Spotlighting Innovative Use Cases of Mobile Learning

Samantha Eastman, UC Riverside
Alex Rockey, UC Davis

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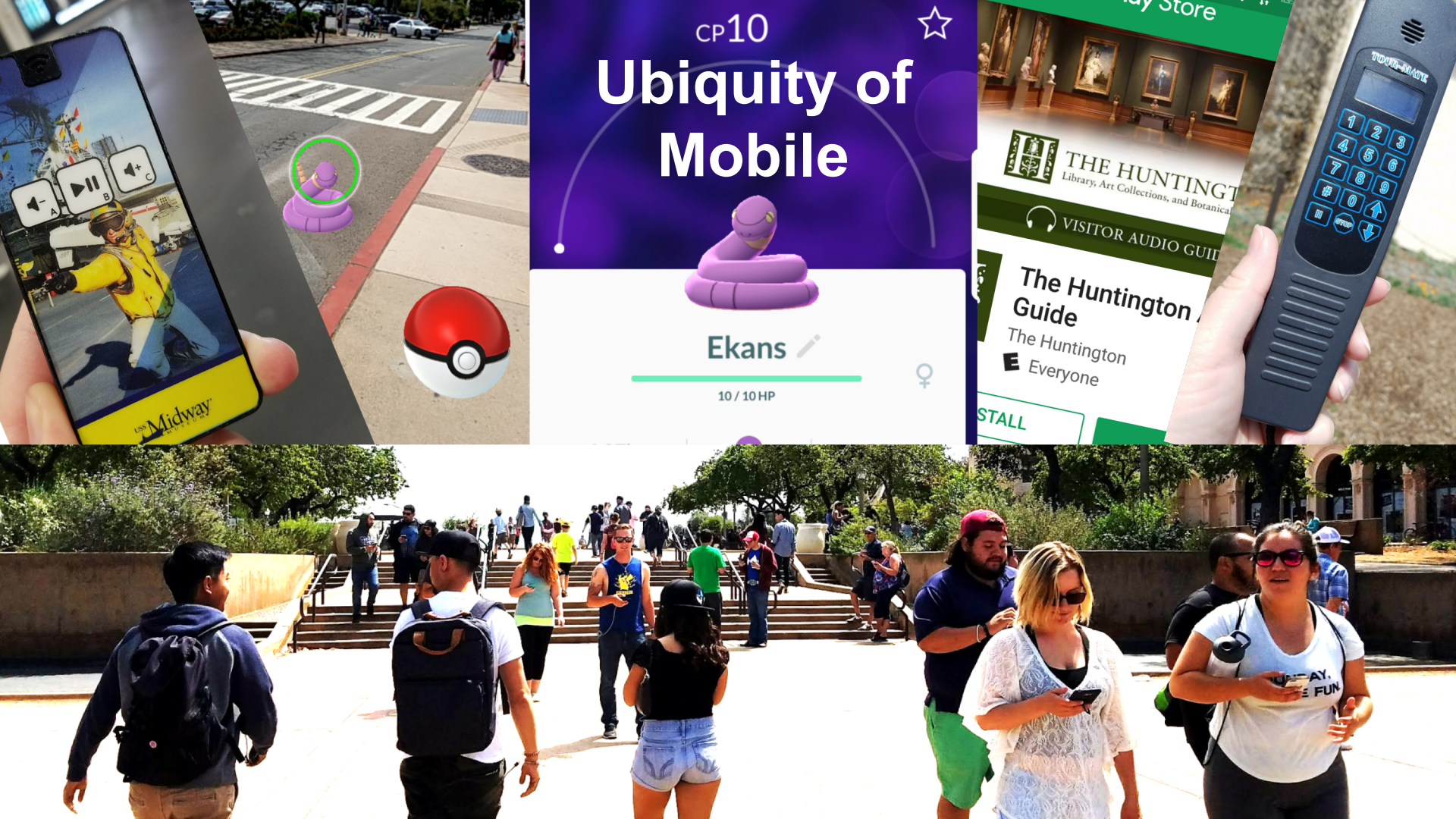
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Ubiquity of Mobile
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THE HUNTINGT
Library, Art Collections, and Botanical
VISITOR AUDIO GUI
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Guide
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Everyone
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“American adults collectively check their phones 12 billion times per day, according to a 2017 Deloitte survey” - Real Simple magazine, June 2018

“According to a 2017 survey by eMarketer, the average adult spends 12 hours a day connected to media.”

- Southwest the Magazine, May 2018

Background of Our Project

More

(Pew Research Center, 2018)

More

?

Our question: How are faculty utilizing mobile technologies to support student learning across UC campuses in innovative ways?

Background of Our Project

Instructional **D**esign

Faculty **S**upport Group

Mobile Learning SIG

We have questions!

1. What is mobile learning? 2. What is being done on each campus?

Research Design

Pedagogy

Use cases from
UC courses

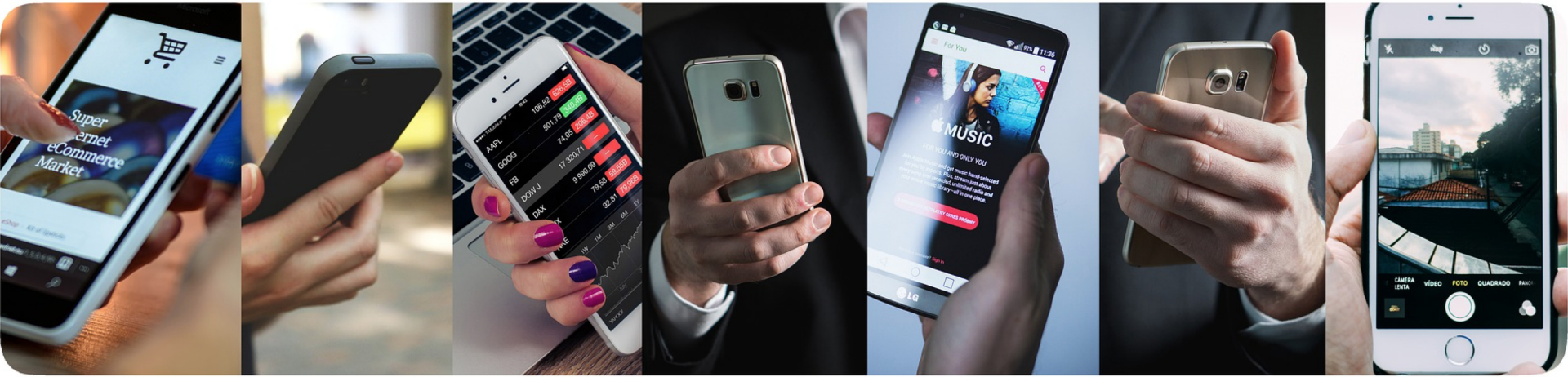
(IRB)

