

Lessons Learned from the Active Learning Online Course

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Topic: Note-taking

Participants: Mohamed Fadlelmula and Eyad Masad

Comment: I found this incredibly useful and believe students will too. Often, we expect them to have skills that they may not have given and no one explicitly addressed them. Note-taking needs to be explicitly taught and, in many cases, incentivized. [See resources, point 5 on how to incentivize this.](#)

Resources

1. [The Cornell Note-taking System](#) - to share with students [plus some more videos about the method](#)
2. [Skeletal notes](#) and/or handouts with gaps - Dr. Fadlelmula
3. OneNote - we have access to it via TAMUQ IT's subscription to Office 365. Decide if you want students to take notes by hand instead; there's evidence that supports hand-written notes 'stick' better. If you are okay with laptops in the classroom, OneNote is a good tool.
4. [Other note-taking techniques](#) to explore before deciding on what to share with your students
5. Snapshot of Dr. Masad's skeletal notes assignments. Dr. Masad incentivizes this by grading notes. Dr. Fadlelmula plans to incentive note-taking by allowing them to bring their notes to quizzes.

Research

Lessons Learned from the Active Learning Online Course

- “Results suggested that students receiving partial notes performed better on examinations later in the semester and on conceptual questions during the cumulative final examination than students receiving full notes. Students receiving full notes also self-reported more negative effects on attendance.”

Cornelius, T. L., & Owen-DeSchryver, J. (2008). Differential effects of full and partial notes on learning outcomes and attendance. *Teaching of Psychology, 35*(1), 6–12. <https://doi.org/10.1080/00986280701818466>

- “When students take note, they remember as much as **70%** of their notes within **24 hours**, especially if they review their notes.”

Cohen, D., Kim, E., Tan, J., & Winkelmes, M. A. (2013). A note-restructuring intervention increases students' exam scores. *College Teaching, 61*, 95–99. doi:10.1080/87567555.2013.793168

Topic: Using the Active Learning Cycle

Participant: Bilal Mansoor

Three steps of the cycle:

1. assign students an activity that has them explore a new topic or concept;
2. introduce or teach the topic using a microlecture, text, or video; and
3. give students an assignment that requires they apply what they have learned in an authentic setting.

Comment: Common misconceptions regarding the use of AL cycle in any teaching format are:

- (1) why expose students to content that is unfamiliar to them?
- (2) once you have uncovered misconceptions OR lack of prerequisite knowledge, how best to use it to inform instruction?

Hack:

- (1) Pique student interest in new learning by posting a thought-provoking problem/video or any other activity.
- (2) Create teachable moments

Research:

- https://www.ted.com/talks/peter_norvig_the_100_000_student_classroom?language=en
- Uncovering and addressing students' faulty mental models encourages students to question their misconceptions, leading to more motivated learning and deeper reasoning. Identifying your students' faulty prior knowledge also provides you with key teachable moments (Nilson & Goodson, 2018).

Nilson, L. B., & Goodson, L. A. (2018). *Online teaching at its best: Merging instructional design with teaching and learning research*. Jossey-Bass.

Topic: Establish a Rhythm for Participation

Participants: Konstantinos Kakosimos and Eyad Masad

Comment: Providing a module roadmap helps students gain an understanding of course expectations and allows them to plan their work time more effectively. A predictable rhythm, often a weekly pace for modules, helps students manage their time to meet course expectations.

Resources:

- Boettcher, J. V., & Conrad, R.-M. (2016). *The online teaching survival guide: Simple and practical pedagogical tips*(2nded.). Jossey-Bass.
- The Rhythm of Online Teaching (<https://www.insidehighered.com/blogs/technology-and-learning/rhythm-online-teaching>)
- Online Classroom routines (<https://blog.nise.institute/online-classroom-routines-making-online-instruction-work-now>)
- Dr. Kakosimos will work on a two-week basis with a regular rhythm. Dr. Masad will work on weekly basis.

