

From marks to mastery

Same questions, different information

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“I find week 6 hard.”

A student's feedback to me that I cannot act on easily.

Week 6 is not a skill. It is a location in a schedule.

It tells me *when* they got lost, not *what* they got lost in.

The case study course

STAT2001 / 2013 / 6013 — Introduction to Mathematical Statistics

- Second-year undergraduate / first-year postgraduate
- About 150–200 students (Sem 1), 40-50 students (Sem 2)
- Widely regarded as one of the hardest courses in the program

184 tutorial and practice-exam questions (197 for actuarial students)

Doing the questions is hard. Knowing what a wrong answer means is harder.

The problem

A student gets a question wrong.

They know which question. They may not know which skill.

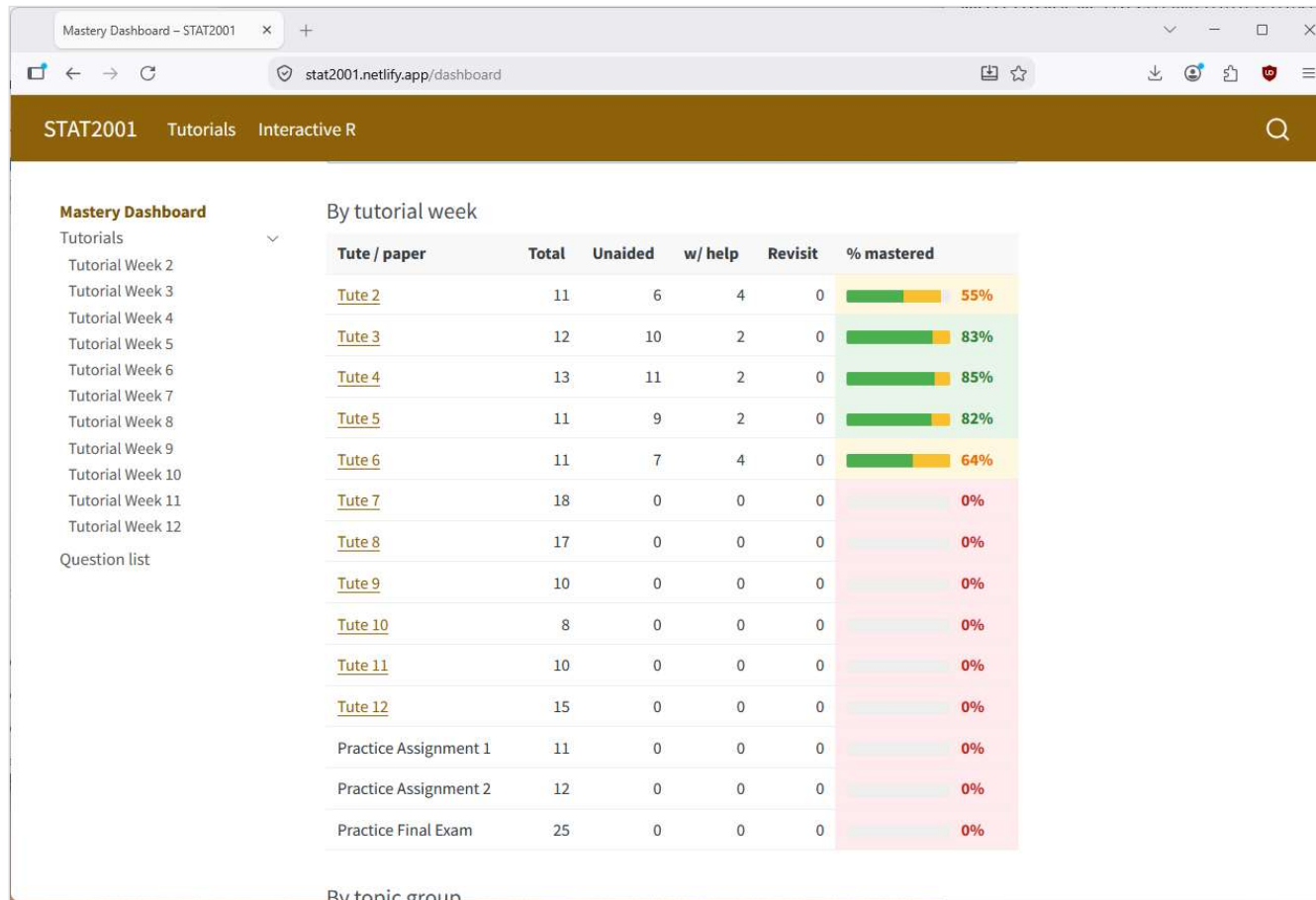
So they re-read the whole week, possibly all materials leading up to that point.

