Two-Stage Collaborative Exams

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Outline

- What are two-stage collaborative exams?
- Why should you try it?
  - Benefits and Challenges
- How do you organize a two-stage exam?
  - My implementation; Workshop
- What do students think?

How Many of You…

… know what a two-stage exam is?

… have tried a two-stage exam?

… would be willing to let others observe their two-stage exam?

How I learned about two-stage exams

Carl Wieman

PHAS CWSEI

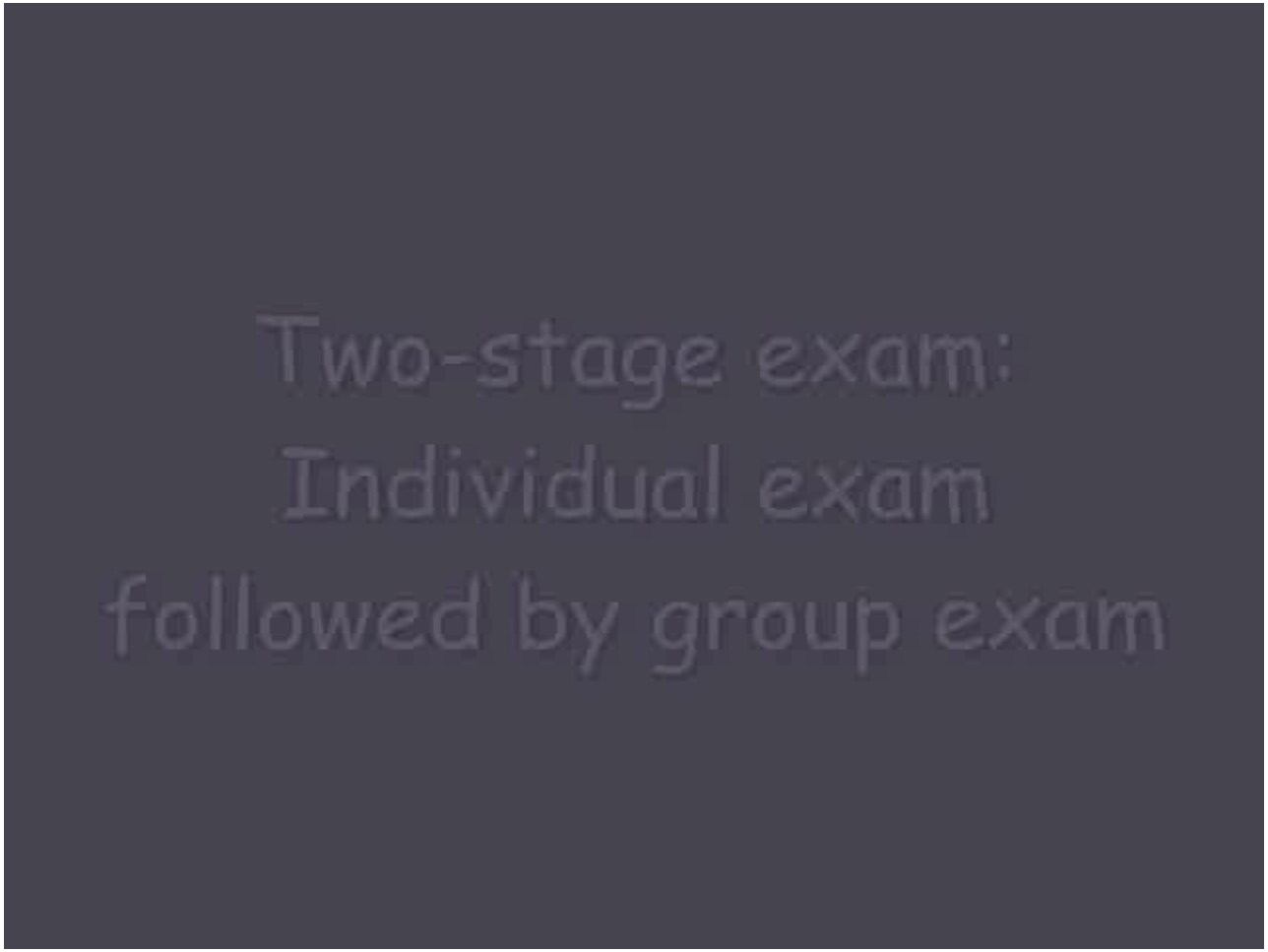
Brett Gilley (EOAS)

CW (2009): “I found it somewhat surprising that, even though we were trying this for the first time based only on what we read in this paper, it was a total and overwhelming success.”

