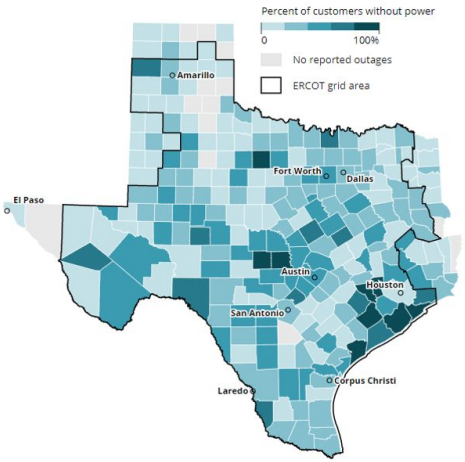
Dwight Look College of
ENGINEERING
TEXAS A&M UNIVERSITY

Team 28: Power Outage Education App
Bi-Weekly Update 3

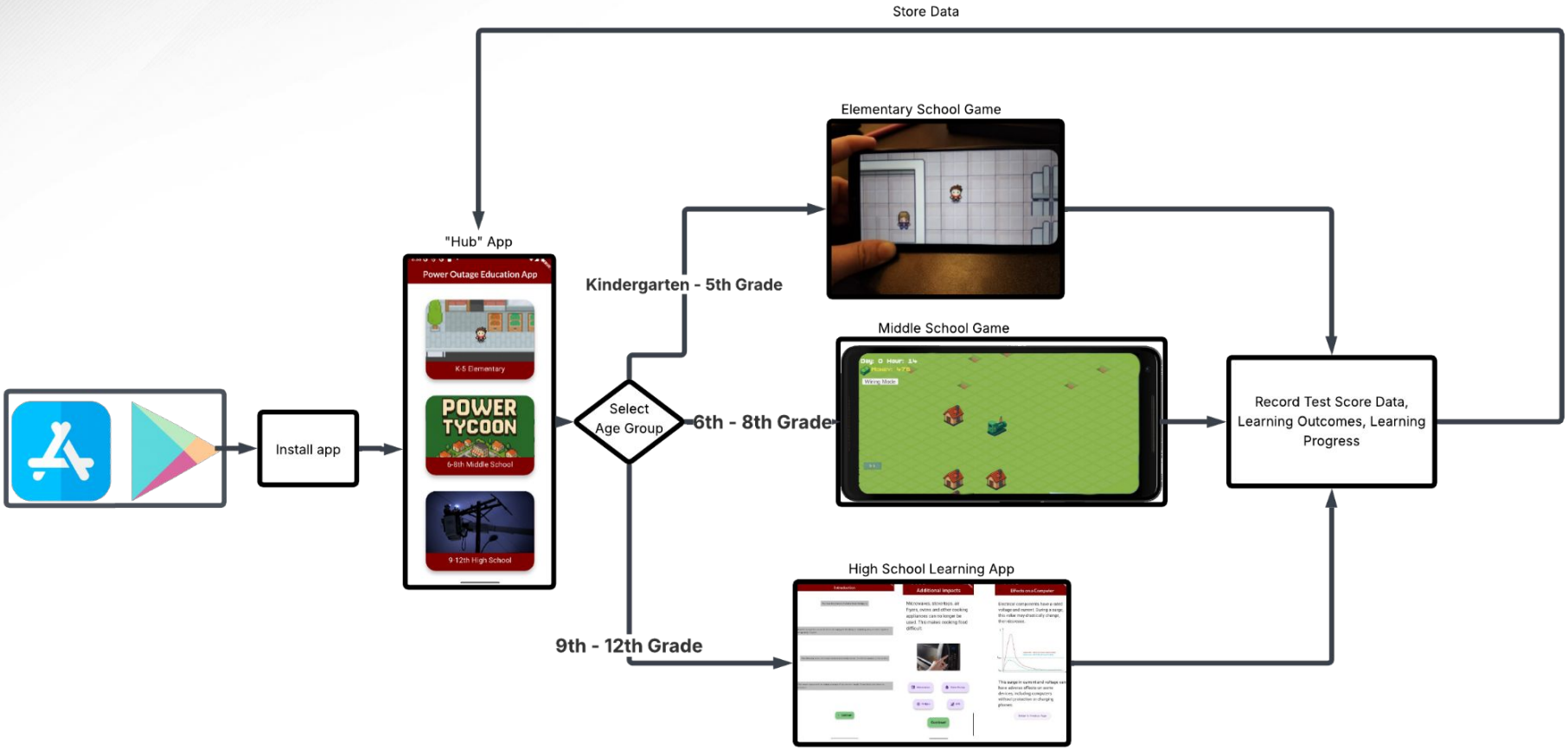
Jackie Villanueva, Aidan Petropoulos, Joey Raphael
Sponsor: Dr. Mladen Kezunovic
TA: Swarnabha Roy

