Common Challenges for Teaching in an ALC: A Primer for First-Time Instructors

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There are 2 main challenges presented by teaching in an ALC

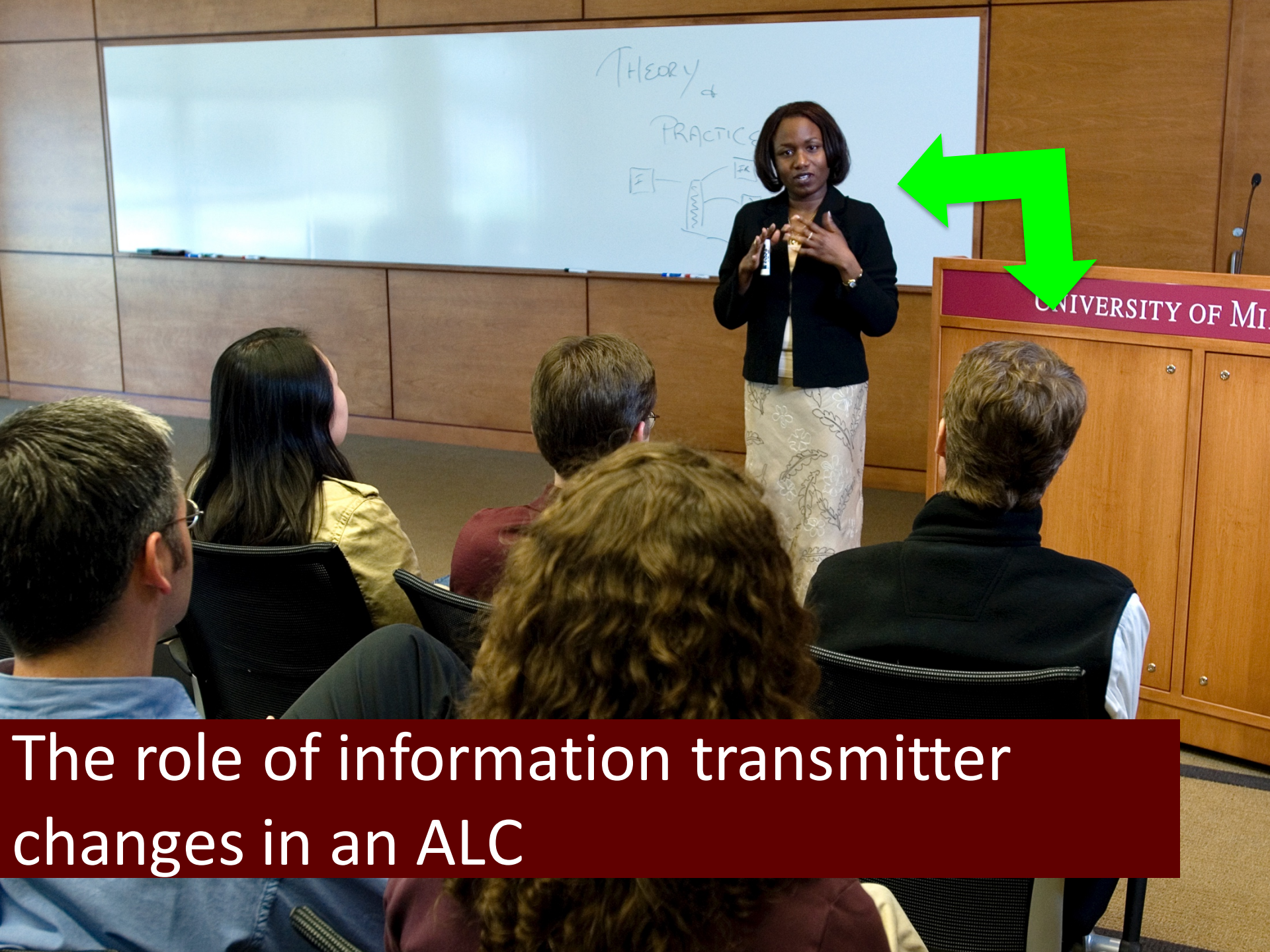
- Changes in faculty and student roles
- Challenges due to the physical space