Tech Infrastructure

WiFi in classrooms
Device ownership
Mobile access to LMS

Pre-Session Poll

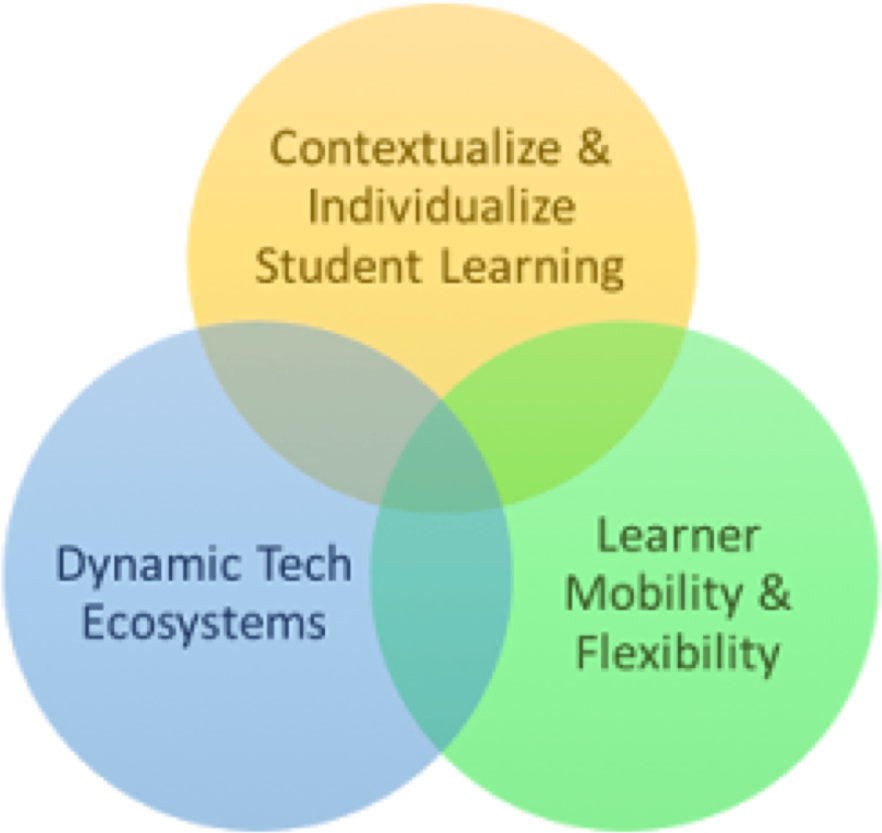
https://tinyurl.com/mobilelearningELD



Crowdsourcing a Definition of Mobile Learning

- With a group, create a definition of mobile learning drawing from some of the keywords generated with the Pre-Session Poll.

Defining Mobile Learning



Defining Mobile Learning

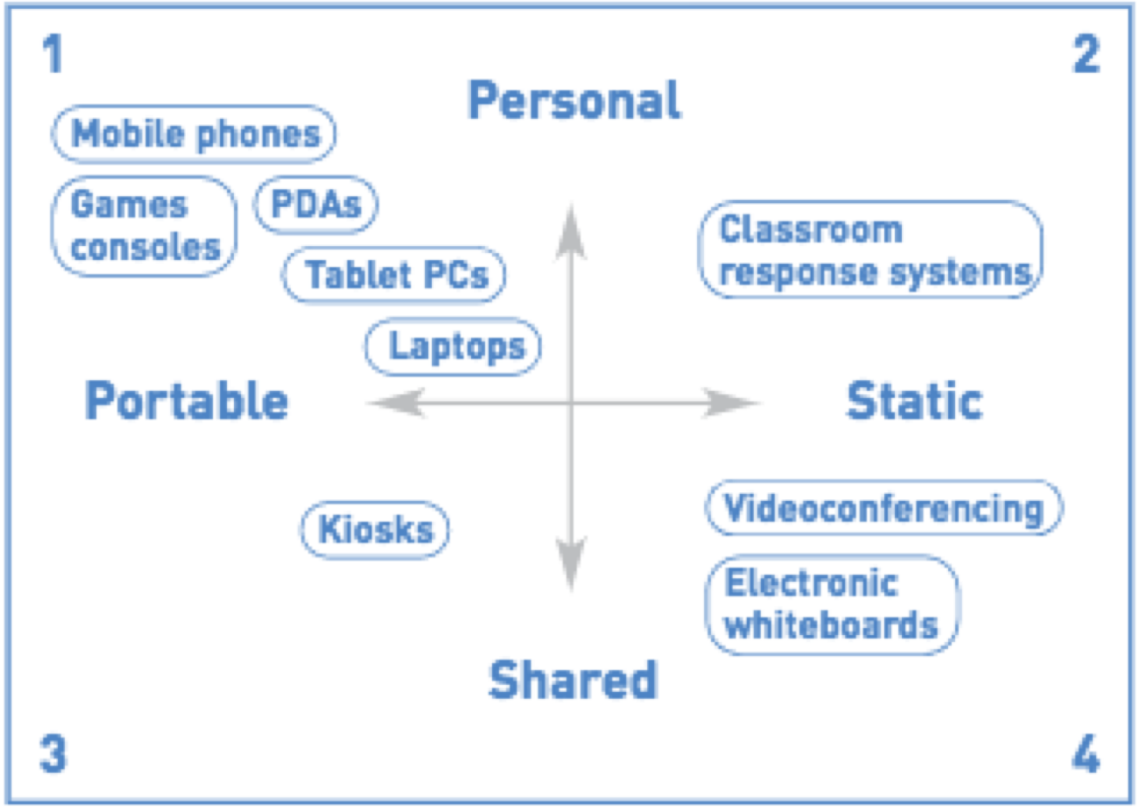
- Educause definition:

“Using **portable computing devices** (such as iPads, laptops, tablet PCs, PDAs, and smart phones) with **wireless networks** enables **mobility** and mobile learning, allowing teaching and learning to extend to spaces **beyond** the traditional classroom. Within the classroom, mobile learning gives instructors and learners **increased flexibility** and new opportunities for **interaction**” (Educause).