Project Summary

- Problem statement: “People are often uninformed about the best course of actions to take before and during a power outage.This lack of knowledge can result in lack of preparation and uninformed decision-making that can cause further harm.”
  - The 2021 Texas Freeze
  - Outages caused by natural disasters
- Solution: Develop an app that provides different age-specific knowledge to educate students about the impact of power outages utilizing engaging, interactive apps. By informing people about what measures to take before, during, and after a power outage, the harm caused by power outages can be mitigated.



Integrated System Diagram



Project Timeline

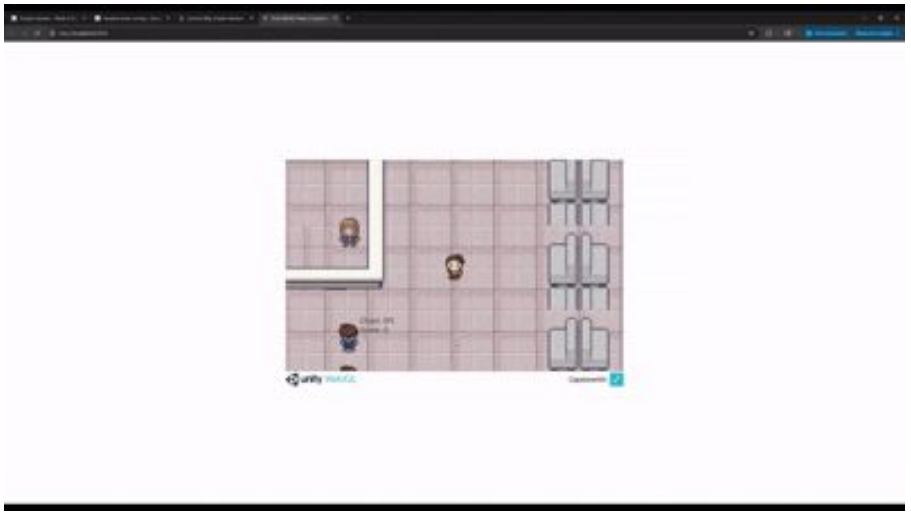
Base Subsystem Functionality (completed 9/14)	Flutter / Unity Integration (completed 9/28)	Refine Integration and Subsystems (to complete by 10/26)	System Test with Students (to complete by 11/15)	Implement Feedback from Student Testing (to complete by 11/22)	Validation (to complete by 11/26)	Demo and Report (to complete by 12/5)

- Green: Completed
- Yellow: In Progress
- Red: Behind Schedule
- White: Not started

Elementary Subsystem

Accomplishments since last update 16 hrs of effort	Ongoing progress/problems and plans until the next presentation
• Conducted functional system testing for both android and IOS devices • Confirmed input interactions on tablets, phones and computers • Error/Exception testing for network loss and reload handling	• Noticeable lag when switching Unity scenes • Scaling issue in tablets and phones • App performance when internet connection is slow

Elementary Subsystem



Internet testing
reload gameplay

Loss of internet
validation test

Middle School Subsystem

Joey Raphael

Accomplishments since last update 15 hrs of effort	Ongoing progress/problems and plans until the next presentation
• Verified memory and CPU performance on test device • Resolved random crashing on integrated app	• Test load times for game integrated into app • Verify response times for UI interaction • Create more assets to make game more visually appealing

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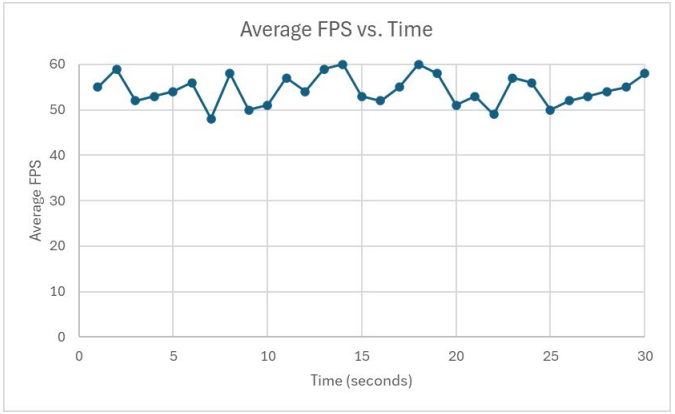
Middle School Subsystem