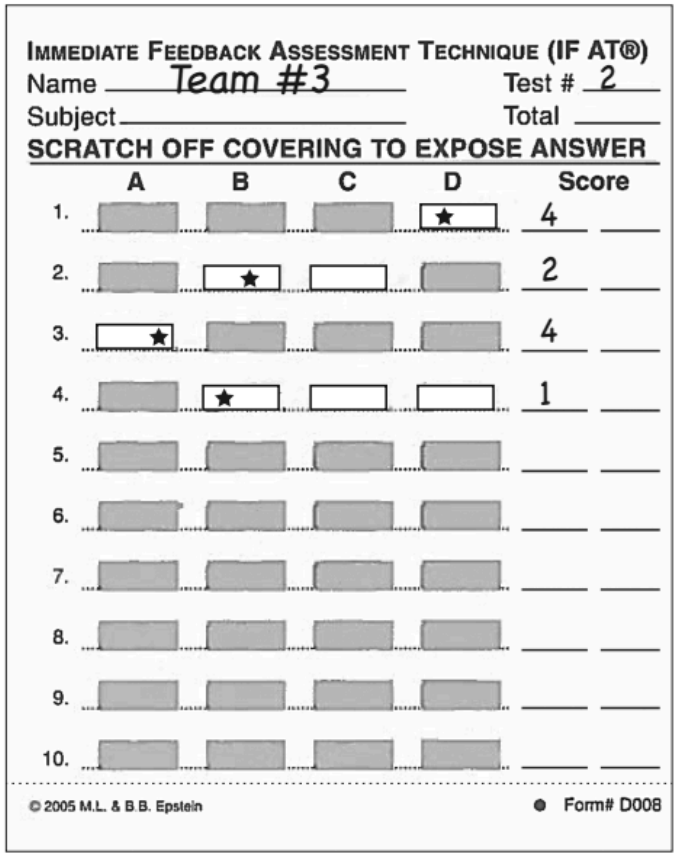
2012: Observed Brett Gilley’s two-stage exam.

What Are Two-Stage Exams?

Lots of information – google “CWSEI two-stage”



More Fun with IF-AT-cards



IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT®)

Name Team #3 Test # 2

Subject _____ Total _____

SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	Score	
1.				★	4	
2.		★			2	
3.	★				4	
4.		★			1	
5.						
6.						
7.						
8.						
9.						
10.						

Form# D008

Benefits

- Retention
- Learning
- Motivation
- Reduced test anxiety
- Exam signals: collaborative learning important

Other Benefits

- Working under pressure in teams, potentially with people you don't know.
- Reach consensus or compromise.
- Assessment says: "I care about your learning".

Learning During a Two-Stage Exam

- Similar to Peer Instruction, but
  - high-stakes
  - better prepared students
  - more students actively participating
- 'Testing Effect': Retrieval with immediate feedback (Roediger & Karpicke).
- Learning: Groups get correct answers that none of the individual members had. (Gilley & Clarkston, Jang et al., C. L. Rieger)

Challenges

- Unexpected.
- Students don’t like when their mark depends on others.
- Institution might be skeptical/opposed.
- Added time or fewer questions.
- Group challenges.
- Increase in grades due to group exam.