- Our definition for participants:

Anything that's done on a device that is or could be mobile that has to do with instruction that's happening inside or outside the classroom.

The Continuum



"Classification of mobile technologies" (From Naismith et al., 2004)

Using Activities to Characterize Mobile Learning in Higher Ed

Theme	Key Theorists	Sample Activities
Behaviorist learning	Skinner, Pavlov	● Drill and feedback ● Classroom response systems
Constructivist learning	Piaget, Bruner, Papert	● Participatory simulations
Situated learning	Lave, Brown	● Problem and case-based learning ● Context awareness
Collaborative learning	Vygotsky	● Mobile computer-support collaborative learning (MCSCL)
Informal and lifelong learning	Eraut	● Supporting intentional and accidental learning episodes
Learning and teaching support	n/a	● Personal organization ● Support for administrative duties (e.g., attendance)

Characterizing Mobile Learning in Higher Education (Adapted from Naismith et al., 2004)

Use Cases:

- iPads for Field Mapping (Geology)
- Understanding Research Methods (Psychology)
- Cross-Cultural Interactions (Spanish and Applied Linguistics)
- Supporting Peer-to-Peer Learning (Microeconomics)
- Chromebooks in Lab (Biology)
- Community Partners Projects (Business/Advertising)
- Snapchat to Identify Species (Biology)
- Pokemon Go for Applying Sampling Methods (Ecology, Evolution and Marine Biology)
- Discussion

Nicolas Barth, UC Riverside

iPads for Field Mapping: Summer Field Geology (Geology 102A/B), 7-30 students

Intended Learning Outcomes:

Students conduct research in the field to:

- identify where things are on the map
- navigate
- recognize landforms
- build maps based on what they see, and
- mark up a map in a way that communicates those things to other people

Students:
Research, observe, co-create, interpret, apply

Instructional Approach: Field mapping using tablets

Teaching and Learning Theory: active learning, situated, constructivist

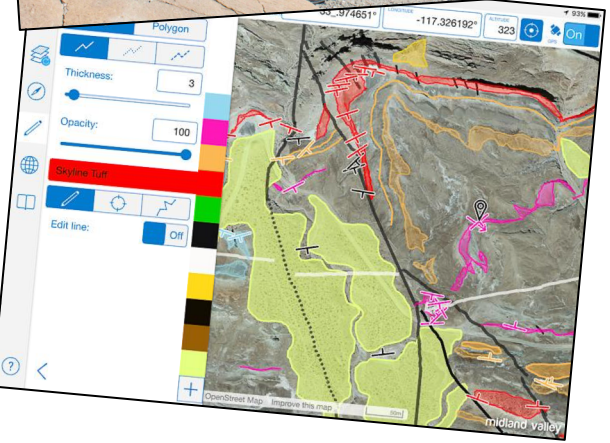
Golden Thread: "teaching field skills to...the next generation of geologists" in real-world contexts that allow students to assimilate, synthesize, associate, and apply knowledge and skills obtained through prerequisite coursework to a new project or problem

Back

Nicolas Barth, UC Riverside

iPads for Field Mapping: Summer Field Geology (Geology 102A/B), 7-30 students

Course Description:



- An immersive, intensive field training in the collection, interpretation, and communication of geologic data
- Covers advanced geological mapping, sections, and production of professional geological reports
- Runs for five weeks straight based at UC reserves in eastern California.
- Project-based; students grapple with real-world scenarios, i.e., evaluate how stable this road is or is this a good place to build the building?

Back

Nicolas Barth, UC Riverside

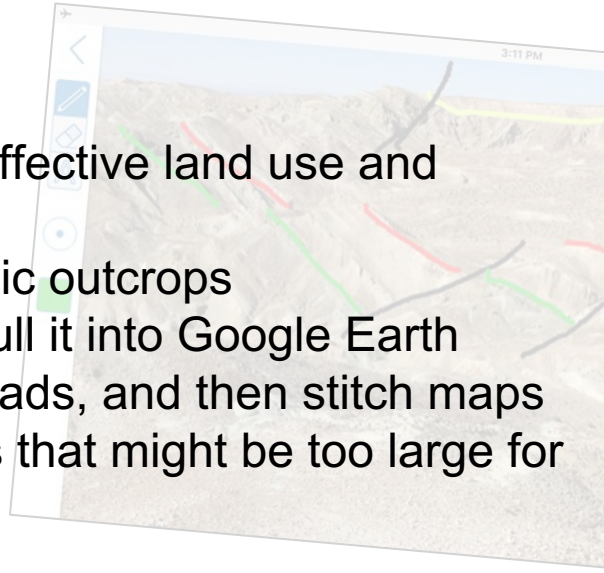
iPads for Field Mapping: Summer Field Geology (Geology 102A/B), 7-30 students

Assignment Progression:

1. One, eight-day project using paper mapping
2. One, one-day excursion to learn how the tablets work and how to use them.
3. One, two-three day mapping assignment using tablets

Students:

- write reports
- interpret different geology
- make decisions concerning effective land use and natural hazards.
- annotate on photos of geologic outcrops
- collect data in the field and pull it into Google Earth
- work in groups to map out quads, and then stitch maps together for working on areas that might be too large for one group to map at once