Joey Raphael

- Stable FPS, does not dip below 45 FPS, rolling average is 53 FPS (target is >50 FPS)
- Cumulative average frame time for rendering and script is 8.4 ms (target is <20 ms)
- Memory usage has increased to 181 MBs (target is <300 MBs)



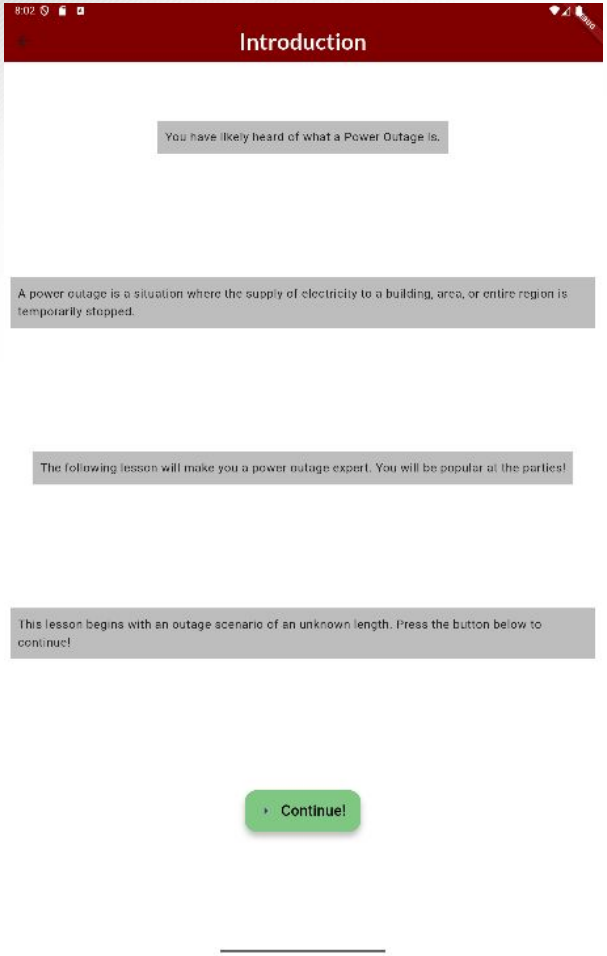
High School Subsystem

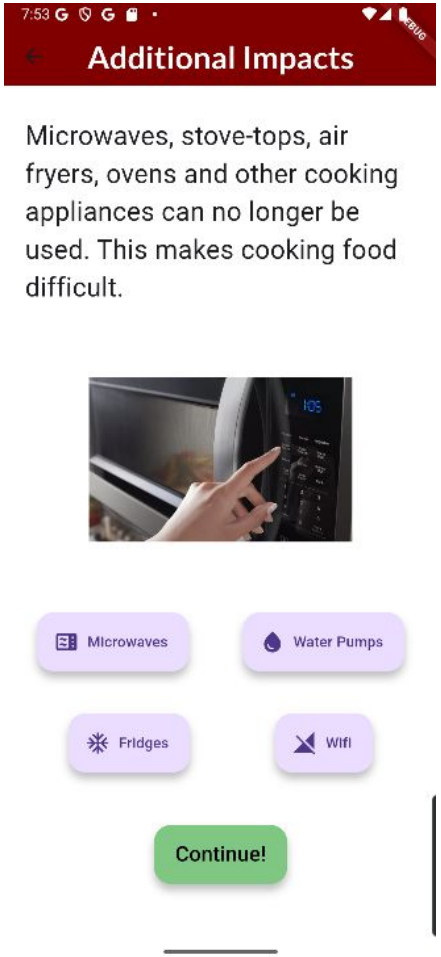
Jackie Villanueva

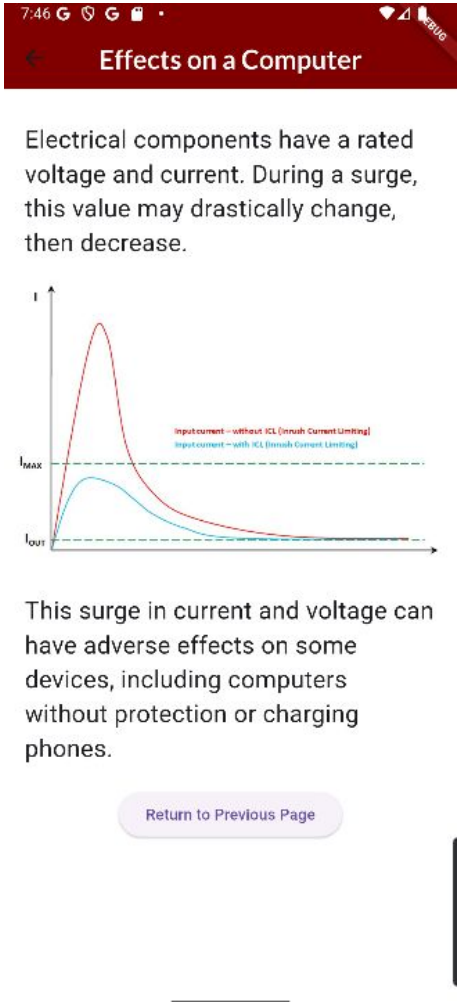
Accomplishments since last update 15 hrs of effort	Ongoing progress/problems and plans until the next presentation
• Revamped UI Design for app • Scheduled for testing	• Finish removing placeholders • Make UI accessible on all devices • Add unique pre-quiz for students that have used the app before (Middle School) • Nonlinear progression