Teaching in an ALC may change student engagement roles

Interaction with you

Interaction with peers

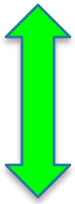
Interaction with materials



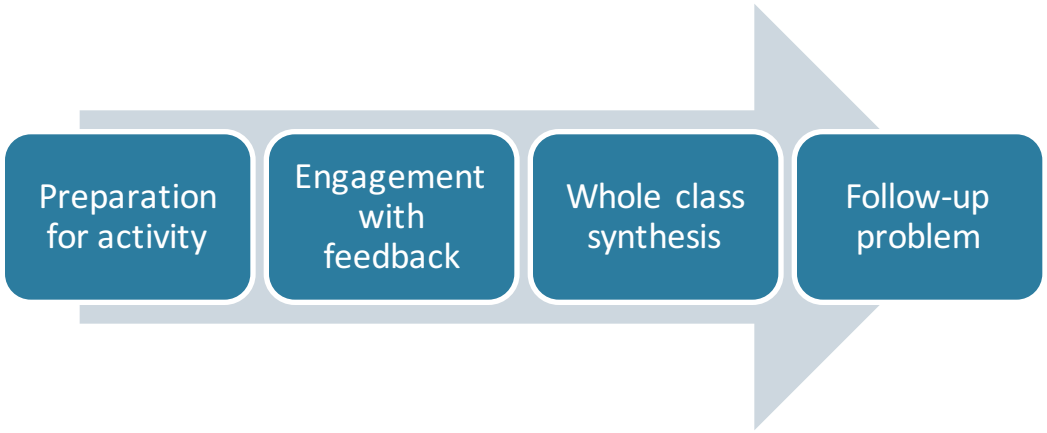
The role of information transmitter changes in an ALC

