Active or passive or both? Looking inside the 'black box' of lectures.

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Content

- What is Active Learning?
- The **F**ramework for **I**nteractive **L**earning in **L**ectures (FILL)
- Results from applying FILL to Physics Lectures in Edinburgh

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Lectures

‘Traditional’

‘Active Learning’

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Evidence for Active Learning

Hake, (1998) Am. J. Phys.

Compared learning gains for over 6000 traditional and active learning physics courses

Deslauriers (2011) Science
Directly compared traditional and active learning class

Freeman et al. (2014) PNAS

Active learning increases student performance in science, engineering, and mathematics

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What is Active Learning (Interactive Engagement)?

..heads-on (always) and hands-on (usually) activities which yield immediate feedback **through discussion** with **peers** and/or **instructors**...

R. Hake, Am. J. Phys. 66(1), 1998

Framework for Interactive Learning in Lectures

Data Collection

- *Lecture Capture Videos.*
- *16 lectures, 8 from each course (1A and 1B).*

Coding

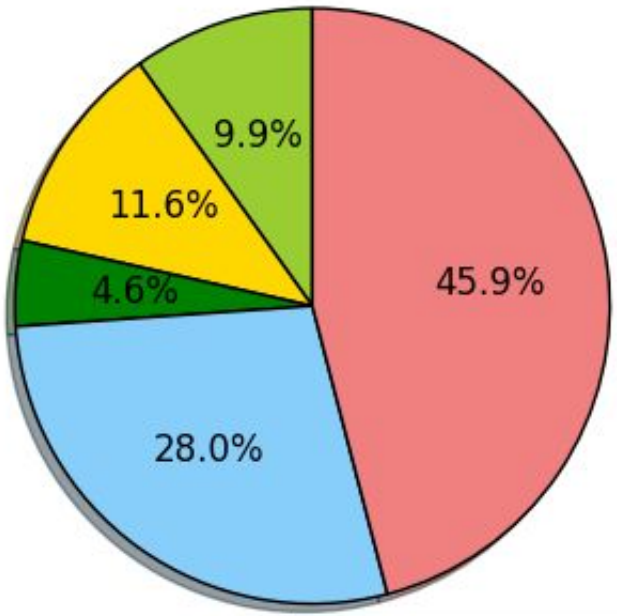
- *Constructivist grounded theory approach.*
- *Activities coded on a continuous (per second) basis.*

Framework for Interactive Learning in Lectures

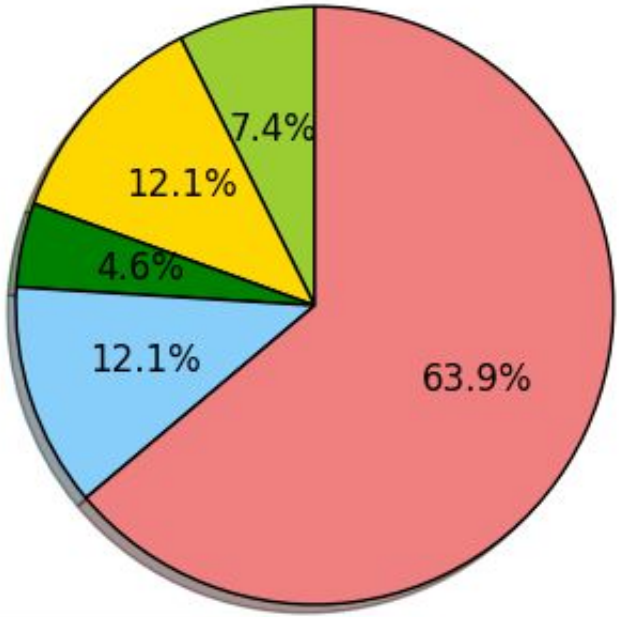
Interaction Code	Activity Summary	Interactivity Categorisation
Ltalk	Lecturer talking, student listening	Non-Interactive
LQ	Lecturer question, student answer	Vicarious Interactive
SQ	Student question, lecturer answer	Vicarious Interactive
S-Thinking	Student silent thinking	Interactive
Feedback	Feedback on PI voting, student listening	Interactive
SS-Disc	Student-student discussion	Interactive

