Engaging Large Classes with Blackboard and Other Strategies

CECIL JOSEPH
ASSISTANT TEACHING PROFESSOR
DEPARTMENT OF PHYSICS
Introduction

Blackboard (BB) is a Learning Management System (LMS) that allows for the implementation of various pedagogical approaches.
Introduction
General Physics I & II at UMass Lowell

1. Course enrollment – Approximately 260+ in Fall, Approximately 220+ in Spring

2. Course Structure –
   ◦ Large Lecture (all students)
   ◦ Recitations (<20 students)- Faculty Delivered
   ◦ Laboratory Co-requisite Course- TA Delivered- Coordinated by Dr. Narayan (Lab Coordinator)

3. ‘Teaching team’ – multiple faculty teach recitations

4. Extensive use of Blackboard prior to Spring 2020
Methods: 3 Adaptations

1. Fall 2017: Using Blackboard to implement inherited design
2. Spring 2020: ‘Rapid’ transition to ‘Online’ Format
Fall 2017: Initial Transition to Blackboard

Fall 2017 – inherited a course with great ‘design’ components

- Conceptual shift implemented in teaching and assessment
- Use of Personal Response System
- Use of written and online HW platforms
- Matched assessment metrics (exams) to HW and Lecture Content- including shift to conceptual questions
- Asynchronous Discussion Boards (Piazza)

Blackboard used to ‘centralize’ all these elements
Spring 2020: ‘Rapid-Transition’ to completely Online

Spring 2020- We all ‘know’ why!

- Lecture Mode- switched to Zoom with TA Assistance
- Continued ‘Clicker’ use for participation
- Recitations – Switched to BB Collaborate
- Written HW – Switched to BB Assignments
- Discussion Boards in Blackboard for asynchronous chats and to set up ‘office-hours’
- Changes to assessment – only had 1 in-class exam; added low stakes multiple assessments (with practice); Final Exam – written submission required (Blackboard and GradeScope)

Blackboard used to ‘centralize’ all these elements & communicate with students
Summer I 2020– ‘Implementation – Testing’

1. Class size approximately 40

2. Class meets 5 days a week, 2 hours each day during Summer I

3. Selected Methods:
   ◦ Zoom Lectures with Polling
   ◦ Zoom Breakout Rooms
   ◦ Learning Assistants
   ◦ Selected ‘Studios’ for certain topics
   ◦ Gradescope for all written assessments (HW, Class Assignments, Exams)
   ◦ Verbal Assessment sessions
   ◦ Asynchronous Content
Course Components

- Course Delivery
- Formative Assessment
- Summative Assessment
- Large Course Considerations

Large Lecture Courses
Course Delivery

- Lecture
- ‘Knowledge’ transfer
- ‘Sense-Making’ / Context
- Discipline Based Education Research
Course Delivery: Knowledge Transfer

Consider Asynchronous Content Delivery

Tracking in Blackboard

Possible to implement ‘Reading Quizzes’

Zoom allows you to record yourself with a slideshow and/or whiteboard and has some video editing features

PowerPoint slides with Narration

Several options exist for high-quality pre-made videos that can be uploaded to ‘your’ YouTube Channel post editing-

Automatically Close-captions
Course Delivery: Knowledge Transfer

Centralize reading/video resources in Blackboard

Example: I post the lecture slides for that day—prior to lecture—with ‘answers’ removed.
Course Delivery: Knowledge Transfer

Use of Discussion Boards – Blackboard has an inbuilt discussion board, links to other implementations - Piazza, Slack, etc. – can be housed in your Shell

Example implementation – Spring 2020
- Can be descriptive
- Can be ‘Subscribed’ for updates
Course Delivery: Knowledge Transfer

Spring 2020- switch to ‘pre-recorded’ Zoom videos of certain content due to time-constraints and course content concerns) – ‘Lost teaching time’ – Recorded ‘full-length’ Lectures in Zoom and posted related content.

Did not include ‘Asynchronous’ lecture material in assessments

Summer I 2020- Used pre-recorded Zoom videos to cover ‘algorithmic’ steps (Problem Solving)
  ◦ Time-consuming substitute for ‘Solutions’ but provided ‘context’ in an ‘asynchronous’ environment.