Ways to expand beyond information transmission

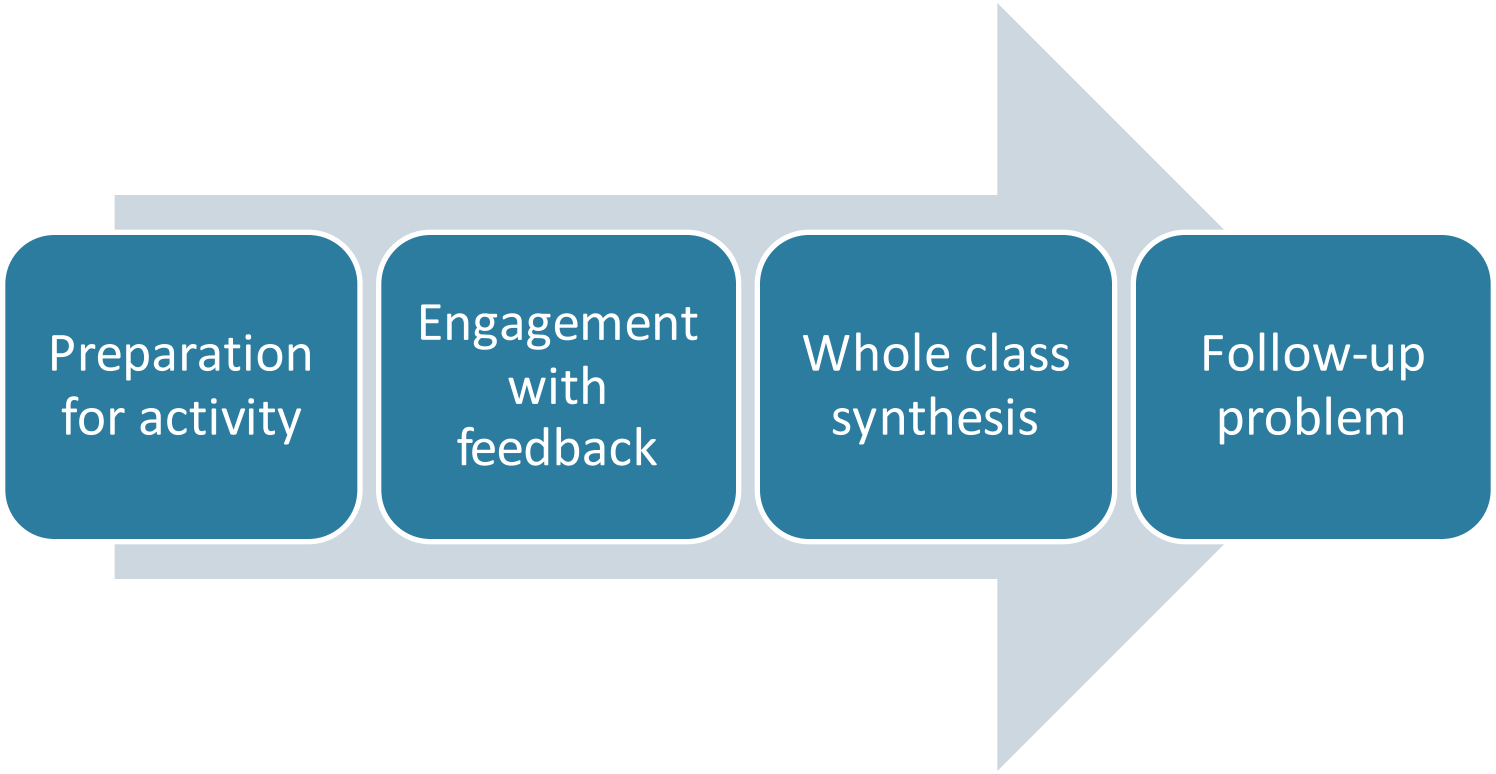
- Provide team in-class activities



- Design semester long group projects



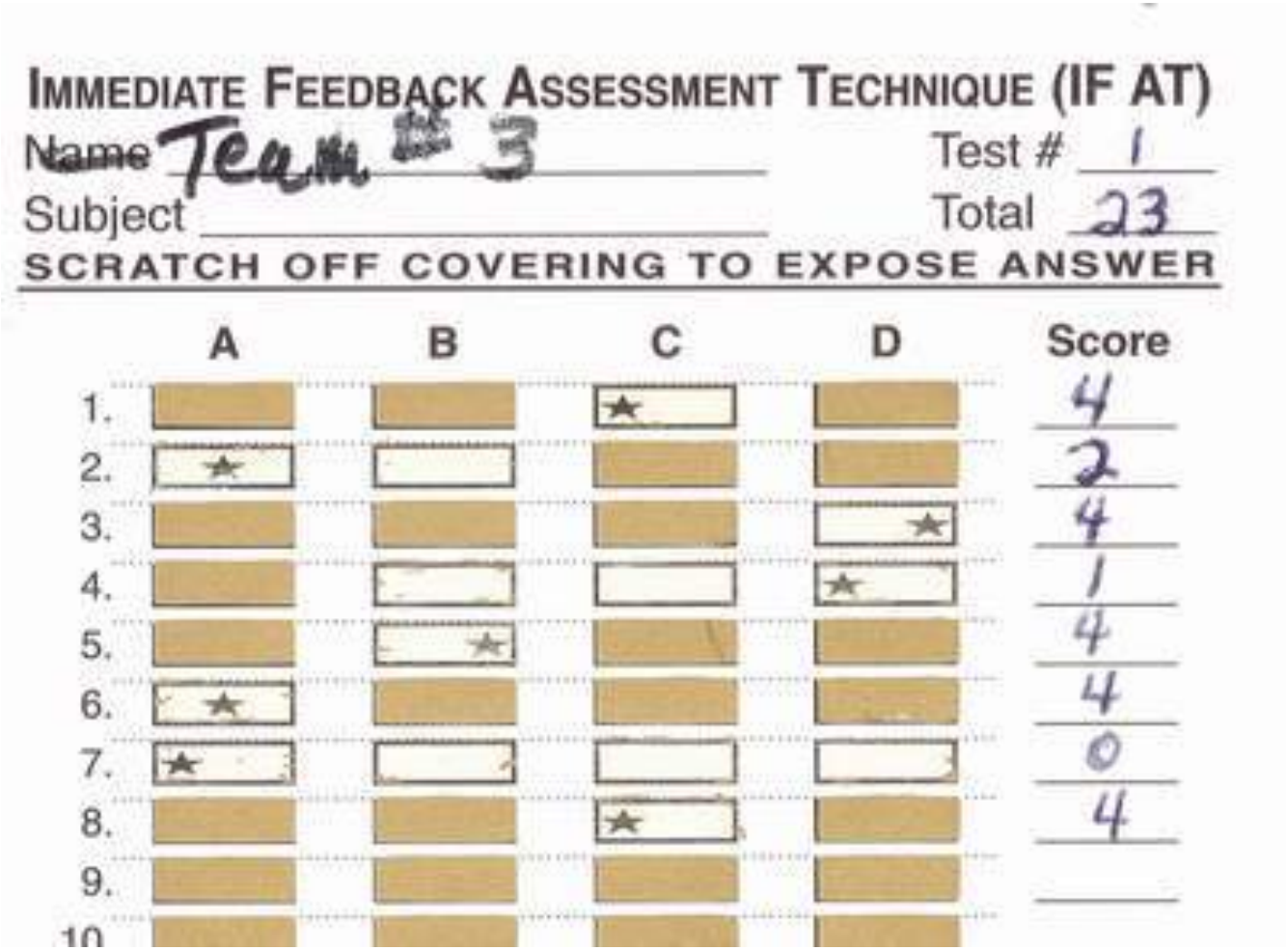
Provide team in-class activities



IF-AT Quiz

- Take the Slate news quiz individually (yellow paper).
- Form a team of 3 – 5 people.
- Answer the questions as a team. As a team, agree on the answer, then have someone scratch off the box corresponding to your answer. A * will be revealed if your answer is correct.