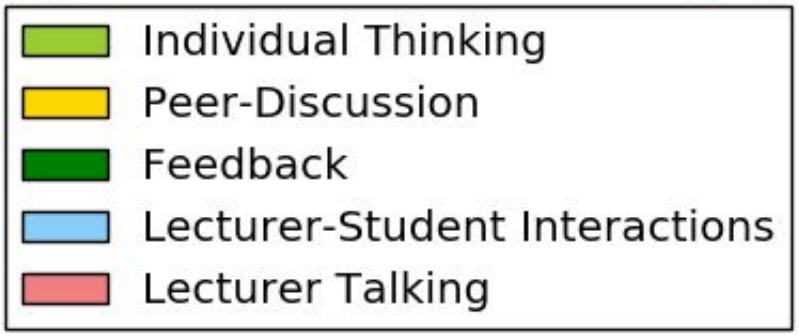
- Continuous temporal coding
- 1-second resolution
- Minimal training

Physics 1A



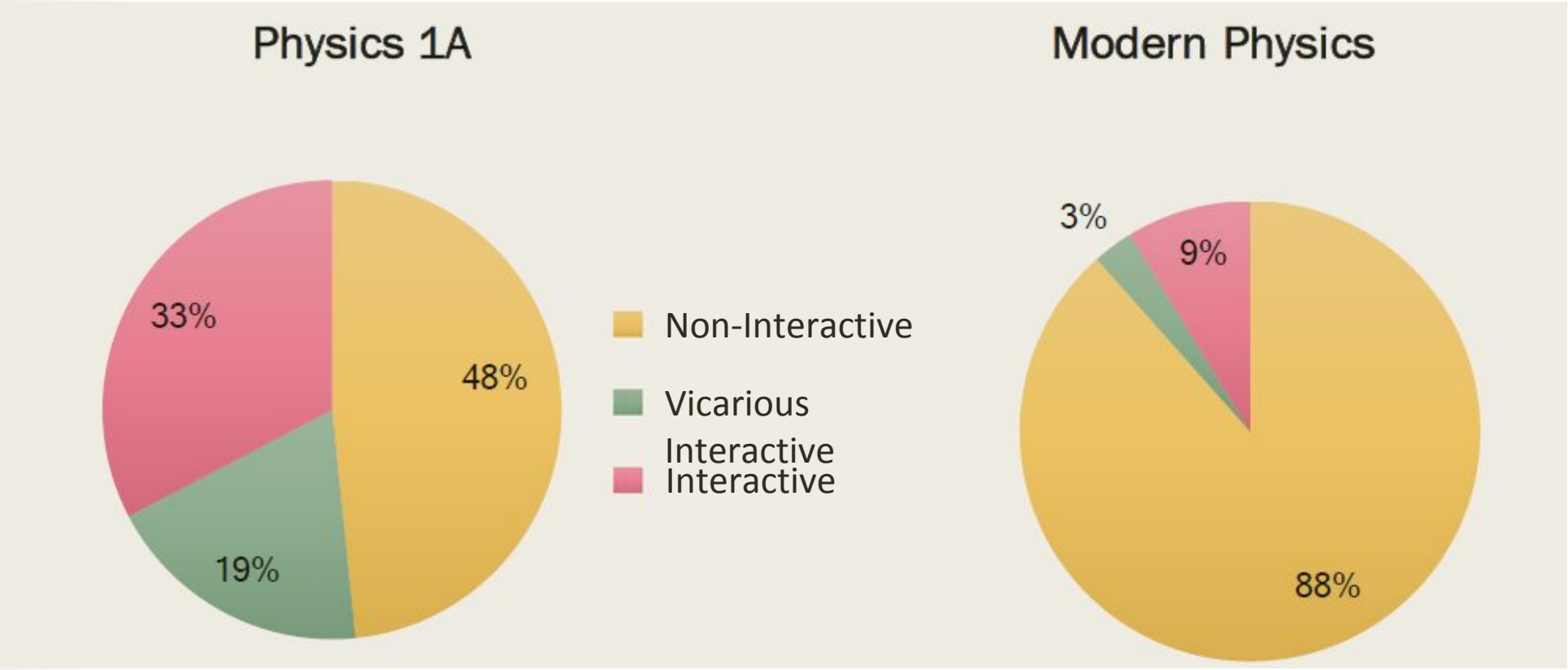
Physics 1B





