

Lecturers' use of computer-aided assessment

How history and contradictions
help shape lecturers' practice

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Introduction

- Background to CAA at the target institution
- Background to this project
- Activity theory as the theoretical framework
- Methodology
- Our findings at this stage
- Conclusions and future work

Background to CAA at the target institution

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The HELM project

Helping Engineers Learn Mathematics

- Started in 2002 by a consortium of universities
- Includes workbooks and a CAA system
- Question bank with thousands of maths questions

Concurrently

- A separate bank of questions was developed for maths students

Harrison et al. (2007), HELM (2006).

Example CAA question

Determine the value of the following integral.

$$\int_1^3 x^2 \ln |x| dx$$

Enter your answer, correct to **2 d.p.**, in the box provided.

Example CAA solution

Using integration by parts:

$$\int_a^b u(x) \frac{dv}{dx} dx = \left[u(x)v(x) \right]_a^b - \int_a^b v(x) \frac{du}{dx} dx$$

So, in this case, we have:

$$\begin{aligned} \int_1^3 x^2 \ln |x| dx &= \left[(\ln |x|) \left(\frac{x^3}{3} \right) \right]_1^3 - \int_1^3 \left(\frac{1}{x} \right) \left(\frac{x^3}{3} \right) dx \\ &= \left[(\ln |x|) \left(\frac{x^3}{3} \right) - \left(\frac{x^3}{9} \right) \right]_1^3 \\ &= \{ (\ln 3)(9) - (3) \} - \left\{ -\frac{1}{9} \right\} \\ &= 6.8875 + 0.11111 \\ &= 6.9986 = 7.00 \quad \text{to 2 d.p.} \end{aligned}$$

Ten years on

- How do lecturers and students use CAA now?
- What sort of student improvement do lecturers and students desire from CAA?
- Does CAA practice affect whether these outcomes are achieved?

Background to this project

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Previous work

Student focus groups

- How students use CAA
- The nature of the feedback given
- The definition of student improvement
- The role of the lecturer

Broughton, Hernandez-Martinez and Robinson (2011, 2012a, 2012b).

Activity theory as the theoretical framework

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Aspects of interest

Students' practices

as influenced by their aims

Students' identities

and its impact on the way they act

Formative assessment

with respect to desired results or "improvement"

