Learning from What Works: Improving an Introductory Computing Course for Architects with Teaching Methods from Media Computation

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Learning from what works

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Using best practices from Media Computation...

Media-based instructional content:
Students today create and consume media through computing. They find media-based content more relevant than abstract lessons in computing concepts.

Pair programming:
Programming with partners helps reduce cognitive load and makes coding a more social and supportive experience.

Peer instruction:
Peer instruction creates a student-driven learning culture. Responding to questions for discussion and reflection makes learning active rather than passive.

...to improve an introductory computing course for architects

Relevant tools and topics:

“Active” labs:
- New course uses a flipped classroom model
- Students watch tutorial videos to prepare for class
- Students work in a pair programming arrangement
- Instructor provides coaching while students work on exercises and scaffolded design projects during lab

Lab reports:
Reports support peer instruction by asking students to reflect upon the computer science principles in the tutorials and solve design problems with their partners.

Results and future work

Implementing best practices improved retention rates by an average of 11% and average scores by 5% over three years.

Student attitudes about the course improved by an average of 32%. In particular, 50% more students thought the course was relevant and would take and advanced version of it in the future – promising results for an introductory course.

Future work:
While this study suggests that Media Computation practices have a positive impact on student retention and affect, we have no data showing improvement in student understanding of computing principles or computational design abilities. In a follow-up study, we plan to conduct a pre- and post-treatment test of students performing design tasks, in an attempt to measure any cognitive effects of the course.

References: