Incorporating Contemporary Research in learning and Assessment of Mathematics.

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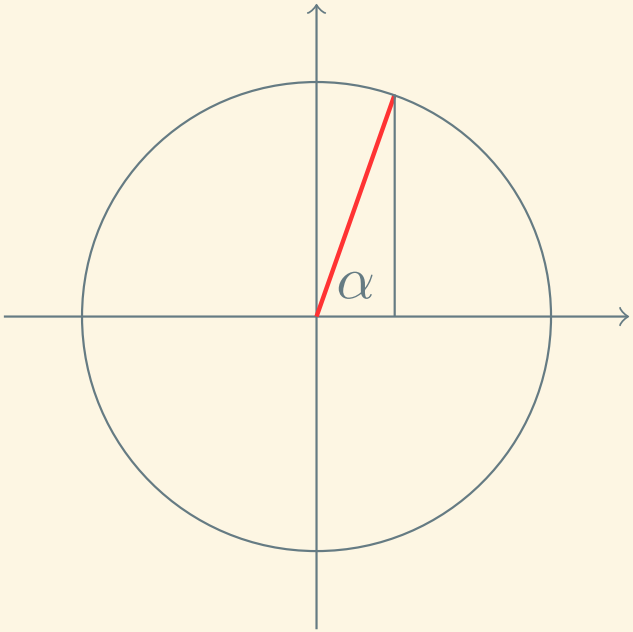
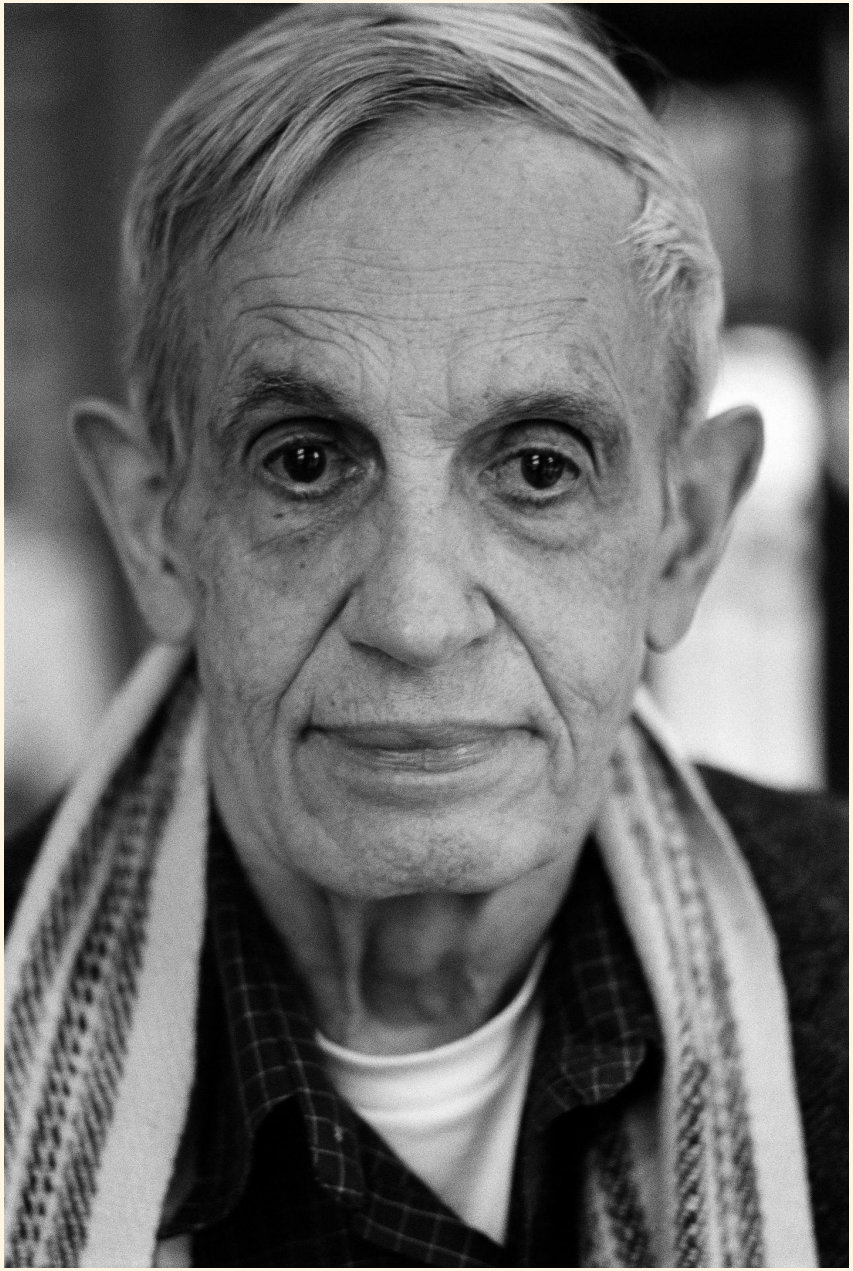
$$\cos(\alpha)^2 + \sin(\alpha)^2 = 1$$



Hairy ball theorem.