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Nicolas Barth, UC Riverside

iPads for Field Mapping: Summer Field Geology (Geology 102A/B), 7-30 students

Successes:

- Creates efficiencies in data collection processes
- Provides opportunities for students to develop highly sought-after, digital skills
- Simplifies concepts relating to spatial orientation through dynamic, graphical representation
- Provides opportunities for group work/student-student collaboration and communication
- Reduces the technology skills gap among students; Intuitive
- Simplifies cheating prevention
- Improves students' abilities to master geologic interpretation

Back

Nicolas Barth, UC Riverside

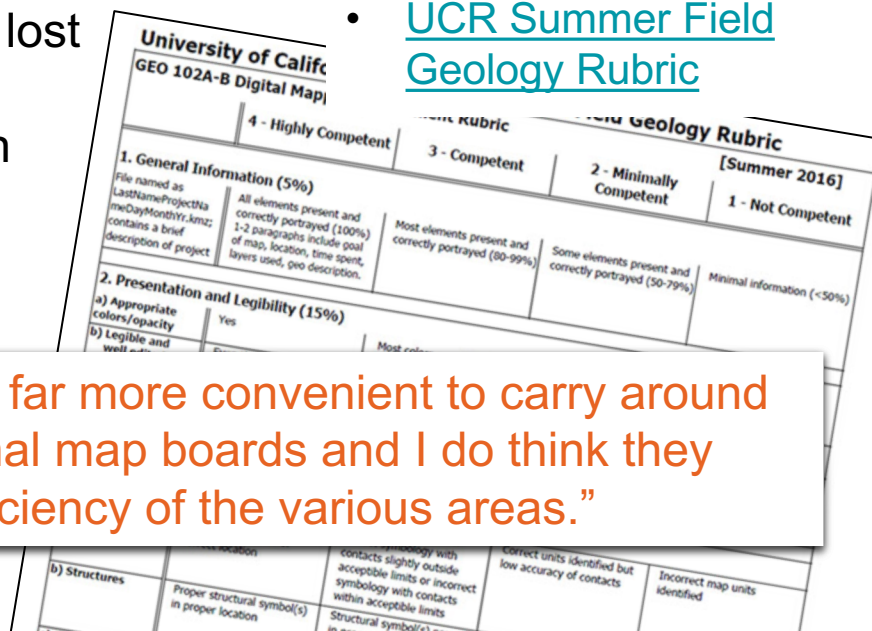
iPads for Field Mapping: Summer Field Geology (Geology 102A/B), 7-30 students

Challenges:

- Finding a system
- Apple's approach to operating system updates; when third-party app developers can't keep up with new updates, it can "brick it", or there may be bugs
- Occasional software crashes, but data is not lost
- Sometimes the iPads overheat
- Maintaining group morale so students remain productive
- Obsolescence of devices; Sustainability

Resources:

- Mobile Learning Use Case eHandout
- UCR GeoPad Digital Field Mapping System
- UCR Summer Field Geology Rubric



"I enjoyed the iPads tremendously. They were far more convenient to carry around and take measurements with than the traditional map boards and I do think they enhanced the understanding and mapping efficiency of the various areas."

Victoria Cross, UC Davis	Use Case for Understanding Research Methods	Research Methods in Psychology, 200 students

Image source: http://psychology.ucdavis.edu/people/szsymons

Learning Outcomes: Students will apply research methods and critical thinking skills to answer the Monty Hall Problem

Instructional Approach and Integrated Technology:
Quickly generate and instantly visualize data using Google Forms and iClickers

Teaching and Learning Theory: Constructivist and Collaborative (Naismith et al. 2004)

Golden Thread:

- "Bringing the hard work into the classroom"
- "Feel the research"

Successes:

- Increased accountability and engagement
- Increased student participation
- Generates data that approaches established ⅓ and ⅔ outcomes

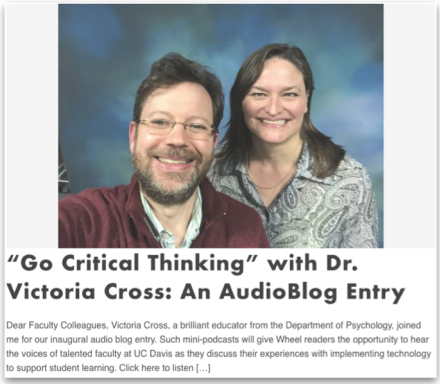
Challenges:

- Dependence on WiFi
- Limited numeric entry on iClickers
- Difficulty of writing "good" iClicker questions
- Changing technologies
- Digital literacies and students' ability to navigate tools

Resources

AudioBlog Entry on *The Wheel*

Lecture capture from 4/5/18



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Robert Blake, UC Davis	Use Case for Cross-Cultural Interactions	Spanish and Applied Linguistics, ≅55 Students

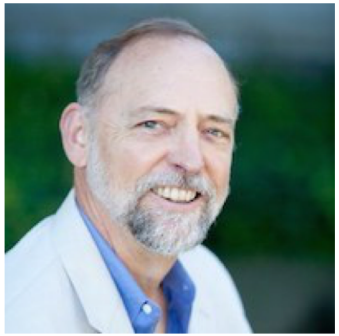


Image source: http://linguistics.ucdavis.edu/people/fzblake

Learning Outcomes: Students will participate in class discussions to develop cross-cultural understanding

Instructional Approach and Integrated Technology:
Encourage *all* students (both bilingual native speakers and second language learners) to participate more frequently and more meaningfully using technologies like Nearpod, Socrative, and Google Forms

Teaching and Learning Theory: Constructivist and Collaborative (Naismith et al., 2004)

Golden Thread:

- "Interaction is where it's at"
- "Conversations that are mediated by technology seem to be freer"

Successes:

- Generates a wide variety of language use (bilingual and second language learners)
- Allows for anonymous participation

Challenges:

- Digital literacies and students' ability to navigate tools
- Liability of certain out-of-class activities
- Changing technologies

Resources:

Discussing Canvas in CIO Report

AudioBlog Entry for The Wheel


'Having one place that integrates all this is really liberating'

Back

Jim Burnette, UC Riverside

Chromebooks in Lab: Dynamic Genome (BIOL 20), 24 students/section (8 sections)

Intended Learning Outcomes:
Students explore scientific discovery using the tools of bioinformatics and genomics, while applying computational and experimental approaches to investigating the genomes of plants and animals for authentic research projects being conducted on campus.