Working on a group task can "test drive" a team



IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT)

Name ~~Name~~ Team # 3 Test # 1

Subject _____ Total 23

SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	Score
1.			★		4
2.	★				2
3.				★	4
4.				★	1
5.		★			4
6.	★				4
7.	★				0
8.			★		4
9.					
10.					

A word about content coverage…

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Less teaching, more learning: 10-yr study supports increasing student learning through less coverage and more inquiry

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Luckie DB, Aubry JR, Marengo BJ, Rivkin AM, Foos LA, Maleszewski JJ. Less teaching, more learning: 10-yr study supports increasing student learning through less coverage and more inquiry. *Adv Physiol Educ* 36: 325–335, 2012; doi:10.1152/advan.00017.2012.—In this study, we compared gains in student content learning over a 10-yr period in which the introductory biology laboratory curriculum was changed in two ways: an increase of inquiry and a reduction of content. Three laboratory formats were tested: traditional 1-wk-long cookbook laboratories, two 7-wk-long inquiry laboratories, and one 14-wk-long inquiry laboratory. As the level of inquiry increased, student learning gains on content exams trended upward even while traditional content coverage taught decreased. In a quantitative assessment of content knowledge, students who participated in the 14-wk-long inquiry laboratory format outscored their peers in both 7- and 1-wk-long lab formats on Medical College Admissions Test exam questions (scores of 64.73%, 61.97%, and 53.48%, respectively, $P < 0.01$). In a qualitative study of student opinions, surveys conducted at the end of semesters where traditional 1-wk laboratories ($n = 167$ students) were used had low response rates and predominately negative opinions (only 20% of responses were positive), whereas those who participated in 7-wk ($n = 543$) or 14-wk ($n = 308$) inquiry laboratories had high response rates and 71% and 96% positive reviews, respectively. In an assessment of traditional content coverage in courses, three indexes were averaged to calculate traditional forms of coverage and showed a decrease by 44% over the study period. We believe that the quantitative and qualitative data support greater student-driven inquiry in the classroom laboratory, which leads to deeper learning in fewer topic areas (less teaching) and can reap gains in scientific thinking and fundamental understanding applicable to a broader range of topic areas (more learning) in introductory biology.

laboratory; inquiry; cooperative; undergraduate; research

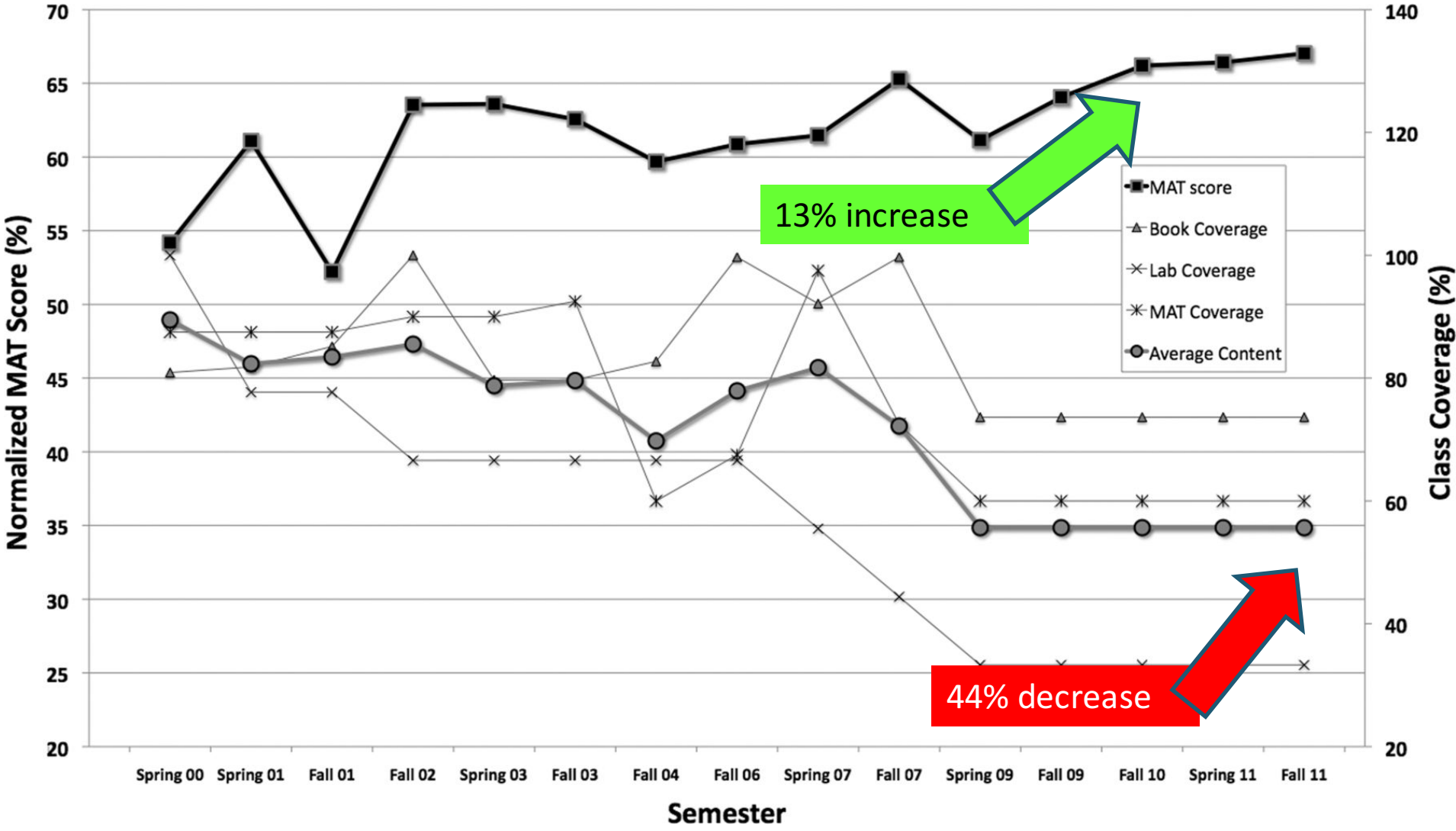
EACH YEAR, the field of biology grows with new developments in knowledge and skills that require increased mastery of topics by our students. While we, the faculty, are concerned that the increased number of topics taught in lecture and laboratory courses might not lead to increased learning, we hope that if we speak clearly and energetically enough, perhaps it will. We often consider our best laboratories to be those with (11, 18, 21). Nor does this inspire creativity, flexibility, and inquisitiveness in our students or help them develop deeper critical and integrative thinking skills (7, 8, 22, 23, 27).

