# Usability testing of interactive curriculum visualization techniques

Austin Toombs
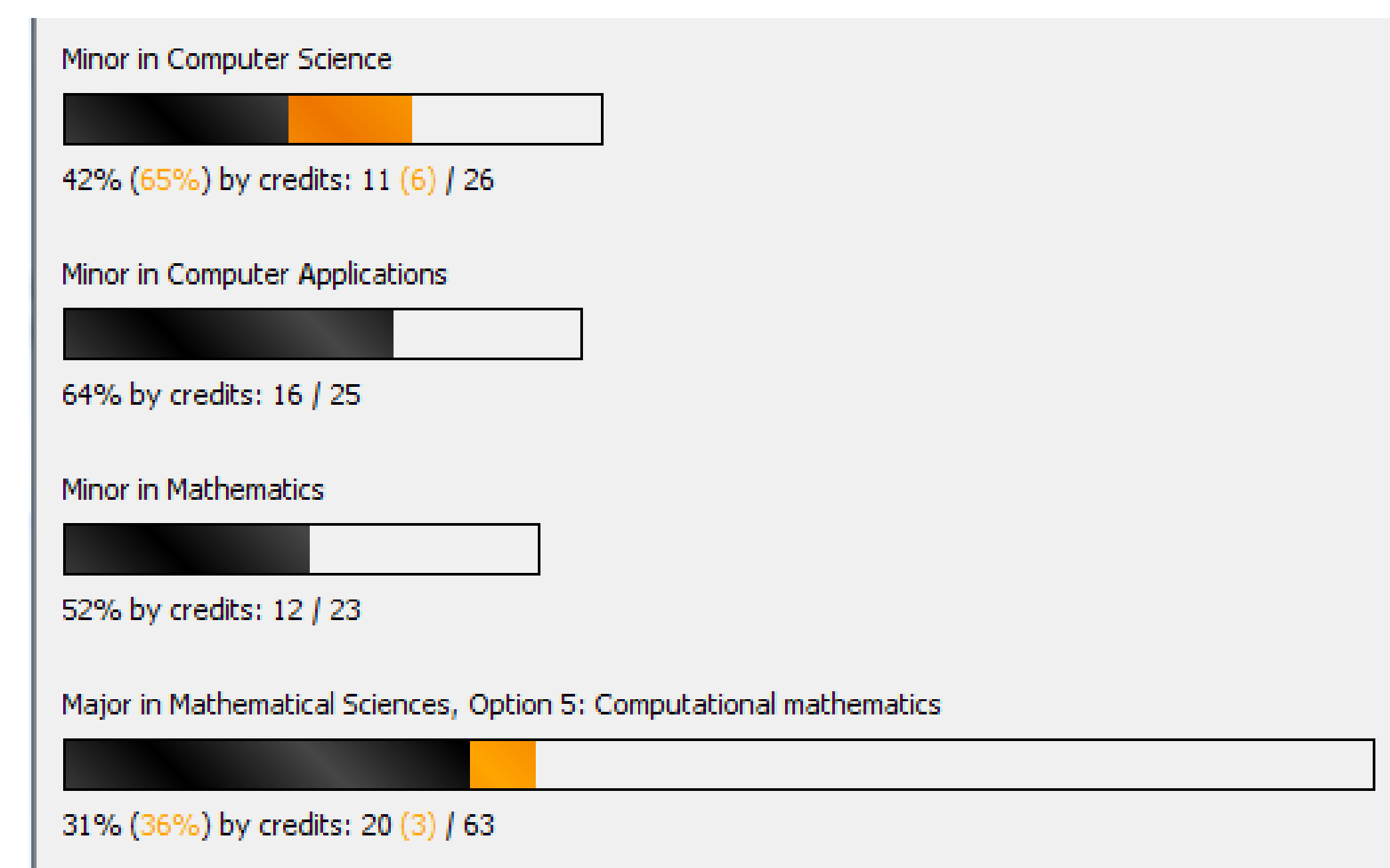Ball State University

Problem and Approach

Course catalogs, degree progress reports, and online course request systems are inadequate tools for helping students make curricular decisions. To address this problem I have been working with the information visualization research team to study the effects of visualization techniques on students' curricular understanding. These techniques are being implemented in CurricVis, a tool that assists students, curriculum designers, advisors and administrators in communicating and reasoning about curricula. The original version of CurricVis represented academic programs with static node-link diagrams. My contributions to CurricVis include the implementation of hypothetical mode, the progress bars, and the progress view.