Teaching and Learning Theory: active learning, situated, constructivist

Students: explore, investigate, interpret, apply, document

Instructional Approach: Students use basic bioinformatics tools for DNA sequencing, analysis, and visualization, while also developing their bench skills and maintaining a laboratory notebook.

Golden Thread: Students apply the scientific method, experience how a scientist works, learn what science is, and how to “do” science in order to understand how all the information in textbooks is generated- by using an experimental approach.

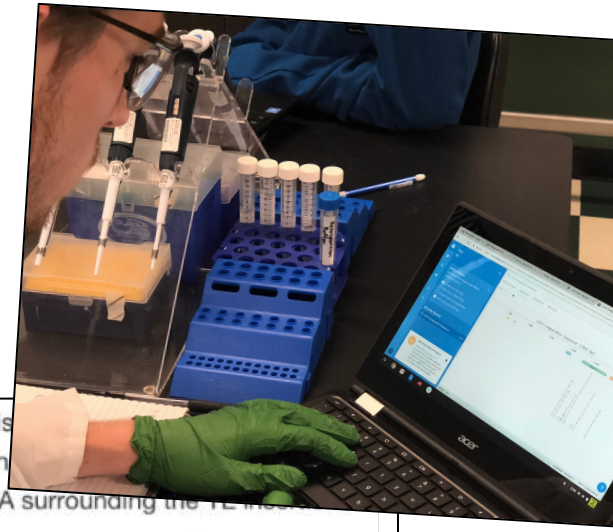
Back

Jim Burnette, UC Riverside

Chromebooks in Lab: Dynamic Genome (BIOL 20), 24 students/section (8 sections)

Course Description:

- Hands-on, laboratory environment
- Can accompany any of the 4-unit, introductory Biology lecture courses:
  - BIOL 005A “Introduction to Cell and Molecular Biology”
  - BIOL 005B “Introduction to Organismal Biology”
  - BIOL 005C “Introductory Evolution and Ecology”



Purpose: To successfully identify TE insertion polymorphis
between three different strains of maize and comparing th
execute a PCR experiment to isolate and analyze the DNA surrounding
in the maize DNA.

Materials:

- large 1.5 ml tubes
- small 0.2 ml tubes

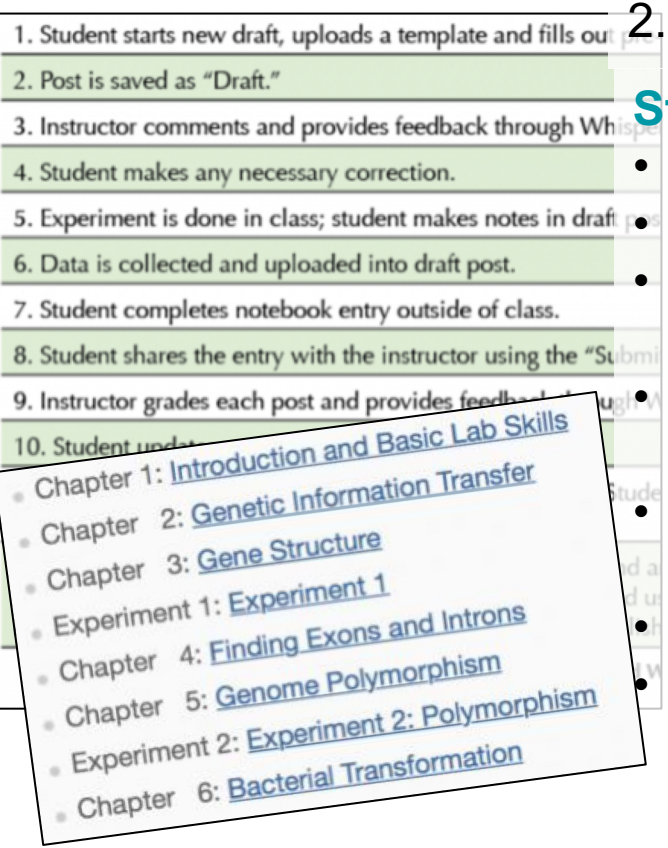
Back

Jim Burnette, UC Riverside

Chromebooks in Lab: Dynamic Genome (BIOL 20), 24 students/section (8 sections)

Assignment Progression:

1. 4 weeks learning background and skills
2. 4-5 weeks working on an authentic, UCR project



Students:

- discover DNA bioinformatics using Muscle and Blast tools
- sequence genetic information using Genome Browsers
- isolate new variations of genes, i.e., generated by a CRISPR cassadine mutagenesis
- amplify genes with desirable traits, i.e., resistance to drought, or to white fly attacks
- use cell phone cameras to record microscope images of gels on which to annotate
- document findings in electronic notebooks
- develop hypotheses and design experiments

Back

Jim Burnette, UC Riverside

Chromebooks in Lab: Dynamic Genome (BIOL 20), 24 students/section (8 sections)

Successes:

- Scientific inquiry among students participating in experimentation on real-world projects allows for authentic exposure to help advance and to accelerate research
- Research findings can be used to i.e., “modify agriculturally important varieties (of alfalfa)”
- Students use Chromebooks fairly easily because of both touchscreen and keyboard options, plus the devices take up less space than traditional laptops
- “Ease of use” removes technology barriers, allowing students to focus on learning biology
- e-Notebooks allow students to capture data electronically, which saves money in printing costs and streamlines documentation for assignments, while shortening turn-around for which instructors provide feedback, and modeling industry-standard, electronic record keeping processes that ensure replicability
- Students who previously have little access to technology gain exposure and develop technology fluency
- Assignments are primarily web-based, and easily integrated with the Google Apps for Education suite