Hairy ball theorem.



'In the STEM classroom should we ask or should we tell?"

Active learning increases student performance in science, engineering, and mathematics Freeman et al. 2014 (PNAS)

FLIPPED LEARNING

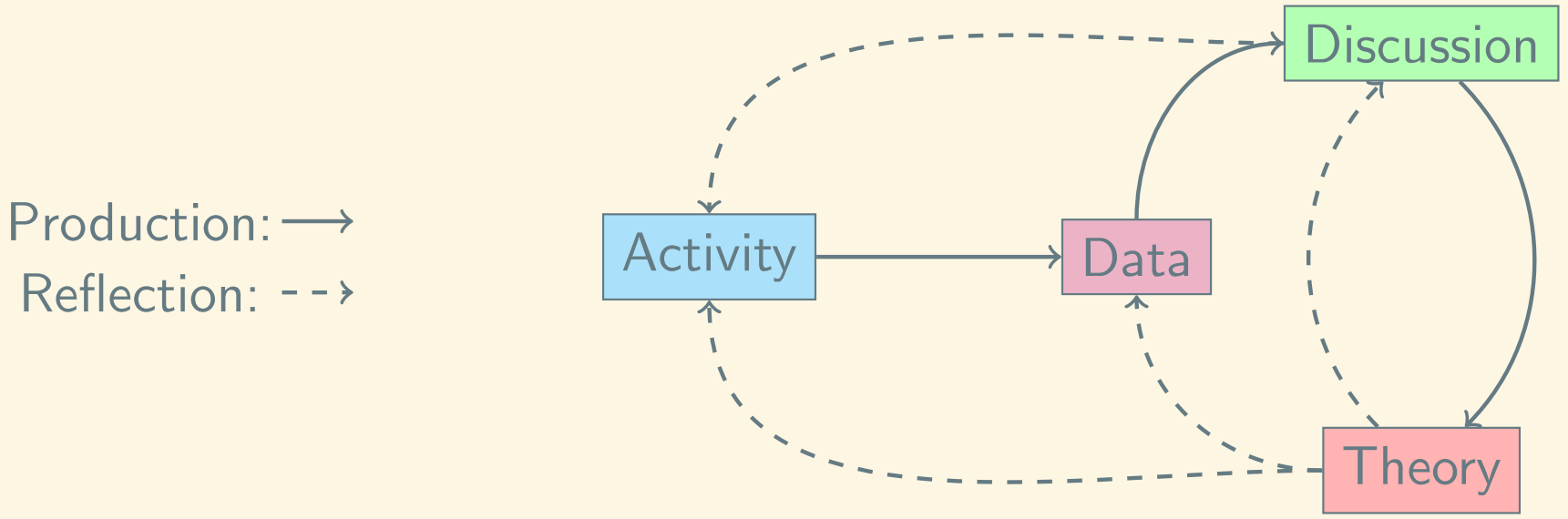
A Guide for Higher Education Faculty

ROBERT TALBERT

Foreword by JON BERGMANN

Video

IN FLIPPED CLASSROOMS, LECTURES ARE ASSIGNED AS VIDEOS FOR HOMEWO..
YOU DON'T NEED EITHER LECTURES OR VIDEO
imgflip.com



Playing Games: A Case Study in Active Learning Applied to Game Theory Knight. 2015 (MSOR Connections)