Hypothetical mode, progress bars, and progress view
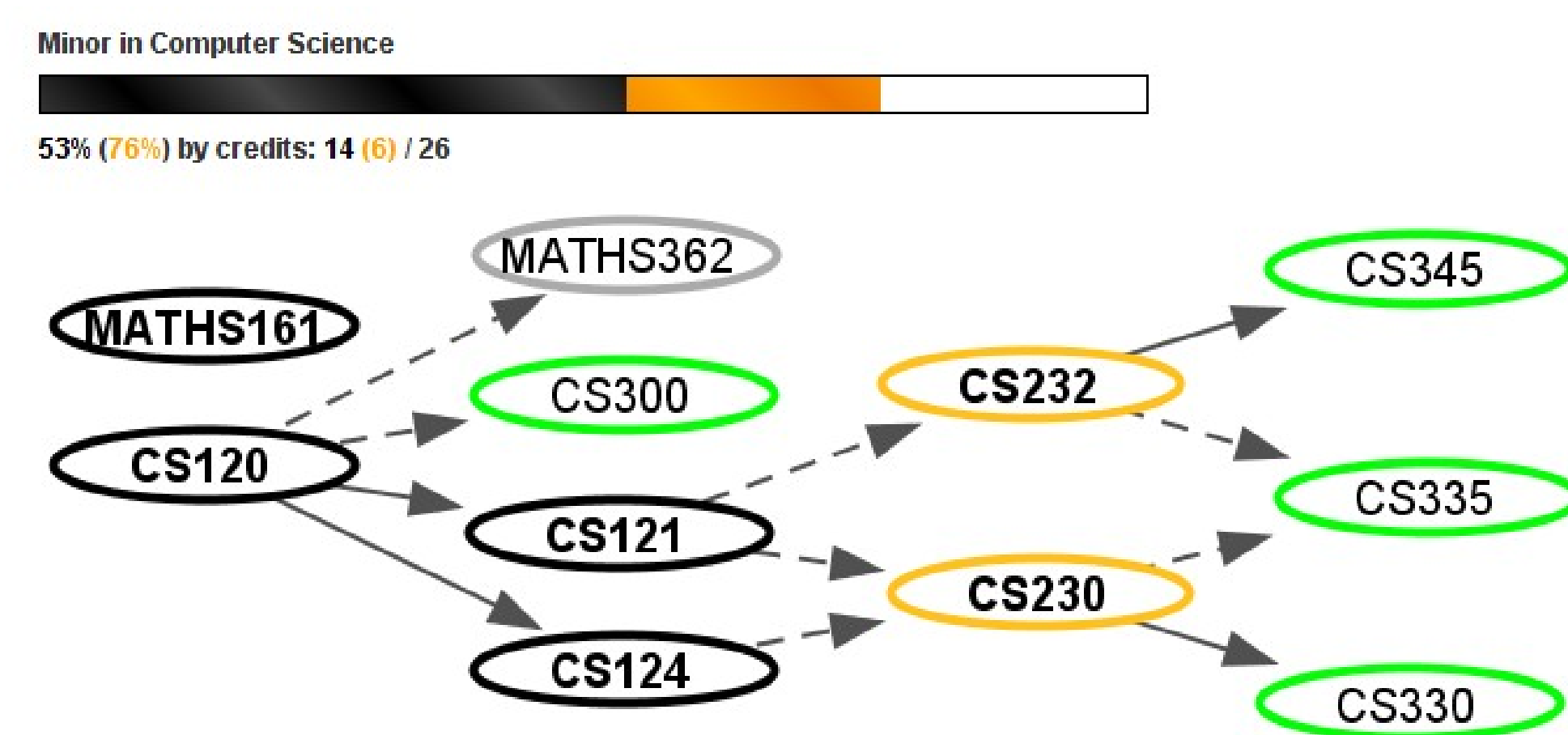
The orange courses are hypothetically taken courses.

To facilitate curricular planning, CurricVis employs a "hypothetical" system that allows students to mark courses as hypothetically complete. Hypothetical mode helps students visualize the effects of their curricular decisions.