- Over 90% of students from Biology 20 students will make an A or a B and 5A, while 43% of students who take 5LA will make an A or a B

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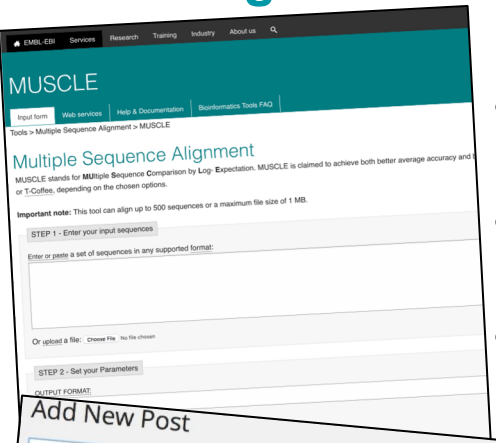
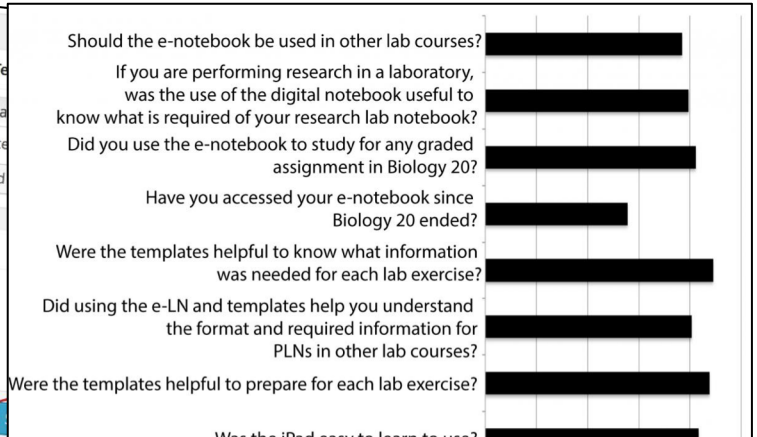
Jim Burnette, UC Riverside

Chromebooks in Lab: Dynamic Genome (BIOL 20), 24 students/section (8 sections)

Challenges:





- Development of bench skills while using devices poses a challenge due to limited physical space
- Students often enroll with very little exposure to use of mobile devices
- Sustainability with lab sets that have a shelf-life; there's a lack of funding sources for maintaining and replacing devices
- Students will need to be able to create and interpret graphs; need to identify a graphing solution

Resources:

[An Open Source, Collaborative Electronic Notebook for Undergraduate Laboratory Classes]

Back

Sherryl Berg-Ridenour, UCR

Community Partners Projects: Advertising (Business 117), 80 students

Intended Learning Outcomes:
Students demonstrate how advertising is part of an integrated marketing communications (IMC) plan by applying the theories and principles of advertising.

Teaching and Learning Theory: active learning, constructivist, behaviorist, situated, collaborative

Students: research, observe, collaborate, interpret, apply, examine, manage, communicate

Instructional Approach: In groups of 6 or 8, students run a six-week social media marketing campaign on behalf of community partner business and service organizations, adjusting based on analytics relating to followership to extend the partner's reach and impact in promotion of services or programs

Golden Thread: To understand how an advertising campaign is run, to see how mobile devices can actually add to the communication strategy, to see how they can use all of the latest technology to increase productivity, and to see how they can use the mobile devices to stay in touch with the group to accomplish a task.

Back

Sherryl Berg-Ridenour, UCR

Community Partners Projects: Advertising (Business 117), 80 students

Course Description:

- Emphasizes an application of the principles of advertising to the marketing of services and ideas.
- Focuses on advertising as part of an integrated marketing communications (IMC) plan.
- Provides an understanding of the broader role of advertising for organizations and marketing communications elements and has a community active partner integrated in the class.

Sherryl Berg-Ridenour, UCR

Community Partners Projects: Advertising (Business 117), 80 students

Assignment Progression:

1. Community partner-client are assigned to groups, with whom students meet regularly
2. Students take on individual roles within groups

OCT 26th YouTube Introductory Video posts
NOV 2nd. Straight sell & Emotional appeal ads posts to media (2)
NOV 9th Emotion/Humor appeal for Thanksgiving
Extra Credit (Nov 21st) Blog/Vlog Challenge "Slice of Life"
NOV 23rd Demonstration/Testimonial
NOV 30th Story Telling or Dramatization Video

Students:

- create ads based on six theories of advertising
- post ads to social media platforms
- watch analytics to see which ads do better and why
- refine tone, wording, and graphics of ads to increase followership
- define personas based on patterns of who's tuning in and when
- adjust ads based on behaviors, attitudes, opinions, and interests of audience
- document the findings in a final paper and to a client

Back

Sherryl Berg-Ridenour, UCR

Community Partners Projects: Advertising (Business 117), 80 students

Successes:

- Impacts the local community in a very positive, meaningful way
- Simplifies monitoring analytics on ads; Access; Immediacy
- Simplifies communication with/among the team and with the client
- Facilitates course management for the instructor
- Helps students with documentation, communication, project management, progress tracking, and collaboration using calendaring, and with the ability to exchange materials or ideas
- Zoom web-conferencing allows students to schedule distributed meetings with one another and with clients, bringing community into the classroom
- Kahoot! web-based polling platform allows for assessments to ensure that students understand the theories and principles of advertising
- Tools/platforms are easy to use; students want to use them, and students scale up very quickly
- Clients often offer internships or letters of recommendation after the course has ended, and clients return

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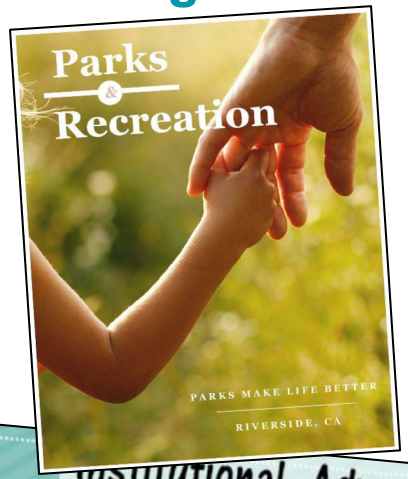
Sherryl Berg-Ridenour, UCR