‘High level’ of time investment- deciding length and content – upside is potential for future utility
Course Delivery: ‘Sense-Making’

Consider Synchronous Content Delivery

Instructor-student interaction and Peer-interaction are essential to learning

Possible Implementations:
- Zoom lectures/ BB collaborate lectures with Polling
- Zoom Groups
- Learning Assistants
- ‘Studio’ style classes/ content
Course Delivery: ‘Sense-Making’

Fall 2017 – Linking Personal Response Systems (PRS), for example ‘Clickers’ to Blackboard

Look for technology that ‘integrates’ with Blackboard (Single Sign On, SSO)

Methods to utilize PRS – Variations on Think-Pair-Share

Consider ‘cost’ to students

Process to address student and instructor issues with technology
Course Delivery: ‘Sense-Making’

Spring 2020 – Synchronous Zoom Lectures with TA Support

Lectures stayed Synchronous in Spring 2020
Course TA answered student queries in Chat during class
Links to videos posted in Blackboard
While students appreciated staying ‘synchronous’ – not clear that ‘lecturing’ synchronously actually delivers content
Course Delivery: ‘Sense-Making’

Summer 2020 – Zoom Polls

Zoom has an inbuilt Polling system

Pre-loaded Questions can be set up

Polls can be Anonymous

Live Histogram is available for instructors- can be shared with students

Help for ‘How to setup a Zoom Poll’ can be found at:
https://support.zoom.us/hc/en-us/articles/213756303-Polling-for-meetings
Course Delivery: ‘Sense-Making’

Summer 2020 – Breakout Rooms

Zoom has the option of ‘Breakout-rooms’

Groups can be pre-loaded; helps if registration is required

The instructor can move people in and out of different groups ‘live’

Students can ‘ask for help’ from within rooms

Promotes ‘community-building’

No pre-assign for more than 200

Help for ‘How to pre-assign participants’ can be found at: https://support.zoom.us/hc/en-us/articles/360032752671-Pre-assigning-participants-to-breakout-rooms
Course Delivery: ‘Sense-Making’

Summer 2020 – Learning Assistants

Learning Assistants – Based on the Colorado Model- former undergraduate students assist the instructor during class

During Class- LA’s can move around into different breakout rooms*- assisting with classwork, guiding/initiating discussion

LA Preparation – meet with LA’s pre- and post- classes to get feedback and discuss pedagogical approach

LA Preparation – Used OneDrive to communicate class materials to LAs

LAs conducted HW/Help sessions outside class, helped students with technical issues, made the instructor aware of ‘what was working’
Course Delivery: ‘Sense-Making’

Summer 2020 – ‘Studio Sessions’

Consists of ‘scaffolded’ class worksheets with well identified learning objectives

Implemented with Breakout rooms and Learning Assistants

Encourages group work and promotes ‘sense-making’

Issues with implementation include course ‘pace’ and the availability of the Content (as opposed to content development)
Course Delivery: ‘Sense-Making’

Introduction
Acceleration is one of the key concepts necessary to fully describe an object’s motion. Along with the concepts of position, displacement, speed, and velocity, it enables us to fully describe an object’s motion in both one and two dimensions.

Learning Goals
After completing this activity, you should be able to...
- Determine acceleration from a velocity versus time graph
- Use the components of a vector to determine the vector’s magnitude and direction, and vice versa
- Add multiple vectors together to determine the magnitude and direction of the resultant vector
- Use graphical analysis to determine properties of vectors (e.g., plot a velocity vector’s components to determine the total displacement)

Analyzing 2D Motion
When an object is moving in two dimensions, its displacement, velocity, and acceleration vectors will each have x- and y-components. When analyzing 2D motion, there are a few key ideas to keep in mind:
- The x-component of an object’s motion can be analyzed independent of the y-component.
- The total magnitude of a vector \( \mathbf{v} \) is related to its x- and y-components via the Pythagorean theorem:
  \[ |\mathbf{v}|^2 = v_x^2 + v_y^2 \]
- Whenever you need to add multiple vectors, add all their x-components together and add all their y-components together. These sums give you the total x- and y-components for the new vector. The magnitude of the vector can be found using the Pythagorean Theorem.

1. Patrick walks 60 m east and then walks 100 m north. Determine both the magnitude and direction of Patrick’s displacement. Show the angle north of east. Show your work.
2. Naomi walks 100 m, 30 degrees north of east and then walks 120 m, 20 degrees west of north. Determine the magnitude of Naomi’s overall displacement. Show your work.