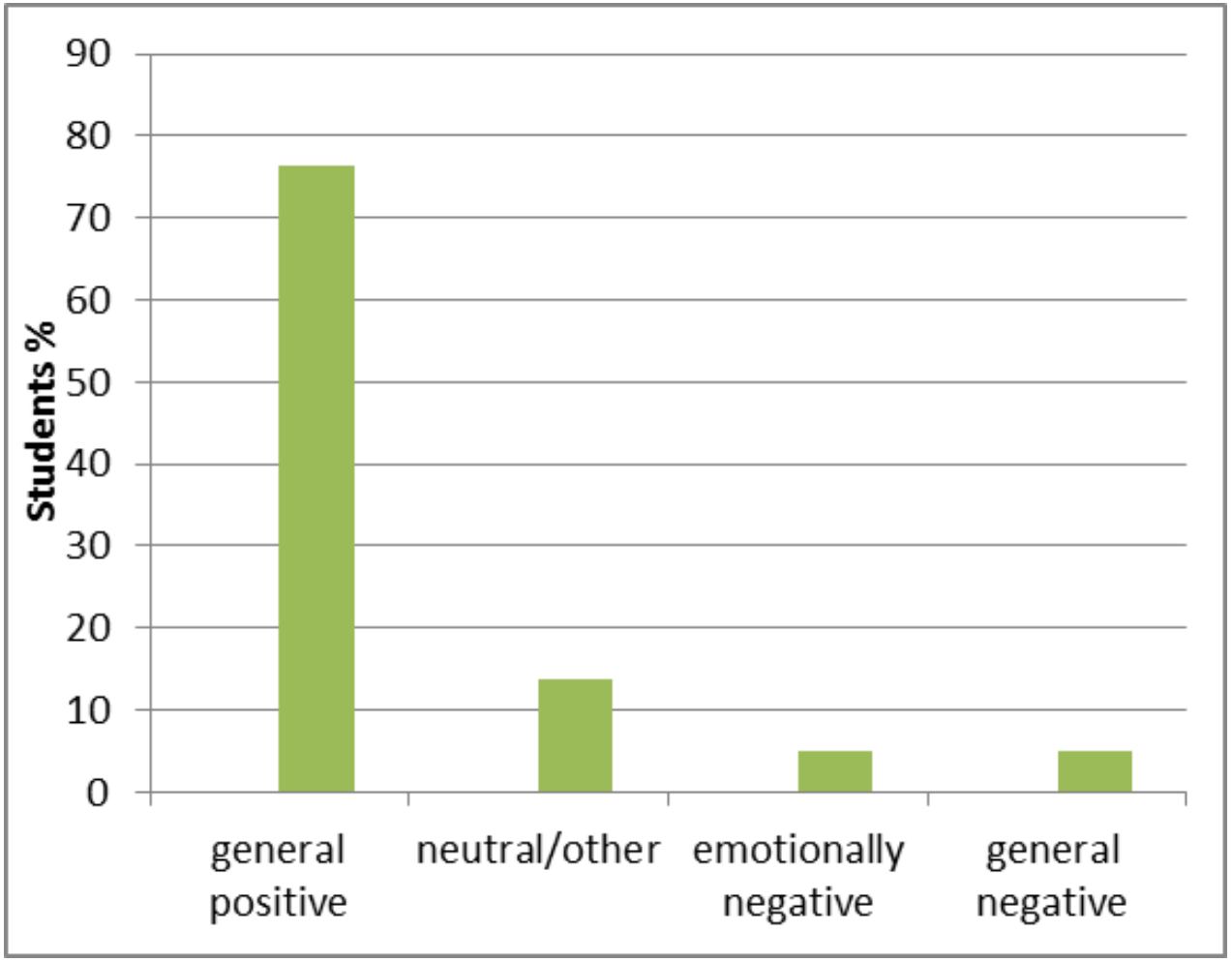
My Preferred Implementation

- Group exam immediately follows individual exam.
- Time: 2/3 individual; 1/3 group
- Marks: 85% individual; 15% group*

  *100% individual if group mark is lower
- One copy per group.
- Groups self-select (3 or 4 students).
- Most questions identical.
- Modified questions if
  - Too many algebra steps
  - You want to enhance discussions
  - You want a group challenge question