In the late 1990s, our department's approach to teaching introductory biology laboratory and lecture courses was predominantly that of a traditional format, with many weekly cookbook laboratories strung together, each focused on a different biological topic. Just as lecture topics jumped from one chapter to the next, so did topics in the laboratory. For example, the week that the topic of photosynthesis was covered in lecture, we would also have photosynthesis "experiments" in the laboratory. In the past, this approach was considered the most efficient for increasing student gains because it enabled teachers to reinforce material presented in lecture. However, student feedback and research data have suggested that these traditional laboratories provide little gain in student learning (18, 23).

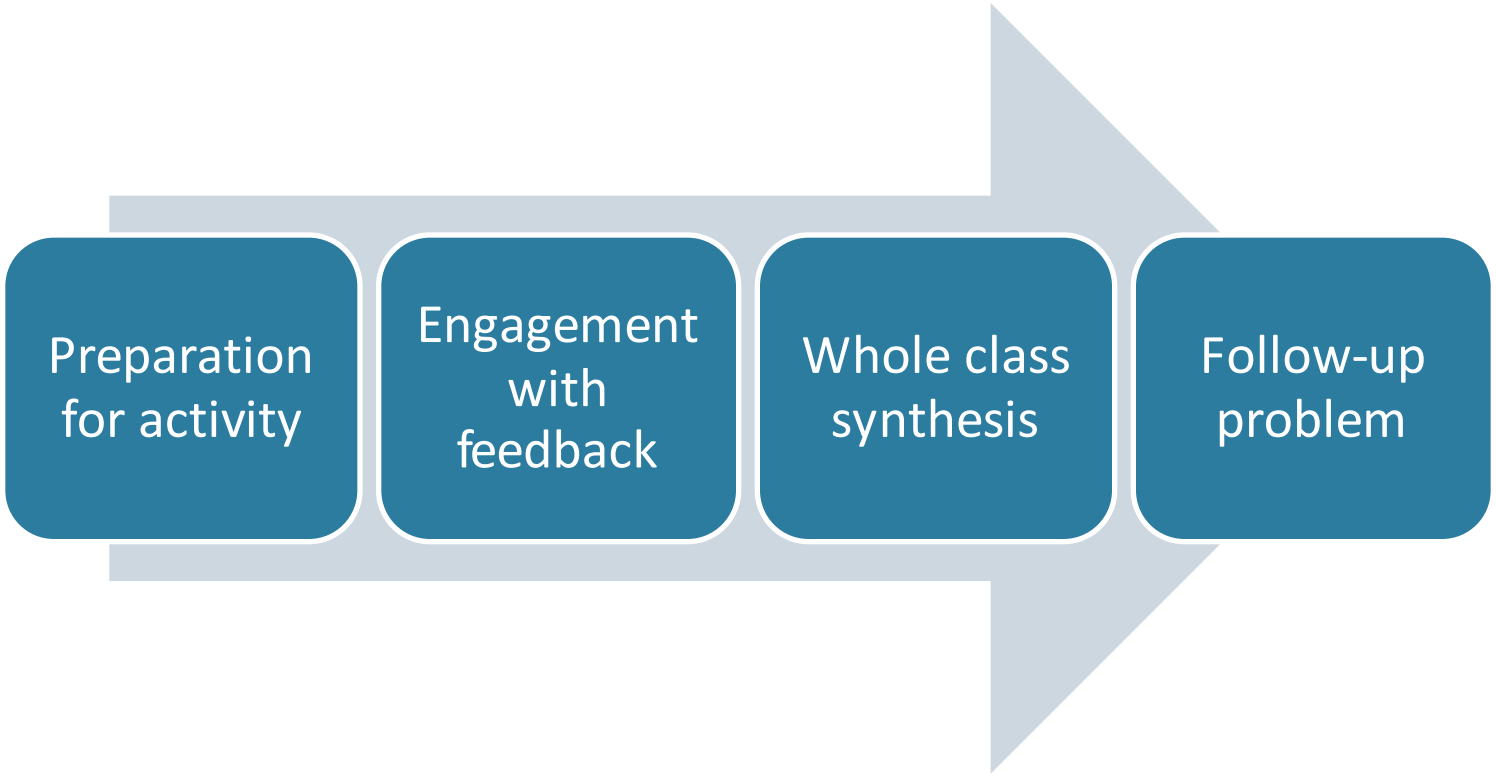
In the late 1990s, our faculty members revisited the learning goals of our curriculum and came to an agreement that in the laboratory portion of a course we wanted our students to learn *1*) more about the topic studied, *2*) the techniques used, and *3*) the process of research. Past and current evidence have suggested that the majority of our students learned little of the above when performing cookbook laboratories (7, 11, 27). Upon review of our assessments as evaluated by Bloom's taxonomy, we also found that our laboratory assignments did not require higher-level or critical thought and thus needed revision (19). The literature suggests that our experience is not unique. When reviewing traditional undergraduate biology courses, Momsen et al. (21) found that of 9,713 assessments as evaluated by Bloom's taxonomy, 93% leveled 1 or 2 (knowledge and comprehension) and <1% were a 4 or above on Bloom.

Our review of the education literature and consultations with experts as well as negative student comments on course evaluations catalyzed a formal curricular reform and research effort. We redesigned introductory biology courses to increase inquiry as well as instituted standardized assessments to collect

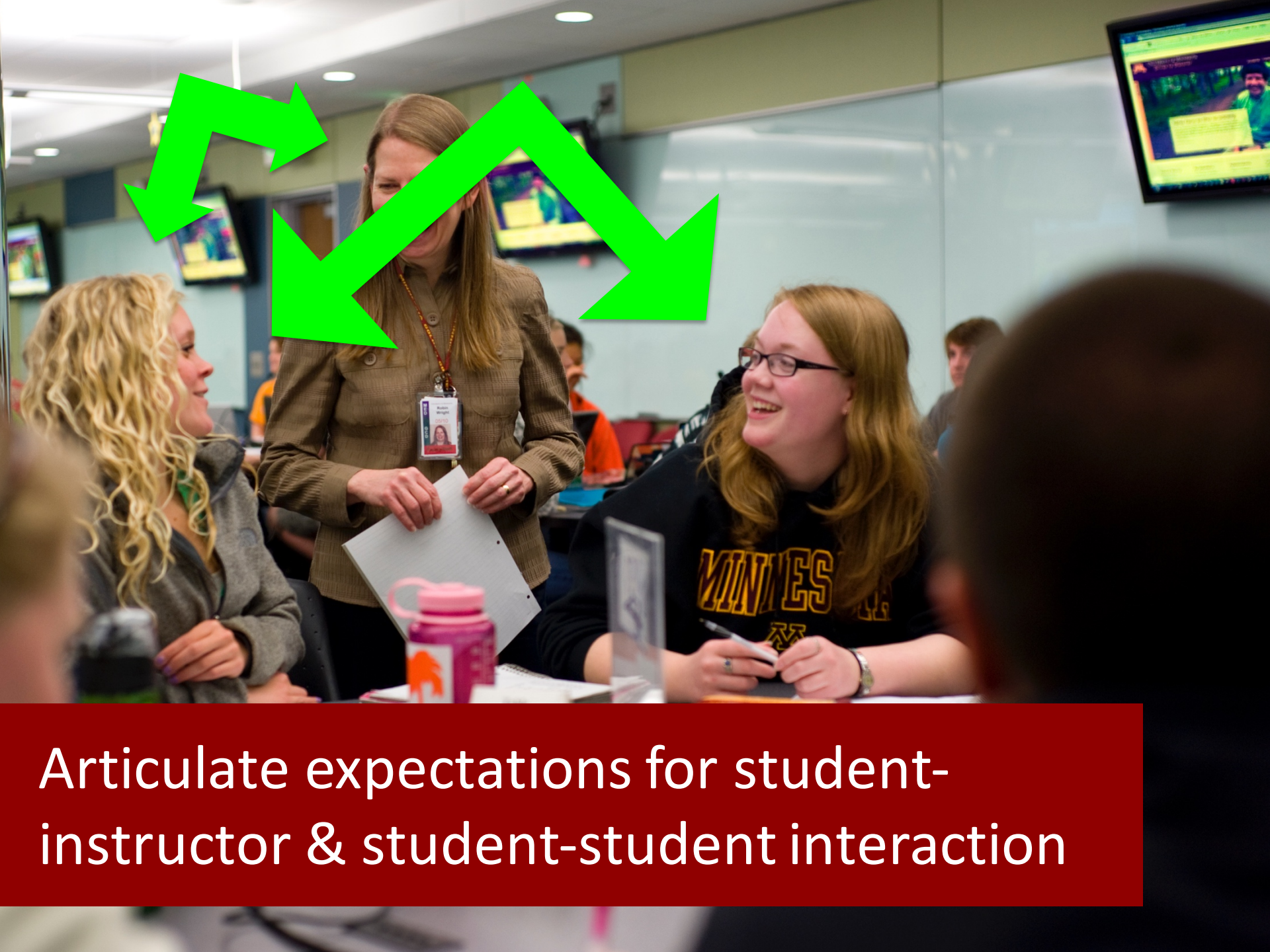
Coverage decreased in 3 different areas, yet test scores actually increase