The progress bars distinguish between real and hypothetical progress, and a separate view displays the progress bar of each program in which the student has made progress (sorted from most progress made to least). This progress view is especially useful for students still exploring programs.


Usability testing

The primary focus of the user studies is to test the efficacy of using interactive curriculum visualizations to communicate about curricula. We do this by comparing the confidence, accuracy, and speed of individuals in our control and experimental groups while they complete the same set of three tasks. The control group has access to a course catalog and a DAPR generated specifically for the questions. Those in the experimental group have access to CurricVis only.

Quantitative analysis

Students in the experimental group were significantly more confident in their responses to the tasks. They were also significantly more likely to find the first two tasks (choosing courses for the next three semesters and picking a minor) to be easier than students in the control group.

Even though the experimental group was more likely to have higher confidence in their answers and more likely to find the tasks to be easier, they still took about the same amount of time on each task as the participants in the control group. One possible explanation for this could be the unfamiliarity of the subjects with CurricVis. Perhaps future adaptations of this test could involve a short tutorial of CurricVis to counteract the unfamiliarity of the tool.
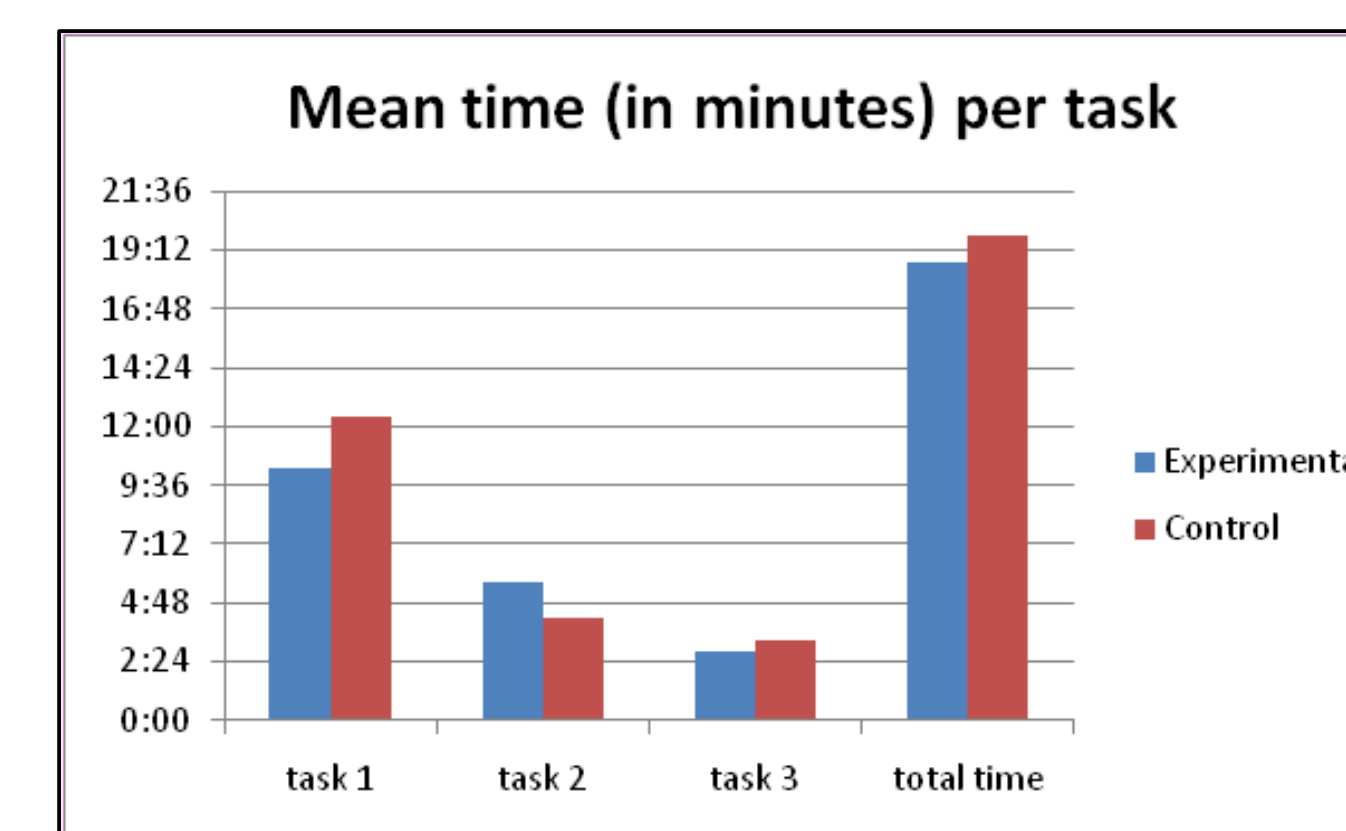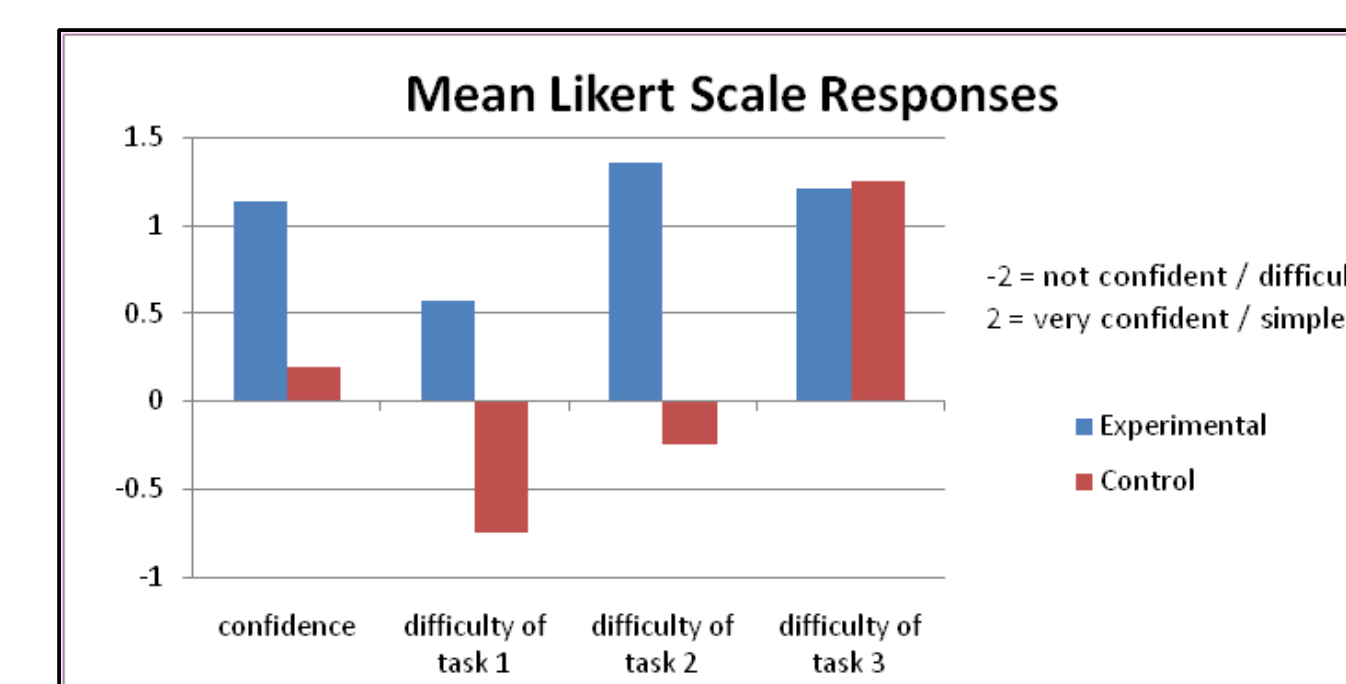
Other interesting results

Over the course of the user testing we have noticed several surprising events. The images to the right are hand-drawn graphs that two subjects in the control group constructed to help them answer a prerequisite question. These graphs support our original hypothesis that node-link graphs are the most natural for expressing curricular data.