What I did: tag each question part with the skill it tests

Every question tagged — down to the individual part. Students self-mark **unaided** / **with help** / **revisit**.

What the week view tells you

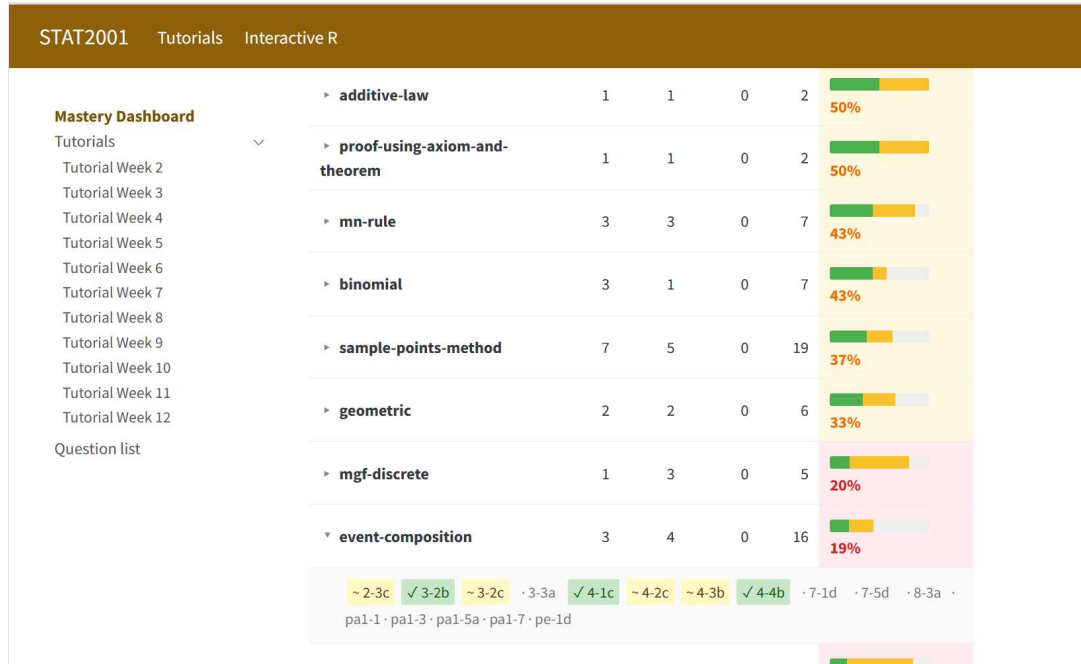
Weakest weeks: Tute 2 at 55%, Tute 6 at 64%.



The screenshot shows a web browser window with the URL `stat2001.netlify.app/dashboard`. The page title is "Mastery Dashboard - STAT2001". The navigation bar includes "STAT2001", "Tutorials", and "Interactive R". The main content area is titled "Mastery Dashboard" and shows a list of tutorials on the left and a table of mastery data on the right. The table is titled "By tutorial week" and has columns: "Tute / paper", "Total", "Unaided", "w/ help", "Revisit", and "% mastered". The rows show mastery data for Tutorial Weeks 2 through 12, Practice Assignment 1, Practice Assignment 2, and Practice Final Exam. The mastery percentages are displayed as green bars and text. The lowest mastery percentages are for Tute 2 (55%) and Tute 6 (64%).

Tute / paper	Total	Unaided	w/ help	Revisit	% mastered
Tute 2	11	6	4	0	55%
Tute 3	12	10	2	0	83%
Tute 4	13	11	2	0	85%
Tute 5	11	9	2	0	82%
Tute 6	11	7	4	0	64%
Tute 7	18	0	0	0	0%
Tute 8	17	0	0	0	0%
Tute 9	10	0	0	0	0%
Tute 10	8	0	0	0	0%
Tute 11	10	0	0	0	0%
Tute 12	15	0	0	0	0%
Practice Assignment 1	11	0	0	0	0%
Practice Assignment 2	12	0	0	0	0%
Practice Final Exam	25	0	0	0	0%

What the keyword view tells you



- A traffic light of mastery, and a map of where the skills sit in the course.
- Minimal marginal effort from students, but a lot more information for them and for me.

Expand a skill and you get every question that practises it.

Data collection

One click sends me their progress. Their self-diagnosis becomes my diagnosis within the semester, not the year after.