Community Partners Projects: Advertising (Business 117), 80

Challenges:



- Calendaring compatibility across both Apple and Android OSs
- Monitoring all groups' activities so they keep pace with assignments
- Some tools/platforms are better for certain purposes than others

Resources:

- Mobile Learning Use Case eHandout
- Community Partners Profile Sheet
- Article
- Community Partners Meeting Presentation

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Kristin Kiesel, UC Davis	Use Case for Supporting Peer-to-Peer Learning	Intermediate Microeconomics, 140 students
 Ima /kristin-kiesel/	**Intended Learning Outcomes:** Students will: "1. Understand economic theories related to imperfect competition applied in many important contemporary fields of economics (e.g. game theory, industrial organization, environmental economics, behavioral economics, and game theory). 2. Be able to apply these theories verbally, graphically, and mathematically in order to analyze complex real world issues."	
	Instructional Approach and Integrated Technology: Foster active student engagement, independent learning from their own questions, and team-based learning using an integrated approach including iClickers, a quarter-long team project, and videos in which students are the presenters. **Teaching & Learning Theory:** Collaborative learning (Naismith et al., 2004)	
	Golden Thread: Foster active student engagement inside and outside of the classroom "A lot of the technology I'm using is…to allow me to use my class time more effectively and support their learning that…happens outside of the classroom."	

Successes:

- Using student evaluations to guide incremental additions to the course design

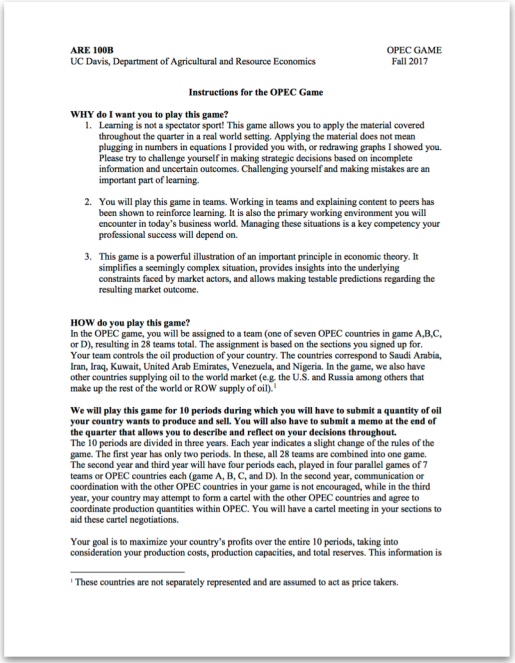
Challenges:

- Ensuring students have done their reading when flipping the classroom
- Maintaining active learning in a 140-person classroom
- Gaining access to the active learning classroom

Back

Supporting Peer-to-Peer Learning (Microeconomics)

Team-Based Project



ARE 100B OPEC GAME
UC Davis, Department of Agricultural and Resource Economics Fall 2017

Instructions for the OPEC Game

WHY do I want you to play this game?

1. Learning is not a spectator sport! This game allows you to apply the material covered throughout the quarter in a real world setting. Applying the material does not mean plugging in numbers in equations I provided you with, or redrawing graphs I showed you. Please try to challenge yourself in making strategic decisions based on incomplete information and uncertain outcomes. Challenging yourself and making mistakes are an important part of learning.

2. You will play this game in teams. Working in teams and explaining content to peers has been shown to reinforce learning. It is also the primary working environment you will encounter in today's business world. Managing these situations is a key competency your professional success will depend on.

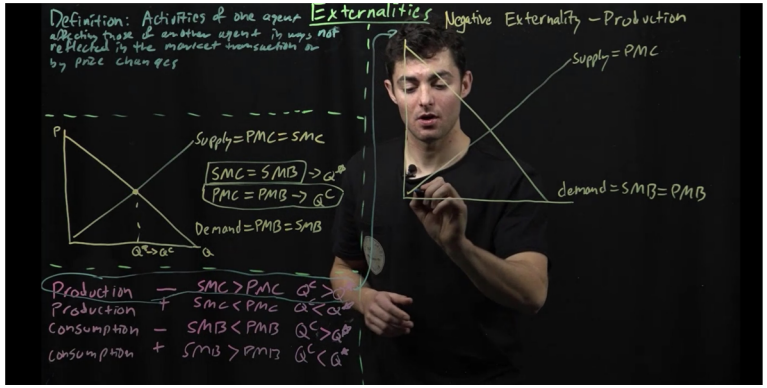
3. This game is a powerful illustration of an important principle in economic theory. It simplifies a seemingly complex situation, provides insights into the underlying constraints faced by market actors, and allows making testable predictions regarding the resulting market outcome.

HOW do you play this game?
In the OPEC game, you will be assigned to a team (one of seven OPEC countries in game A,B,C, or D), resulting in 28 teams total. The assignment is based on the sections you signed up for. Your team controls the oil production of your country. The countries correspond to Saudi Arabia, Iran, Iraq, Kuwait, United Arab Emirates, Venezuela, and Nigeria. In the game, we also have other countries supplying oil to the world market (e.g. the U.S. and Russia among others that make up the rest of the world or ROW supply of oil).[1]

We will play this game for 10 periods during which you will have to submit a quantity of oil your country wants to produce and sell. You will also have to submit a memo at the end of the quarter that allows you to describe and reflect on your decisions throughout.
The 10 periods are divided in three years. Each year indicates a slight change of the rules of the game. The first year has only two periods. In these, all 28 teams are combined into one game. The second year and third year will have four periods each, played in four parallel games of 7 teams or OPEC countries each (game A, B, C, and D). In the second year, communication or coordination with the other OPEC countries in your game is not encouraged, while in the third year, your country may attempt to form a cartel with the other OPEC countries and agree to coordinate production quantities within OPEC. You will have a cartel meeting in your sections to aid these cartel negotiations.

