

# Mastery Grids: An Open-Source Social Educational Progress Visualization



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## 1. MOTIVATION

- Many pieces of educational software are underused [1]
- Solutions
  - Open learning model [2]
  - Social visualization [3,4]
  - Combination thereof: Social progress visualization

## 2. CLASSROOM EVALUATION

- Fall 2013 term
- School of Information Sciences, University of Pittsburgh
- Courses
  - Object Oriented Programming (Java; undergraduate)
  - Database Management (undergraduate)
  - Database Management (graduate)
- Two content-access and/or progress-visualization interfaces
  - Mastery Grids (MG)
  - Links
- Material
  - Questions (QuizJet [5] and SQLKnot [6])
  - Examples (WebEx [7])

| Course                       | Students | Sessions |     |    | Material |           |
|------------------------------|----------|----------|-----|----|----------|-----------|
|                              |          | 0        | 1-3 | 4+ | Examples | Questions |
| O.O. Programming (undergrad) | 35       | 4        | 18  | 13 | 75       | 94        |
| Databases (undergrad)        | 83       | 54       | 26  | 3  | 64       | 46        |
| Databases (grad)             | 35       | 24       | 9   | 2  |          |           |
| TOTAL                        | 153      | 82       | 53  | 18 | 139      | 120       |

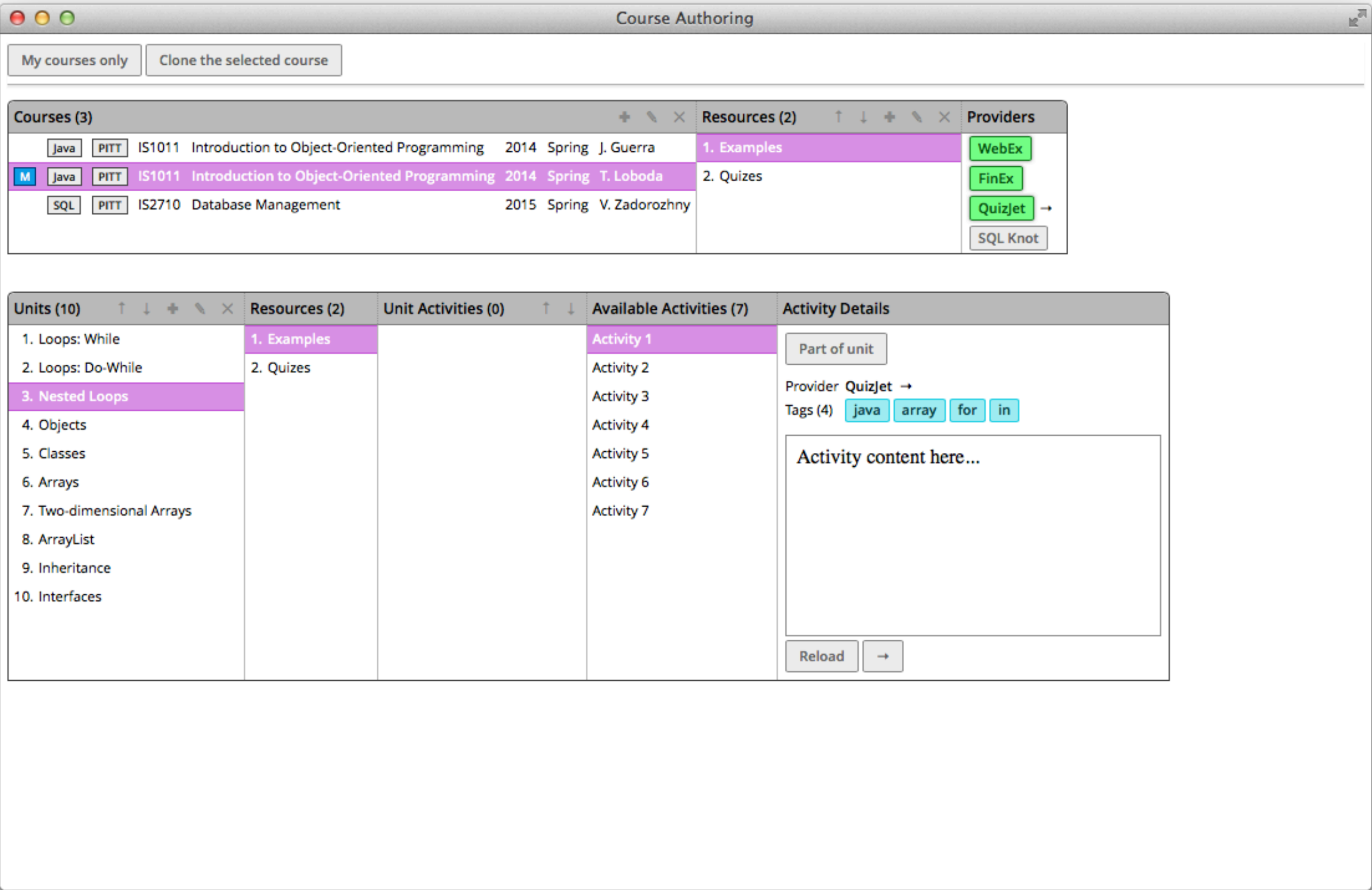
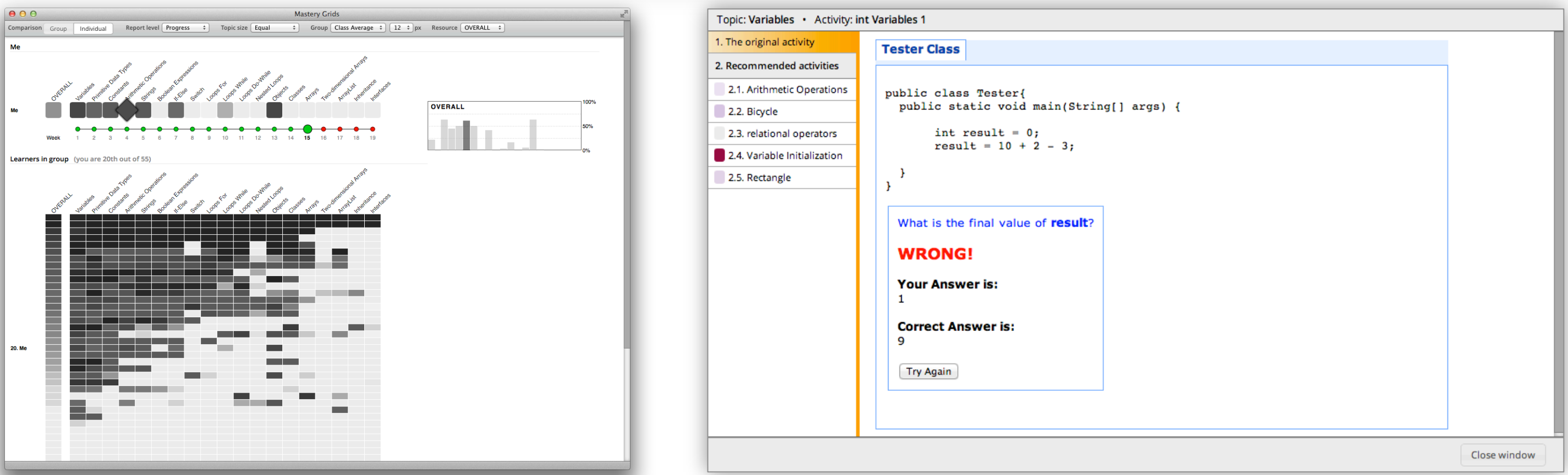
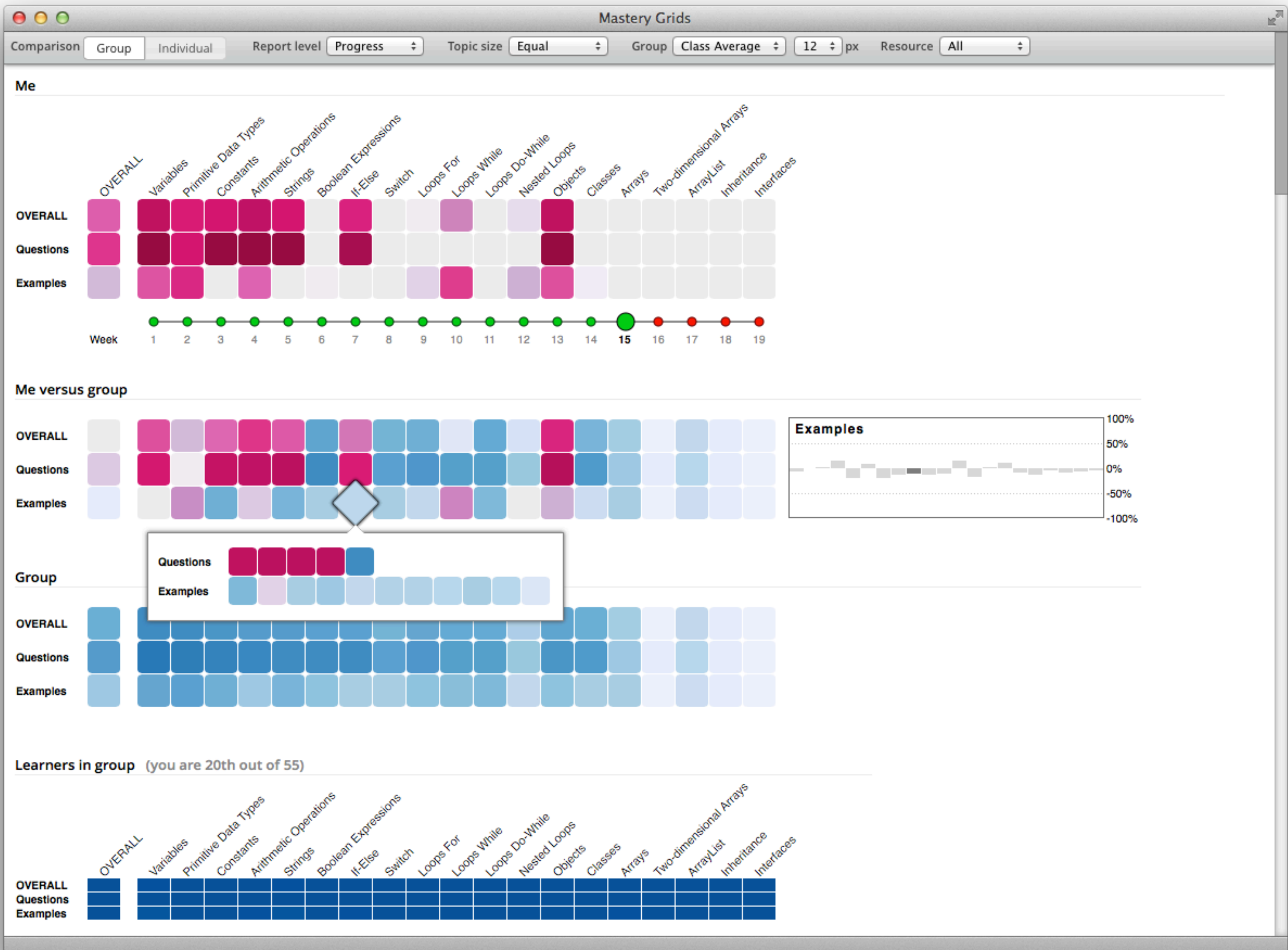
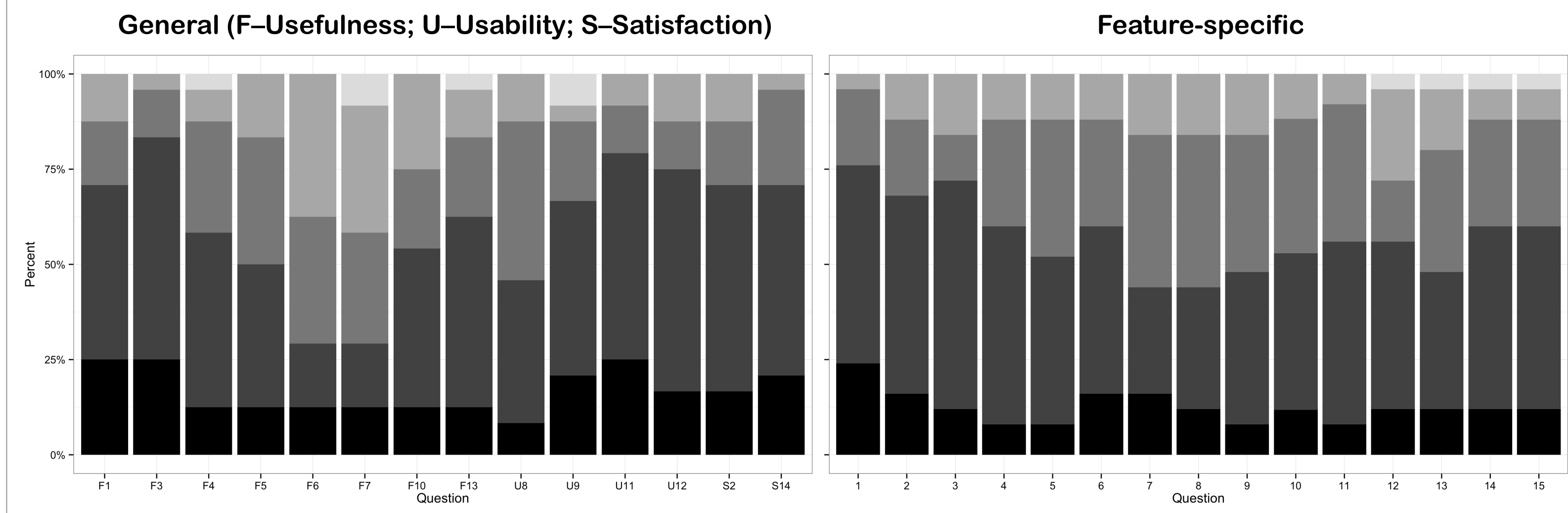
## 3. USAGE PATTERN ANALYSIS

- Java course only
- Preliminary results
- Students who used MG seemed to get more engaged with self-study content in that
  - They answered more questions
  - Tried more examples
  - Inspected more example line comments
  - Got a higher correct question answer ratio
- The groups did not differ with respect to how quickly they explored the material space (activity access per minute)
- The MG group worked with the content more productively by accessing questions (both those they had already seen and those they had not) at a higher rate [8]

## 4. MATERIAL EXPOSITION AND FINAL GRADES

- All three courses
- Alternative explanations
  - Performing one *educational action* was associated with an increase of 0.016 in the final grade ( $SE=0.007$ ;  $p=.0187$ )
  - Students which ended up getting a better grade were also the ones more likely to be engaged with supplementary educational tools

## 5. SUBJECTIVE RESPONSES



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