STAT2001TutorialsInteractive R

Mastery Dashboard

Tutorials

Tutorial Week 2

Tutorial Week 3

Tutorial Week 4

Tutorial Week 5

Tutorial Week 6

Tutorial Week 7

Tutorial Week 8

Tutorial Week 9

Tutorial Week 10

Tutorial Week 11

Tutorial Week 12

Question list

NOTICE TO STUDENTS

Load from pasted linkUse this browser's saved progressClear view

☐ Include **Credibility Theory** (ct1, ct2) - In syllabus for Actuarial students (STAT2013/6013), off by default

23% mastered (unaided)

43 unaided · 14 with help · 0 marked revisit · 127 not yet attempted (out of 184 questions)

Send token to your lecturer

Student UID:

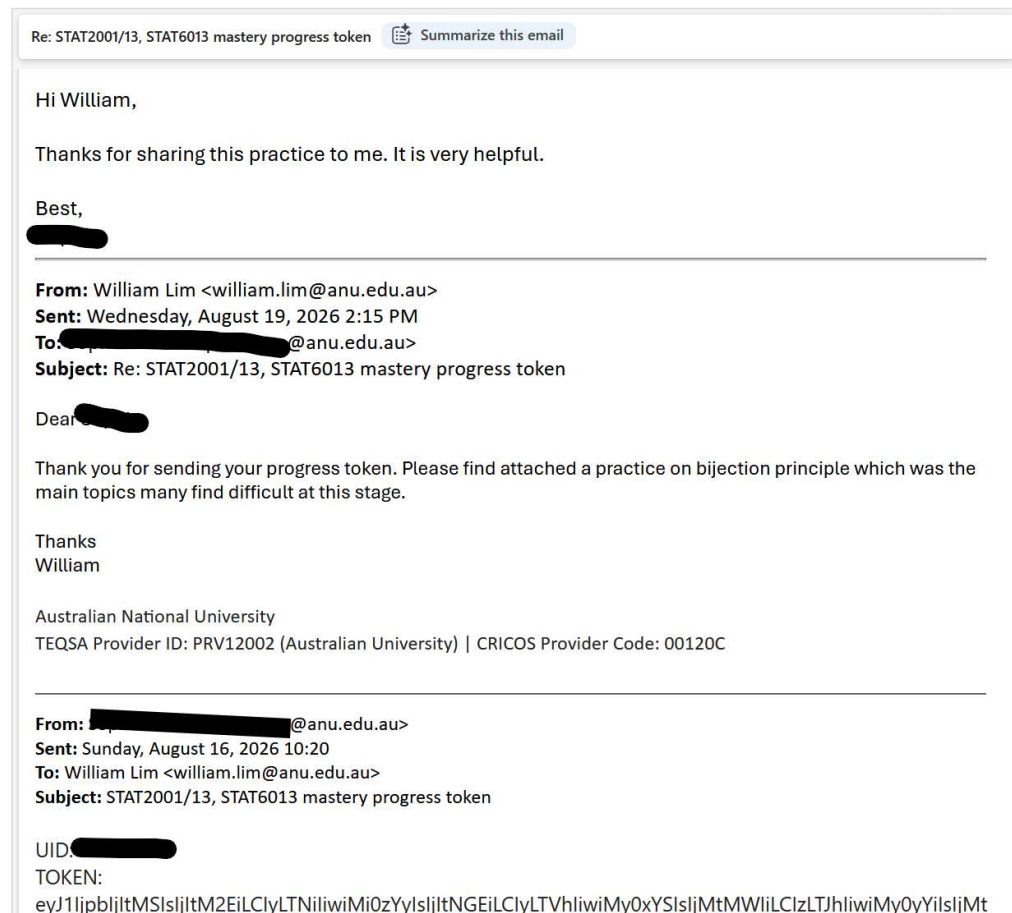
☐ Send **anonymously**

Your UID isn't sent. A random id saved in this browser keeps your own submissions linked to each other, so your progress over time still lines up — but it can't be traced back to you.

Load your progress above first, enter your UID, then click **Send progress**. If that fails, **Email token** still works.

The feedback loop

Meeting the student where they are, and giving them something to act on.



What I know, and what I don't

What I know so far

- The loop works when it runs: token in, targeted practice back, and it helped
- Aggregated tokens show me what the cohort is stuck on, in time to act on it
- The design follows established principles for feedback that supports self-regulation (Nicol & Macfarlane-Dick, 2006)

What I don't know yet

- Uptake is about 17% (7/40) and I don't know the cause of low uptake
- Whether it earns its keep in the later weeks, when a mix of skills is assessed

If you take one thing

Your students are already generating the data.

Every attempted question is a signal about a skill. Most of us don't capture it, and so we don't act on it.

Thank you

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It is an ongoing experiment. Come and ask me at the end of semester whether it worked.

References

Nabizadeh, A. H., Leal, J. P., Rafsanjani, H. N., & Shah, R. R. (2020). Learning path personalization and recommendation methods: A survey of the state-of-the-art. *Expert Systems with Applications*, 159, 113596.

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: a model and seven principles of good feedback practice. *Studies in Higher Education*, 31(2), 199–218.