Average Time on Lecturer Talking = 55%

All interactive lectures are not the same



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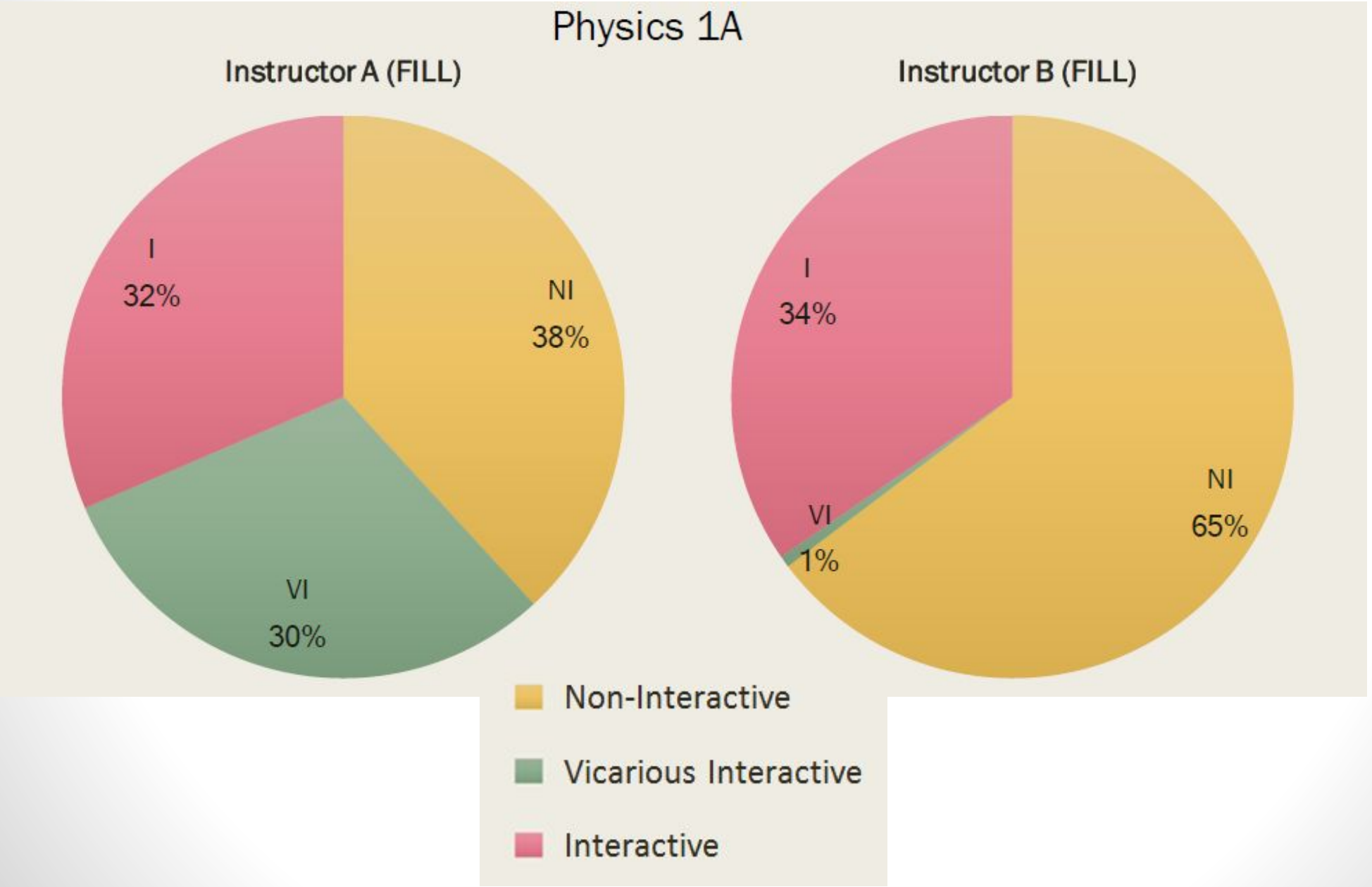

