexus Learning strategies both on and off campus.