Questions 3-8 refer to the following situation: A student leaves Dorm 1 and walks for 120 seconds at a constant speed to Dorm 2 to pick up a book from her friend. She then walks for 200 seconds at a constant speed to the Student Union, gives the book to another friend, and then walks for 270 seconds at a constant speed to the Physics building for class. The figure below shows a map of her route.

- Use the directions indicated and place the origin wherever is most convenient for the vector you are analyzing.
- Calculate the x- and y-components of the following displacement vectors for the walking student:
  a. the vector from Dorm 1 to Dorm 2
  b. the vector from Dorm 2 to the Student Union
  c. the vector from the Student Union to the Physics building
- Find the x-component, y-component, and magnitude of the displacement vector that points from Dorm 1 to the Physics building.
- On graph paper, make a plot of the x-position of the walking student as a function of time. Make a separate plot of the student’s y-position as a function of time. Be sure to label numerical values on the axes of your graphs.
- On graph paper, make a plot of the student’s x-velocity as a function of time. Make a separate plot of their y-velocity as a function of time. Be sure to label numerical values on the axes of your graphs.
- Check your answers with an instructor/learning assistant before proceeding.
- Calculate the areas under the curve for the graphs you made in question 6. Explain/show your work.
- How do your results from question 7 compare to the x- and y-components of the student’s total displacement vector, which you calculated in question 4? Explain.
- What is the acceleration of the student during each time interval? (while moving in a straight line?)

Source Material: Physics and Astronomy Education Research, University of North Carolina, Chapel Hill.
http://www.unr.edu/projects/stu/
Course Delivery: Discipline Based Education Research (DBER)

Used DBER Resources to delineate choice and effort in delivery mode selection

Examples of Discipline Specific Resources- Campadre, PhysPort [discusses a lot of methods that can cross disciplines]

More pedagogical support – ‘Teaching-Excellence’ ListServ
Formative Assessment

Online Platforms

Written Platforms

Student Success
Formative Assessments: Online ‘Grading’ Platforms

Used for delivering ‘instant’ feedback and ‘problem-solving’ practice- can be used to develop specific skills

Possible Implementations: Blackboard Test, Mastering, Sapling, OpenStax, Gradescope*

Considerations:
- Single Sign On desired
- Cost to student
- Significant time-investment for initial setup
- Can provide significant statistics regarding student performance
Formative Assessments: ‘Written work assessment’

Used for assessing methods, critical reasoning, written communication skills

Possible Implementations: Blackboard Assignments, Gradescope*, Graded Discussion Boards

Considerations:
- Single Sign On desired
- Time spent on Grading will vary by instructor familiarity with grading platform
Formative Assessments: Student Success

Gradecenter: Provides continuous feedback to students regarding course performance

Use of ‘categories’ can greatly simplify Grade Calculation

Can be used to identify ‘at-risk’ students in large lectures in a timely manner
Formative Assessments: Student Success

Gradecenter: Initial Setup – Combine Sections in SiS so that there is a ‘Master’ course- All sections of the lecture share the same Blackboard Shell.

Use of ‘Smart Views’ can greatly simplify Visualization

You can select which ‘aspects’ of the Gradecenter are easily accessed – students only see their own scores
Formative Assessments: Student Success

Spring 2020 – Online Blackboard Assignments

Settings allow you to determine number of attempts and which attempt to Grade

The assignment is automatically included in GradeCenter (can be turned off)

Did not seem to limit the file-types that students uploaded. Best to provide clear instructions.

Grading online is cumbersome
Formative Assessments: Student Success

Summer I 2020 - Gradescope – Online Grading Platform

SSO Linked to Blackboard  Can be used to Submit work and administer Online Tests
Formative Assessments: Student Success

Summer I 2020 - Gradescope – Online Grading Platform

Graded using instructor defined rubrics

Rubrics can be imported across assignments and semesters

Individual modifications can be made

Utilized for both Summative and Formative Assessment

Has AI assisted grading – I have not tried (yet)
Summative Assessment

Online Platforms  Written/Verbal Platforms
Summative Assessments: Online ‘Grading’ Platforms

Used for MCQ style questions – GradeScope* is an exception

Possible Implementations: Blackboard Test, Gradescope*, HW Platforms

Considerations:

A. Ease of use,

B. Flexibility/Support in setup for unknown/ unanticipated complications

C. Fidelity
Summative Assessments: Online ‘Grading’ Platforms

Spring 2020 – ‘Online Quizzes’ using Sapling

Replaced remaining ‘Monthly exams’ with timed ‘Low-stakes Online Quizzes’.