Design a semester long group project



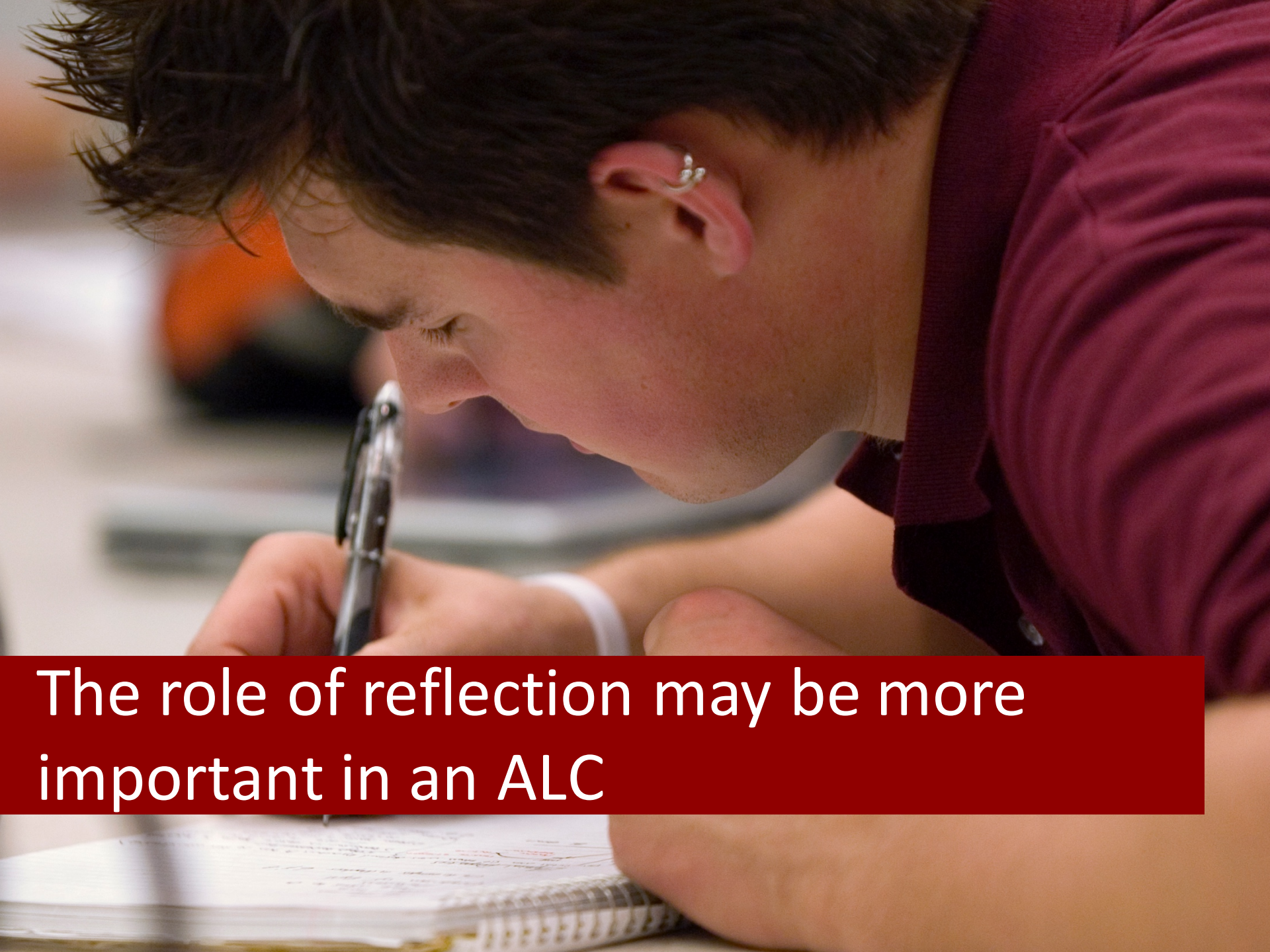
Design a genetic solution to a societal problem and present this in a poster