Squad	1	2	3	8	9
Cake	1	2	3	3	4

Crew	5	5	10	11	12
Gauss	0	5	5	6	7

Squad	3	3	3	3	4
Crew	3	3	3	8	9

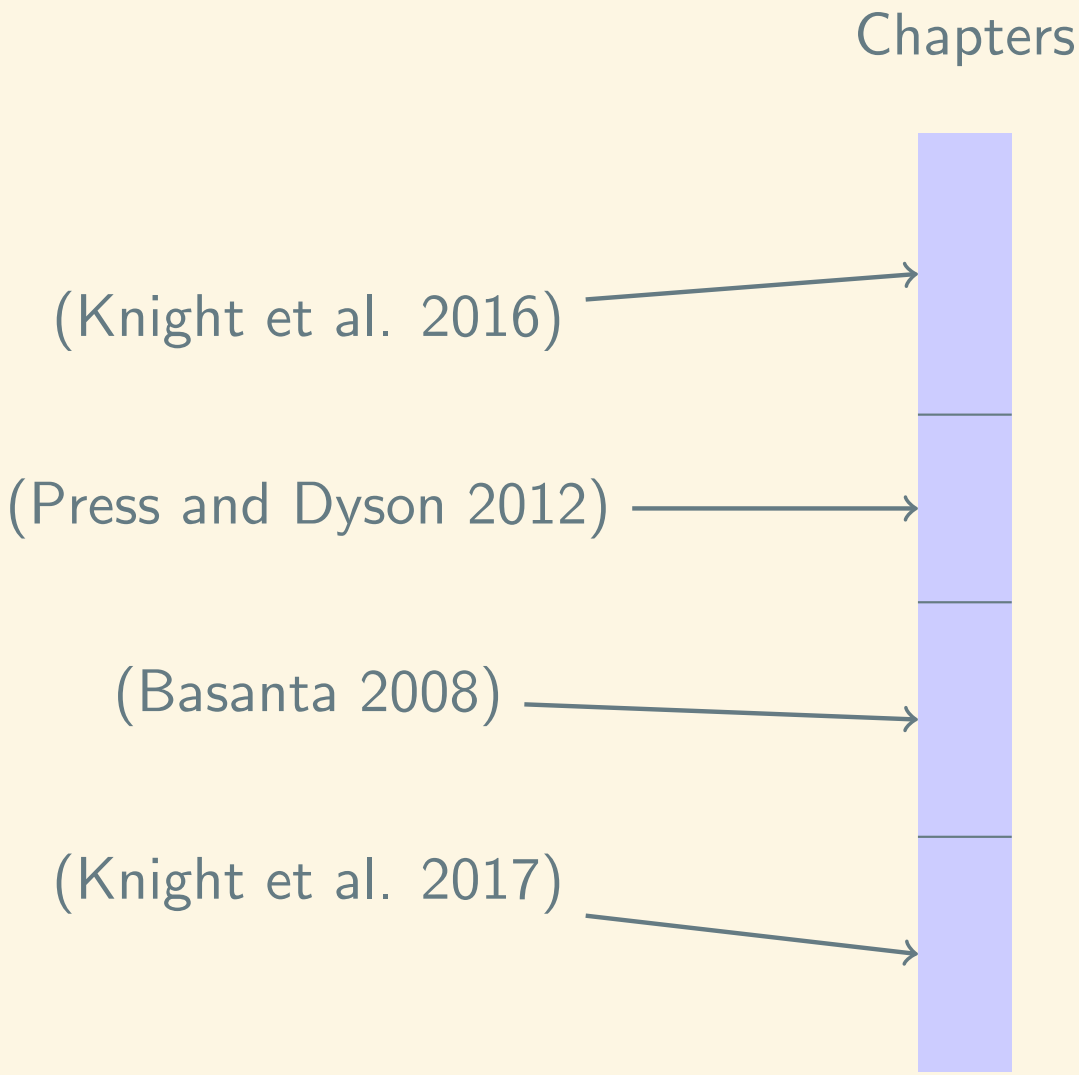
Cake	3	6	9	12	12
Gauss	3	6	9	12	17

Squad	3	6	9	14	15
Gauss	3	6	9	9	10

Cake	1	2	3	8	8
Gauss	1	2	3	3	8

3,3	0,5
5,0	1,1

Squad	9	13	28
Cake	4	16	24
Crew	12	21	31
Gauss	7	24	34


Chapters
(Knight et al. 2016)
(Press and Dyson 2012)
(Basanta 2008)
(Knight et al. 2017)

FAQ: Students don't [do some activity] before class.

Assessment

Consider the accompanying 2008 paper entitled "Studying the emergence of invasiveness in tumours using game theory" by Basanta et al.

1. Give a general summary of the paper. [3]
2. There is a minor error in this paper in the game matrix, describe and suggest the fix. [2]
3. How does the theorem in part 4 of this question relate to the findings of the paper? [2]
4. Suggest an alternative area of game theory that could also be used. [3]

(Dr Stephen Rutherford. BIOSCI.)