Implications for Practice

- FILL framework useful for characterising interactions in lectures.
- Gives insights that can inform teaching
- Easy to implement - analysis via lecture recordings

Conclusions

- Active learning is evidence based…
- …..but classes vary considerably
- ...and depends on implementation
- Lecturer talking can be used effectively with student-centred activities

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Wood et al. '**Characterizing interactive engagement activities in a flipped introductory physics class'** Phys. Rev. Phys.Educ. Res. 12, 010140 (2016)

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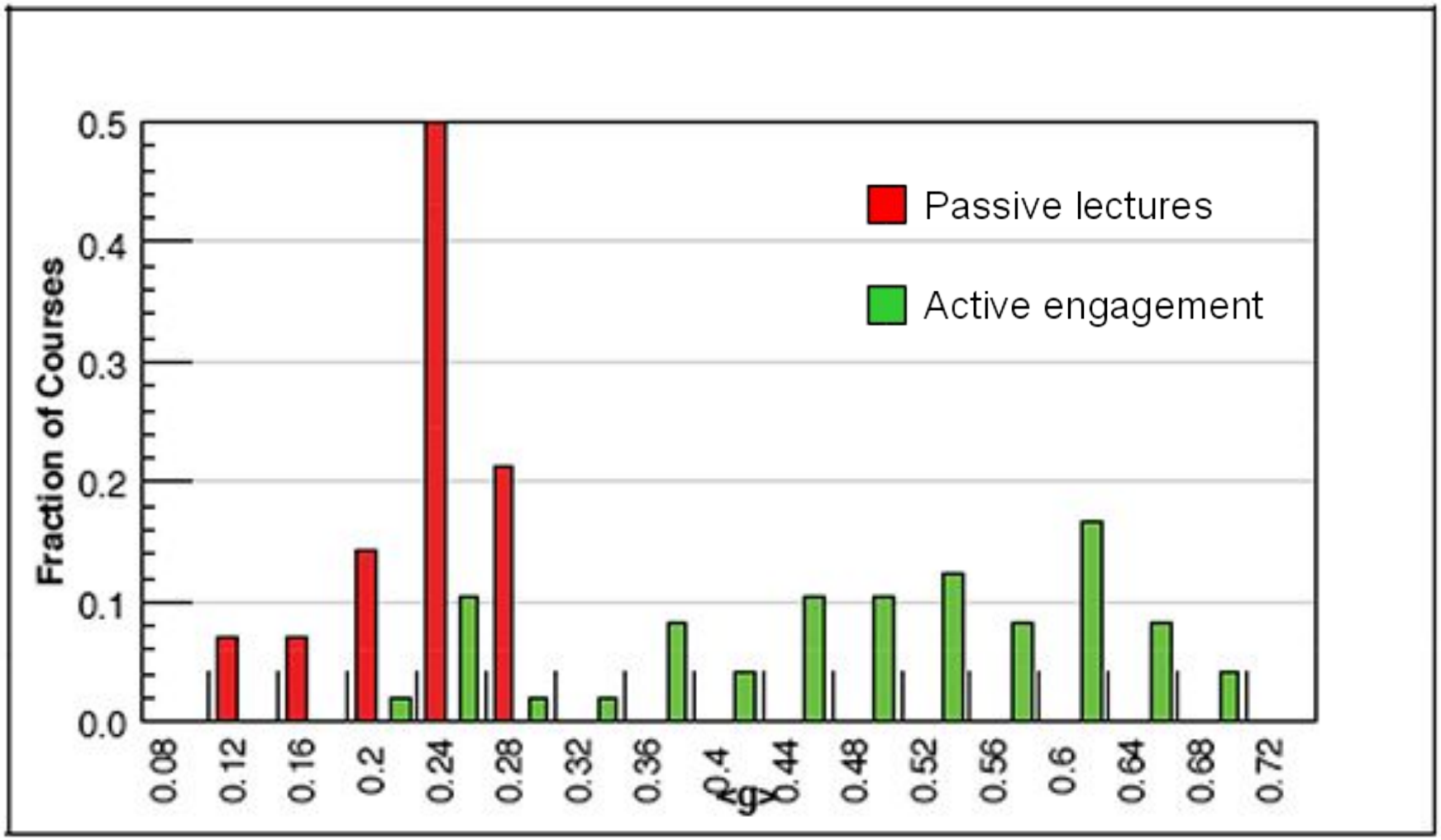