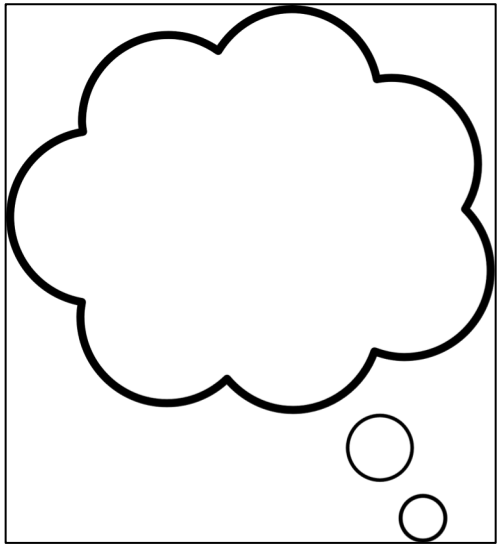
Your goal is to maximize your country's profits over the entire 10 periods, taking into consideration your production costs, production capacities, and total reserves. This information is

[1] These countries are not separately represented and are assumed to act as price takers.



Peer Produced Videos

iClickers



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Kelly Thomasson (Teaching Assistant), UC Santa Barbara

SnapChat to Identify Specifies (Biology)

Vertebrate Biology Lab, 40-50 students

Intended Learning Outcomes: Memorize 150+ birds, amphibians, mammals and bones in 9 weeks. Help students who have test anxiety get used to the timed testing environment for the class final.

Instructional Approach: Create a flash-card, pop-quiz way for students to memorize the specimens. Bombard students with pictures of the specimens even when they weren't in class, but not have a stream or thread of information that they could go back to. She posted 2-5 pictures/day.

Teaching & Learning Theory: Collaborative, Informal and Lifelong

Golden Thread: The only negative comment I got was, "I wish there was more." There is also this secret objective: that they love learning. It really should be like, "Wow, this is cool!"

Successes:

Some students added their snaps of birds to the chat.

Students were talking about birds outside of class.

The students were more social and friendly during lab than other labs she's TA'd, and all came to lab even though it wasn't required and went from 9-11pm.

A few students from other classes joined the SnapChat group and lab.

Challenges:

Had to ask a student how to use SnapChat photo editing tools.

Resources:

Presentation at UCSB Grad Student Teaching Symposium 2018:
https://gauchocast.ucsb.edu/Panopto/Pages/Viewer.aspx?id=1ed8fe83-9f8c-43a2-8ee3-a8f001230dce

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Randall Long (Teaching Assistant), UC Santa Barbara

Pokémon Go, Google Forms, Google Spreadsheets

Conservation Ecology, 100 students

Intended Learning Outcomes: Students use ecological sampling techniques and compare different types of sampling methods and distribution of Pokémon in different geographical areas using Pokémon Go. Students report their Pokémon collection to create a large data set (Google Form). Student groups use the large data set to develop a research question based on hypotheses they generate based on primary literature that can be answered using the data. Students then analyze the data in R Studio, and write a short scientific paper about their findings and how their sampling techniques and the different geographic locations may have affected those findings.

Instructional Approach: Students had to choose a geographical location, determine its boundaries, and collect Pokémon in that area for 120 minutes total. They had to note time, date, weather, location, and other environmental features of their sampling area on a Google form, which collected everyone's data in a Google spreadsheet. The class then used the data from the spreadsheet to develop research questions, investigate that question, and write a short research paper on it.

Teaching & Learning Theory: Collaboration, Flexibility, Project Based Learning

Successes:
Preliminary review of student work and survey shows that students achieved the learning outcomes much better than previous years.

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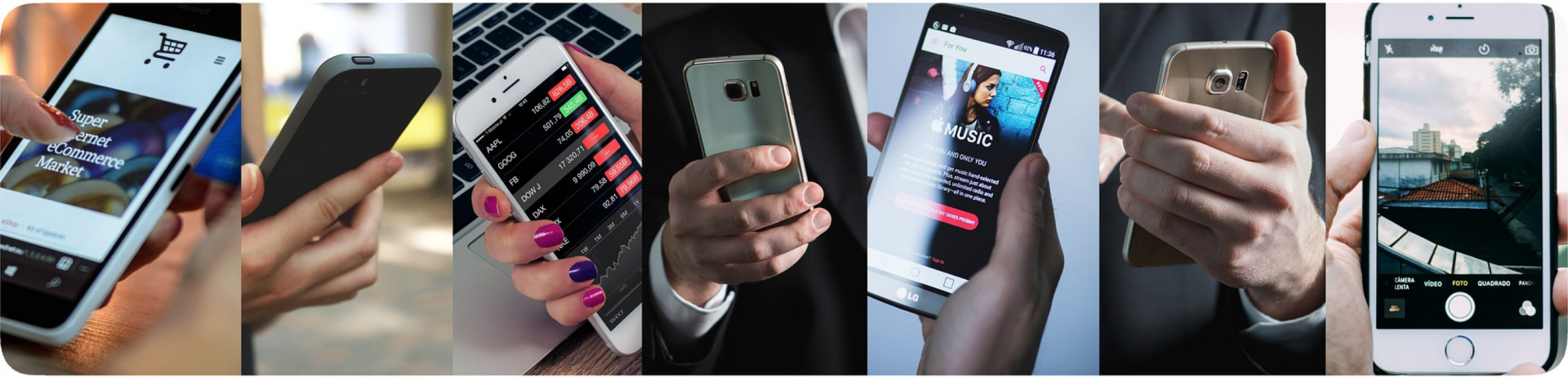
Discussion: Emerging Themes

- Successes
  - Increase **participation** and **engagement**
  - Instantly generate and **visualize** large data sets
  - Creates **efficiencies** and saves resources
  - Create “appropriate” and **“relevant” uses** of technologies during class time
- Challenges
  - **Changing** technologies
  - **Digital literacies** and students’ ability to navigate tools
  - **Cost; Management**
  - **Infrastructure**
    - Access to active learning classrooms
    - Access to WiFi

Discussion

In what ways can we support or implement innovative and effective uses of mobile technologies?



Questions?

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