The role of community

and the development of tools

Lecturers' practices

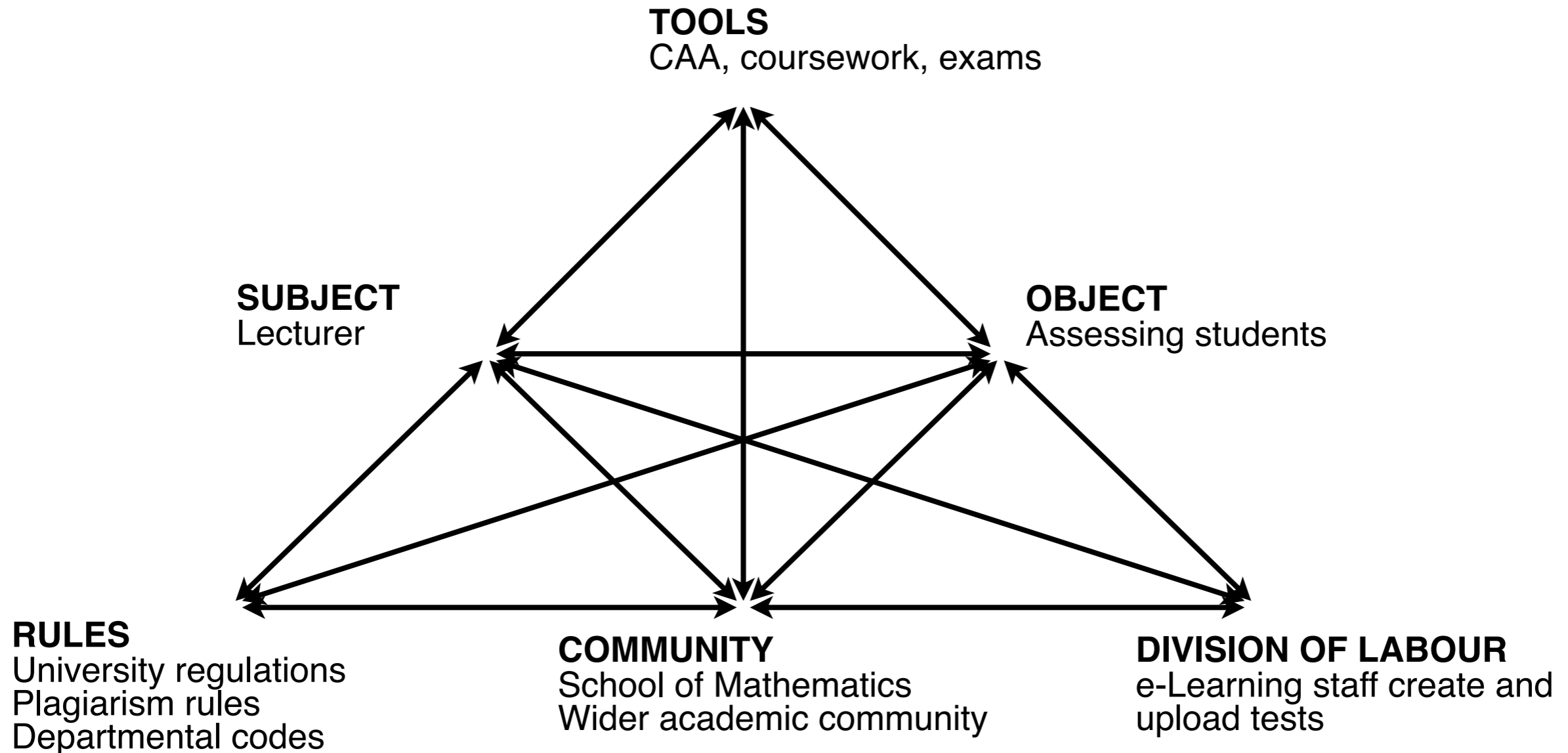
and the influences on it