Lessons Learned from the Active Learning Online Course

- Snapshot of Dr. Masad's module roadmap

MEEN 222 Materials Science
Mechanical Engineering Program - Texas A&M at Qatar
Fall 2020
Course Master Plan

Notes:

- Useful resources of recorded lectures:
 - Source 1: Unless a link is provided, video lectures are from the YouTube channel of Dr. Patrick Shamberger, Assistant Professor, Department of Materials Science and Engineering- Texas A&M University?
<https://www.youtube.com/user/pjshamberger>
 - Source 2: YouTube Channel of Tonya Coffey
<https://www.youtube.com/channel/UC8D8ZAJvULIIV3kYowffhw>
 - Source 3: Materials Concepts
<https://www.youtube.com/user/MaterialsConcepts>
- All recorded lectures are from Source 1 unless a link is provided.

Week 1: (Aug 23 – Aug 27)

Issues to Address:

- What is Materials Science and Engineering?
- Why are Materials Important?
- Why is it important for engineers to understand materials?

Class Notes:

- **Chapter 1: Introduction to Materials Science & Engineering**

Recorded Lecture:

- What is Materials Engineering?
<https://www.youtube.com/watch?v=x5OD2KZXd54>

Concept Review and Illustration

- WileyPlus Tutorials: Processing/Structure/Properties/Performance of Materials, Ceramics, Metals. Polymers, Composites.

Assignment:

- Aug 27 - Skeletal Outline for Week 1

Research

A rhythm also reduces stress because the structure answers questions, such as, "What's next?" (Boettcher & Conrad, 2016). It is particularly important to establish a rhythm for posting, reading, and replying to the online discussion forums, which are the online version of classroom discussions. The other online activities can be scheduled around the discussion forums. For example, a discussion forum might open with a problem, question, or challenge on Monday; require an initial posting or a comment by Wednesday; and close with a

deeper, more analytic, and collaborative comment by Friday or Saturday. Readings, content assignments, and collaborative activities can revolve around these class discussions.

Topic: Microlectures

Participant: Dr. Abdala

Comment: Dr. Abdala plans on using microlectures this semester and observed that they hold as a good pre-class activity regardless of class format (online or face-to-face).

Resources

[CTL slides on how and why to create microlectures](#)

Research

Our main findings are that **shorter videos are much more engaging**, that informal talking-head videos are more engaging, that Khan-style tablet drawings are more engaging, that even high-quality pre-recorded classroom lectures might not make for engaging online videos, and that students engage differently with lecture and tutorial videos. -- How video production affects student engagement: an empirical study of MOOC videos

Philip J. Guo, Juho Kim, and Rob Rubin. 2014. How video production affects student engagement: an empirical study of MOOC videos. In *Proceedings of the first ACM conference on Learning @ scale conference (L@S '14)*. Association for Computing Machinery, New York, NY, USA, 41-50.

DOI:<https://doi.org/10.1145/2556325.2566239>

Topic: Effective Teamwork

Participant: Dr. Khraisheh

Comment: Dr. Khraisheh plans on making teams sign a team charter that they will be held to in the event of conflict or unequal work distribution.

Resources

[Group project tools](#)

[Sample team contract](#)

Research

Lessons Learned from the Active Learning Online Course

- ... assigning work to student teams can lead to learning benefits and student satisfaction, provided that the instructor pays attention to how the teams and the assignments are set up.

B. A. Oakley, D. M. Hanna, Z. Kuzmyn and R. M. Felder, "Best Practices Involving Teamwork in the Classroom: Results From a Survey of 6435 Engineering Student Respondents," in *IEEE Transactions on Education*, vol. 50, no. 3, pp. 266-272, Aug. 2007, doi: 10.1109/TE.2007.901982. <https://ieeexplore.ieee.org/document/4287121>

- Compared to students taught traditionally, **students taught in a manner that incorporates small-group learning achieve higher grades, learn at a deeper level, retain information longer, are less likely to drop out of school, acquire greater communication and teamwork skills, and gain a better understanding of the environment in which they will be working as professionals.**

Turning Student Groups into Effective Teams,

[https://www.engr.ncsu.edu/wp-content/uploads/drive/1ofGhdOciFwloA2zofffqkr7jG3SeKRq3/2004-Oakley-paper\(JSCL\).pdf](https://www.engr.ncsu.edu/wp-content/uploads/drive/1ofGhdOciFwloA2zofffqkr7jG3SeKRq3/2004-Oakley-paper(JSCL).pdf)