Articulate expectations for student-instructor & student-student interaction

Communicate your philosophy about teacher and student roles

- On the first day of class
- In your syllabus
- Throughout the term



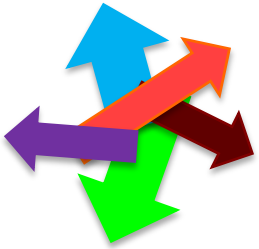
The role of reflection may be more important in an ALC

Inform students that you will solicit their feedback

- What was the muddiest point from class today?
- How does this space impact your learning?
- How is the course going so far? What helps your learning? What hinders your learning?

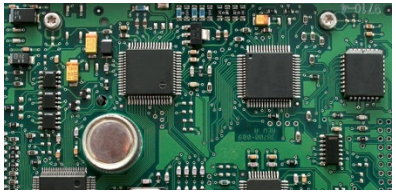
Challenges presented by the physical space

Lack of a central focal point



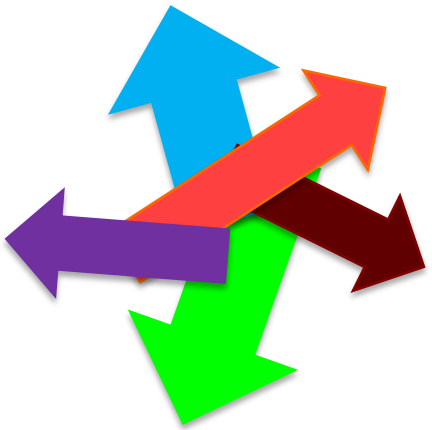
Multiple distractions

Overwhelming technology



Overcoming the lack of a central focal point

1. Direct attention
2. Stand in front of screen while talking if possible
3. Have all screens identical when addressing the whole class
4. Have students use microphones
5. Solicit early semester feedback

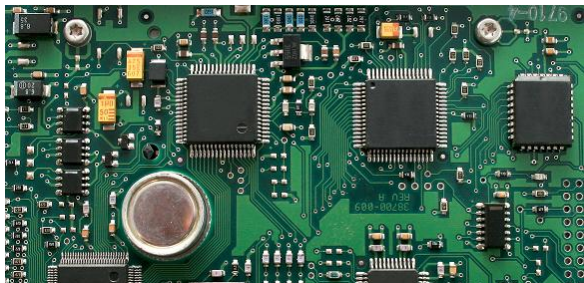


Overcoming multiple distractions

1. First day distraction speech and syllabus policy
2. Have students close or put down devices for emphasis of a point
3. Provide quiet time for reflection
4. Consider moving some discussions online
5. Folders for handouts
6. Solicit early semester feedback

Overcoming overwhelming technology

1. Observe someone using the room
2. Decide what you will and won't use before the class
3. Practice using the tech
4. First day tech speech
5. Turn off student monitors when not needed
6. Solicit early semester feedback



Summary

Before Class Starts	First Day of Class	During Class sessions
• Design activities that meet your learning outcomes and take advantage of the space. • Decide what technology you will and won't use. • Take an incremental approach to changes in teaching.	• Communicate your philosophy about teacher and student roles. • Articulate expectations for student-instructor and student-student interaction. • Inform students that you will solicit their feedback.	• Direct student attention during class. • Set aside time for large group interaction. • Ask for student feedback early in the semester.

What is one thing from today's workshop that you will apply when you teach in an Active Learning Classroom?

Write this on a notecard

Leave it in the folder on your table

Lack of a larger classroom community

Whole class synthesis discussion

Online discussions outside of groups

Activities to switch up group members