Dealing with contradictions

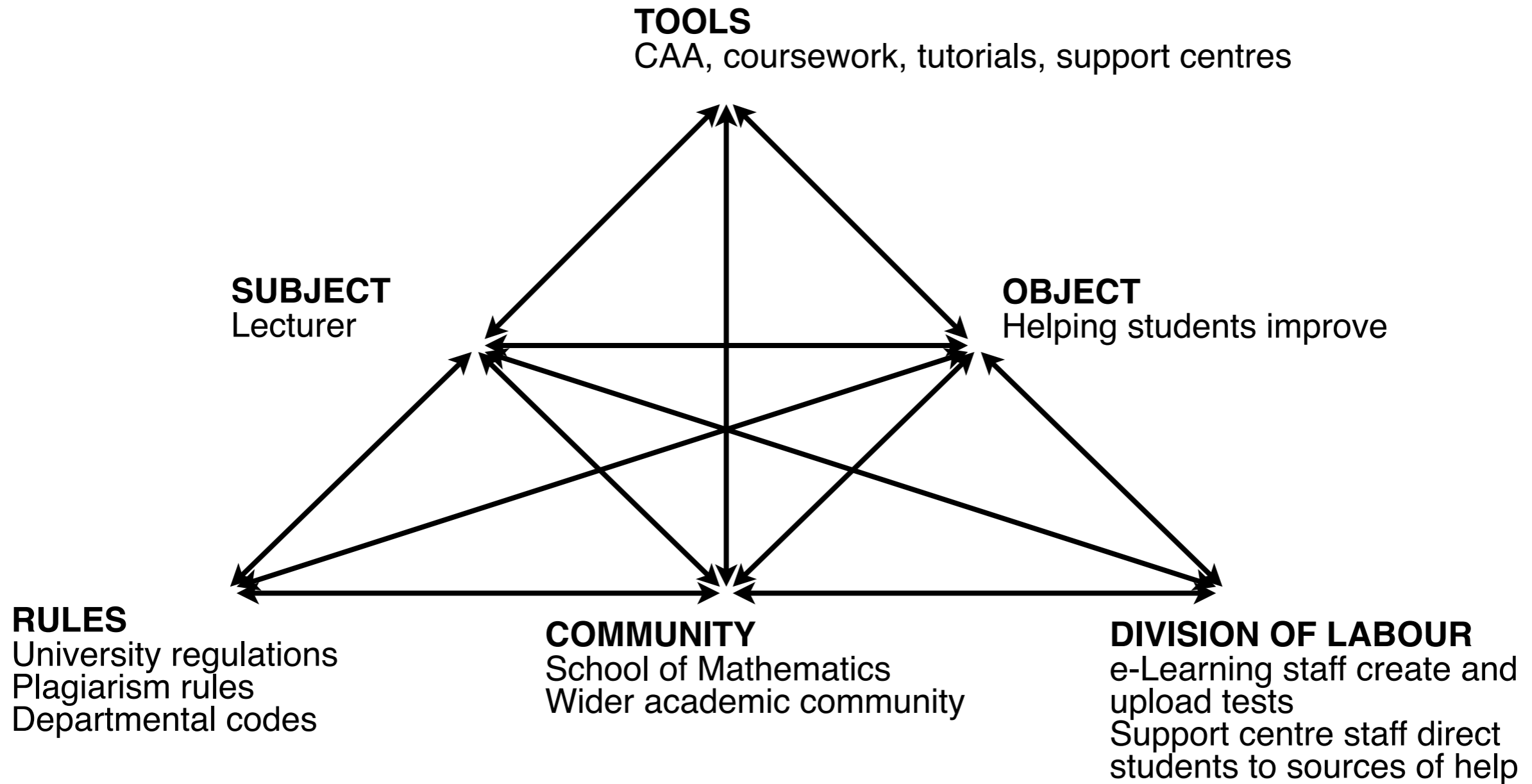
between practice and ideals

Engeström (2000); Roth and Lee (2006).