The Students' Perspective

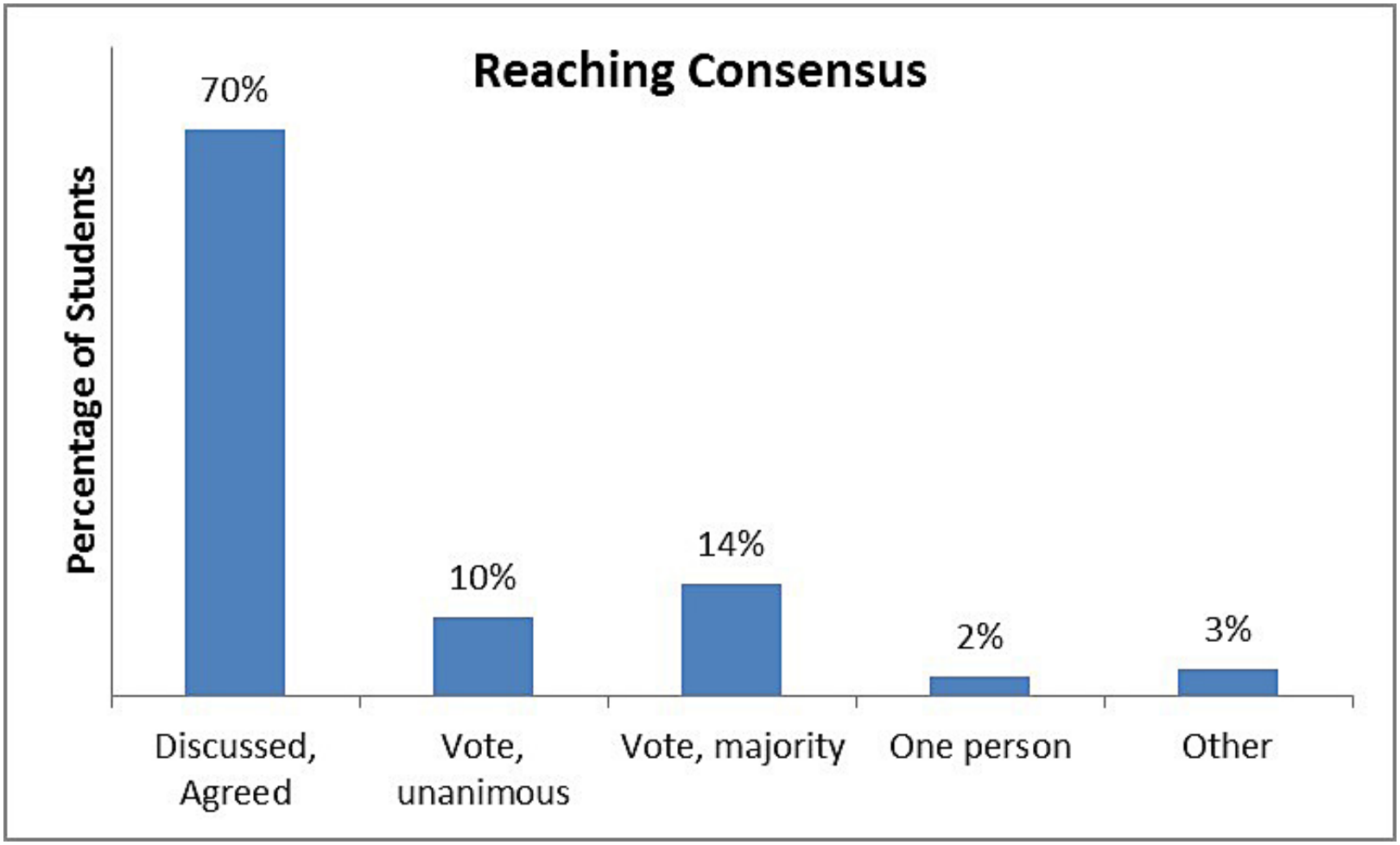
(Rieger and Heiner, 2014; N = 123)



OVERALL CODE	DETAILED CODE	Description of code	No. of times mentioned (N = 123 students)
General Positive (TOTAL: 236)	G/E	good, enjoy, benefit, great, liked, useful, OK, interesting	56
	H	helpful	30
	C	Increased confidence	9
	LE	Good learning experience, good way to review exam	21
	LE-D	Learning from: discussions with others, hearing other approaches, comparing with others, explaining yourself, collaborating	48
	IF	Immediate feedback: good to know if right or wrong	34
	IF-LM	Immediate feedback: learning from mistakes	16
	GD/B-pos	positive mention of group working together, group members, meeting friends, group preparation, cooperation, and references to grade boost	22
Neutral/ Other	Misc	random comments not fitting into the above categories as well as suggestions.	15
Emotionally negative	D/Sad	dislike, frustrating, not helpful, feeling sad or depressed, less confident	15
General Negative	GD/B- neg	negative mention of group not working so well together, not everyone pulling their own weight, hard to explain to others, and concerns about unfair grade boost to weaker student, not fair for the individual	15

Reaching Consensus

(Rieger and Heiner, 2014; N = 123)



Some Results From Literature

- Group performance better than individual.
- Increased retention.
- Learning beyond retention.
- Performance on delayed tests (Ives): 6-7 weeks/2 weeks after two-stage midterms.

Thank You!

References

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