Questions selected to gauge conceptual understanding, use of figures to dissuade internet searches

Setup such that time was limited- but students could start anytime during a specified time-window

Practice Quiz using same delivery mode given one week prior
Summative Assessments: ‘Written work assessment’

Used for assessing Content Mastery

Possible Implementations: Blackboard Assignments, Gradescope*, Class Presentations, Papers, Verbal Assessment sessions

Considerations:

A. Ease of use,

B. Flexibility/Support in setup for unknown/ unanticipated complications

C. Fidelity
Summative Assessments: ‘Written work assessment’

Spring 2020 – ‘Written’ Final Exam- using Blackboard and GradeScope

Three-hour final exam- consisted of 1 Multiple choice module and 5 Written response modules

Multiple choice module automatically graded in Blackboard – setup as a timed test

Written modules setup as Blackboard assignments, Also Gradescope was used as an alternative submission site

Questions were selected bearing in mind the Exam is open-book.

Fidelity issue- ‘Chegg’ solves any exam within 2 hours. However- the weightage for the Final was reduced (after the transition), class average did not show a significant spike, difficult to ‘cheat’ to a better grade as grading has multiple components.
Summative Assessments: ‘Written work assessment’

Summer I 2020 – Online Exams with Gradescope

Used ‘Online Assignments’ in Gradescope

Contained automatically graded MCQs and written ‘file upload’ responses

Fidelity- kept exams – from release to submission- Under 2 Hours
Summative Assessments: ‘Written work assessment’

Summer I 2020 – Verbal Assessment Sessions

Two 15-minute individual verbal assessments scheduled with each student

Sessions were scheduled using ‘Calendly’ – online scheduling platform (free)

Students were informed about the ‘topic’ for their session when it was scheduled

Course Policy stated that students needed a microphone (required) and that a Webcam was recommended

Students were presented with a problem/situation and were graded on their ability to communicate how to solve it using concepts and techniques covered in class
Large Course Considerations

Student Technology Access and Comfort

Faculty Technology Access and Comfort
Student Technology Access

Communication is Essential - use of Announcements

- Use of Announcements
  - My Announcements
  - My Tasks
  - What's New

Arrange to provide ‘help’ – Office hours, ‘step-wise’ documentation

- Online Transition Help
  - How to Attend Recitations Online
    - Attached Files: How to Attend Recitations Online.pdf (174.563 KB)
  - How to attend Lecture Online Using Zoom
    - Attached Files: How to Access Lecture Online in Zoom.pdf (134.64 KB)
  - How to Submit Written HW Online
    - Attached Files: How to Submit Written HW Online.pdf (178.149 KB)
  - Modified Schedule and Due Dates
    - Attached Files: GenPhys2_Spring2020_ModifiedSchedule.pdf (105.362 KB)
Student Technology Access

Minimize use of multiple ‘new’ interventions in the same course
- Zoom/collaborate/Microsoft Teams across all components
- Use similar implementations for formative and summative assessments (BB/GradeScope)

Some interventions come with a ‘cost’ to students
- Consider Open Educational Resources
- Online HW platforms typically have a cost associated

Use the Policy to set the ‘minimum’ level of technology required
Faculty Technology Access

Identify faculty impact of different interventions
- Consistency of technological approach across recitation sections
- Provide course-faculty with support for implementation of selected techniques

Content Modification will take a significant amount of time
- Online instruction may require restructuring of course schedule
- Developing/Implementing new content will constrict time available for other interventions

Select pedagogical/technology interventions that can be translated to aid in face-to-face instruction (if possible)
- Examples: Content based videos, GradeScope, Learning Assistants
Future Work – Fall 2020

Course Delivery: Synchronous (Zoom) and Asynchronous (Platform TBD)

Potential Components: Zoom Polls, Zoom breakout rooms, Gradescope for Written assessments, OpenStax online HW
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