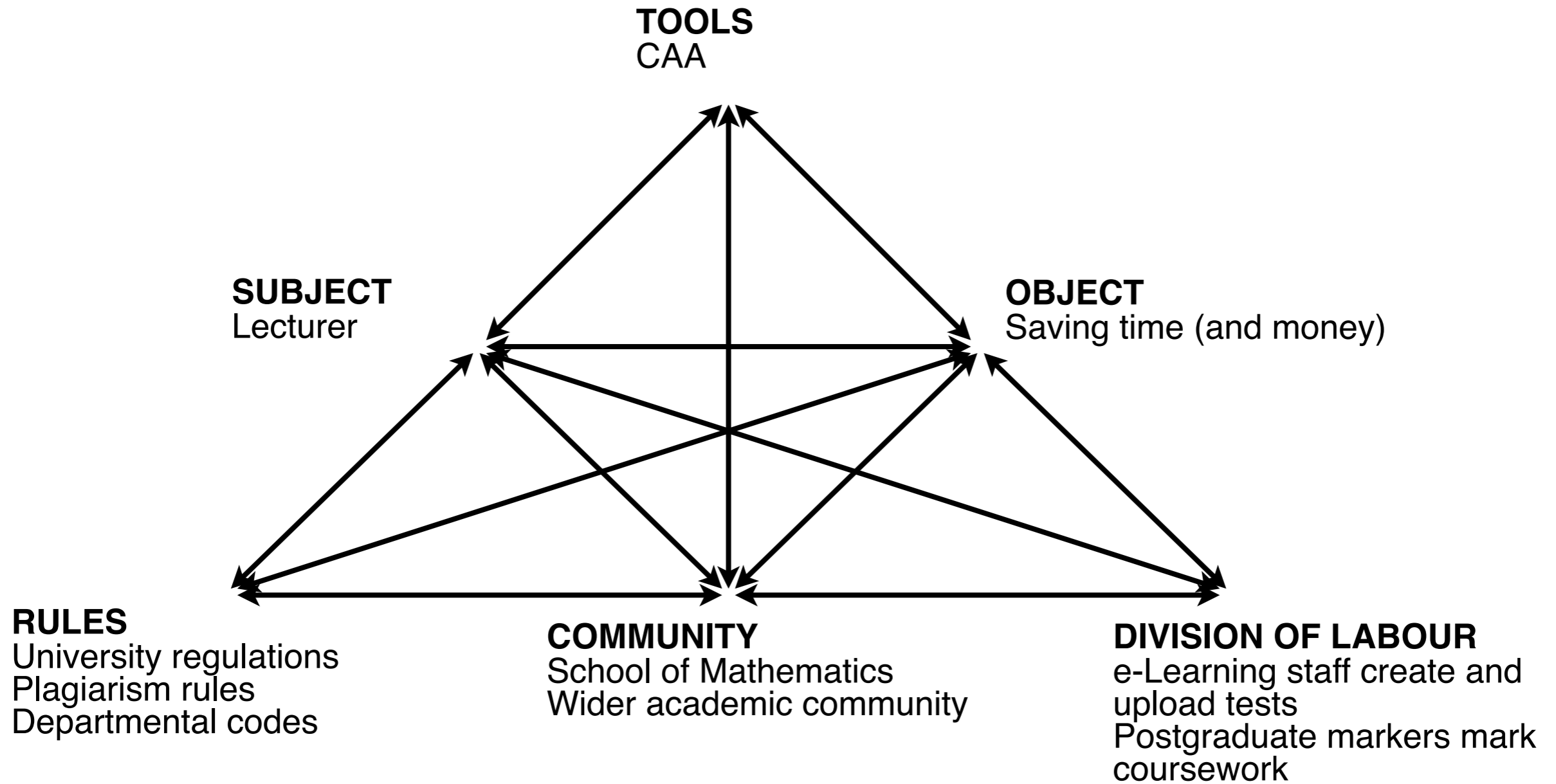
Lecturer activity



... or perhaps...



... or even...



Lecturers' CAA practice

For this part of the project, we ask:

1. Why are lecturers using CAA?
2. How do lecturers implement CAA in their maths modules?
3. What are lecturers' perceptions of issues arising?
4. How do lecturers deal with these issues?

Methodology

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Getting answers to questions

- Approached 13 lecturers of mathematics-based modules to complete a questionnaire
- Received nine questionnaires
- Six took part in a follow-up interview

Findings

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Why are lecturers using CAA?

What are the aims of the activity?

Save time

by continuing inherited practice

Support student learning

by encouraging them to practise

Assess students more frequently

by offering immediate feedback

Conform to department influence

by following advice from colleagues

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How do lecturers use CAA in their modules?

What actions have lecturers made towards their aims?

| | | CAA coursework test | | Paper-based coursework test | No test |
|---|---|---------------------|-----------------|-----------------------------|---------|
| | | Invigilated | Non-invigilated | Invigilated | |
| Access to practice test granted more than one week before a test | Access to practice tests granted after the test | 0 | 2 | 1 | 1 |
| Access to practice test granted up to one week before a test | Access to practice tests granted after the test | 0 | 1 | 0 | 0 |
| | Access to practice tests not granted after the test | 3 | 1 | 0 | 0 |

What issues have lecturers faced?

What contradictions have lecturers experienced while using CAA?

The questions are formulaic and not challenging enough.

The questions do not test conceptual knowledge and understanding.

The feedback is not beneficial to every student.

Lecturers do not know how students approach the tests.

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How have lecturers responded to these issues?

How has the activity changed?

Authoring new CAA questions that challenge conceptual knowledge

Replacing the online test with a paper version

Introducing other assessments and restructuring the assessment profile

Reducing the weighting of CAA towards the overall module mark

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What changes do lecturers anticipate making?

How might the activity change in future?

If lecturers are happy with the current setup, we might not expect further change.

If they are unhappy, they might tweak CAA practice further.

They might also seek a different CAA system.

Conclusions and future work

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In ten years of CAA practice

- Lecturers practices have become more diverse and continue to change.
- Lecturers inherit CAA practice and are keen to continue using CAA.
- They retain CAA as a tool for assessing students, but look to other assessment tools to address contradictions.
- There is a growing desire for a new system that addresses these contradictions.

Implications

- The lecturers are likely to continue to use CAA for the foreseeable future.
- They will not rely heavily on CAA for summative assessment and grading.
 - They do not believe that CAA is the most appropriate assessment tool for assessing conceptual knowledge.
 - There are concerns that students do not use CAA in the manner expected or desired.

Future work

Student study

- Questionnaires and individual interviews with students that use CAA
 - Aims of students
 - Student activity

Lecturer study

- Questionnaires and individual interviews with lecturers that do not use CAA
 - Compare aims and activity to lecturers that use CAA

Further information

Short links

- **References**
sbpr.es/rm12a
- **This presentation**
sbpr.es/rm12b