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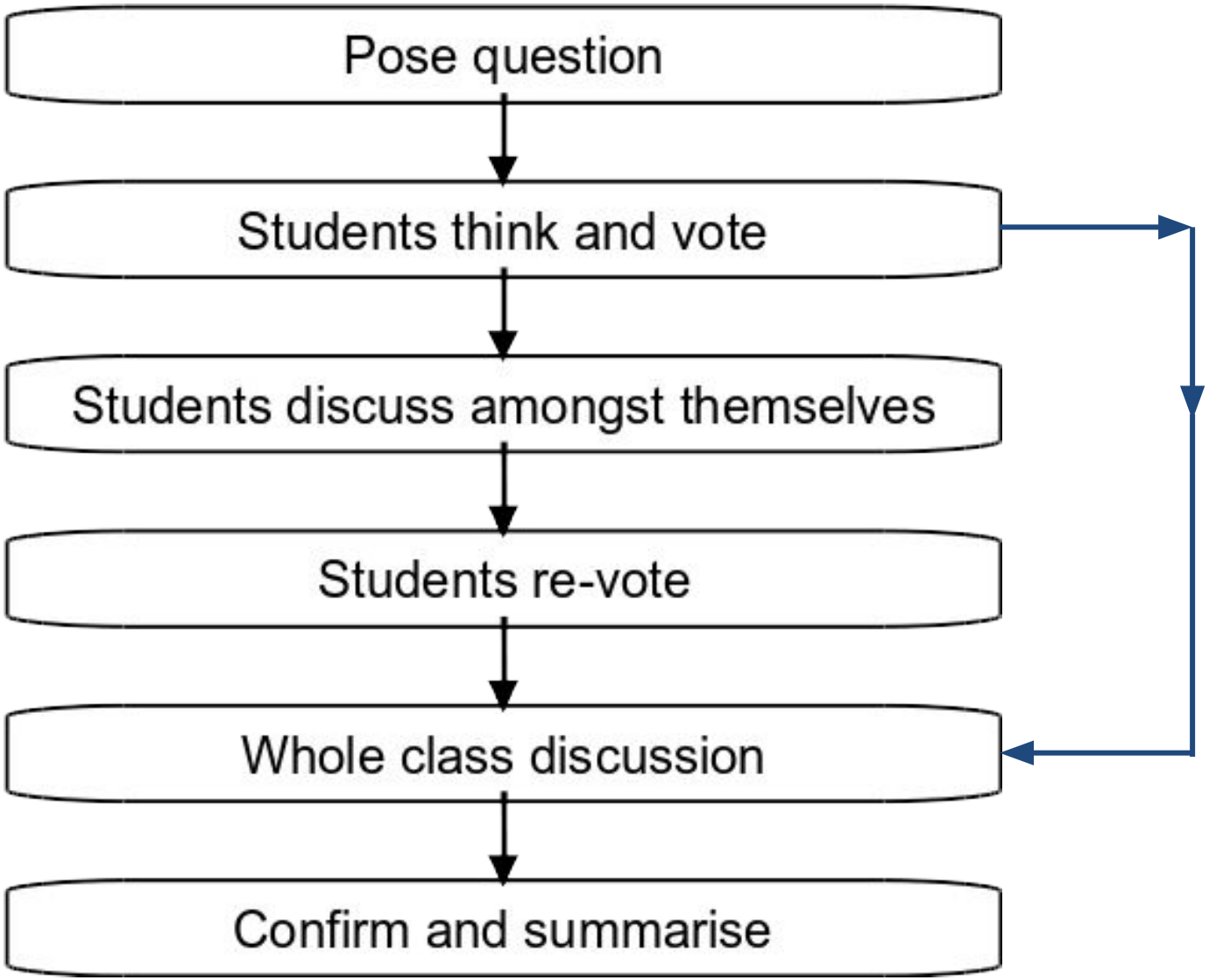
Peer-Instruction



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Context

- Large lectures: 200-300 students
- ‘Flipped’ Approach
  - Pre-readings and Quiz
- Active Learning Approach (Peer Instruction)