I demonstrated CurricVis to each of the control group subjects after they completed their tasks. Every one of them so far has agreed that CurricVis would have been much more helpful than the tools they were given.
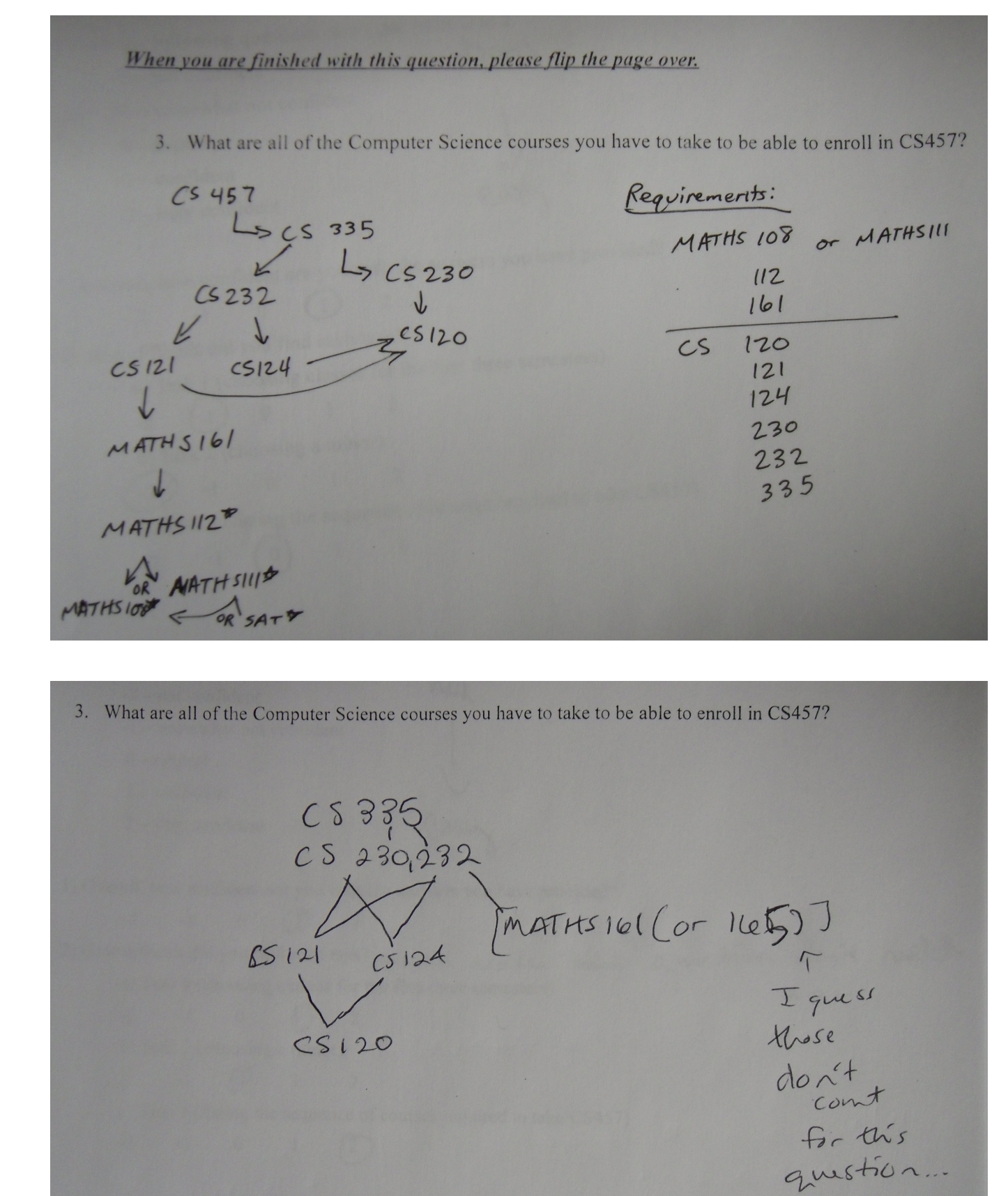
Current status

Post usability analysis: user testing has been completed and appropriate changes are being made to the software.
Dissemination: CurricVis is being presented to the heads of various departments at Ball State, as well as at several academic conferences.

Future work

This work leads to insights into the development of interactive visualizations for complex systems and the integration of usability analysis with information visualization research. The ultimate goal of this work is to make the software and techniques we develop available to any institution. Using CurricVis to represent curricula would reduce the current cost of supporting curricular reasoning among students, curriculum designers, advisors, and administrators by improving the efficacy of advising in higher education.

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