- Researched and applied a designated UI design
- Removed placeholders throughout the application
- Encountered several issues with making UI accessible for all apps
- Preparations for testing is currently underway

High School Subsystem







Execution Plan

	8/24/25	8/31/25	9/7/25	9/14/25	9/21/25	9/28/25	10/5/25	10/12/25	10/19/25	10/26/25	11/2/25	11/9/25	11/16/25	11/23/25	11/30/25	12/7/25	Date of Milestone	Owner of Milestone
Debug and Test Software																	11/22/25	Jackie
Research Flutter/Unity Integration																	9/6/25	Joey
Fix any remaining subsystem bugs																	9/20/25	Jackie
Integrate Unity onto Flutter																	10/11/25	Aidan
Procure tablet for testing																	9/27/25	Jackie
Testing on phone/tablet																	11/29/25	Aidan
Optimize performance of Unity app running within Flutter app																	11/1/25	Joey
Verify UI scaling on different aspect ratios, resolutions																	9/30/25	Joey
Validate question design, record learning progress of students																	11/14/25	Joey
Remove placeholders																	11/1/25	Jackie
Refine Flutter App UI																	11/1/25	Jackie
Add start screen for unity game																	11/1/25	Aidan
Finalize questions with Doseum																	11/1/25	Aidan
Add nonhorizontal navigation																	11/8/05	Jackie
Refine DoSeum Game UI																	11/1/25	Aidan
Testing with Students																	11/1/25	Jackie
Finalize App Design																	11/29/25	Jackie

Not Started
In Progress
Completed
Behind Schedule

SYSTEM Validation Plan

Milestone #	Test	Detail	Validation Method	Data	Status	Owner	Expected Date of Completion
1	App Functionality Testing	App successfully opens and does not crash, lag, or glitch.	Boot up the app and navigate through all systems of the app.	- Each game/app currently opens and does not crash when run.	Success	Jackie Villanueva	10/26/2025
2	Subsystem Objective Completion	Each subsystem can be played from start to end.	Run through each individual subsystem and reach the 'end.'	- UI issues on the Elementary subsystem makes this difficult to complete	Partial Success	Aidan Petropoulos	10/26/2025
3	User Interface Consistency	Check that all buttons, menus, and text show up correctly and work the same way on both phones and tablets	Run the app on an Android phone and tablet. Confirm the correct functionality of each button. - Account for edge cases in which buttons are not directly pressed, visually inspect the collision detection of UI elements with Flutter Layout Explorer provided in DevTools - Modify code to log into console how long it takes for function to run after associated button is pressed on app. Button press to app action should not take longer than 10 ms for a response.	- UI is currently inconsistent on the Android tablet and phone. - Buttons work as intended	Partial Success	Joey Raphael	10/26/2025
4	Offline and Online Functionality	The app has different interfaces for if it is online or offline.	Run the software with and without wifi. Check if the interface correctly differs between the two scenarios.	- App continues to run with or without wifi and works when reloaded	Sucess	Aidan Petropoulos	10/26/2025
5	Performance (Middle School System)	The game runs at an acceptable performance - Less than 100 ms latency between touch input and button response - Average of 30 FPS, frametimes less than 200 ms	- Load integrated app into test phone / tablet - Monitor system resource usage using Flutter resource profiler - Plot RAM usage, CPU usage, frametimes, over time and label events such as app loading, game loading, game start, game end, etc. - Verify that usage of system resources does not exceed target device specs i.e game does not use more than 4 GBs of RAM, utilize more than 4 cores in standard 8-core CPU, average FPS is >30, average frametimes are <3ms	- Output graphs detailing frametime over frame, memory usage over time, CPU usage over time with key events labeled (game loading, game start, game end, app start, etc.) - Frametimes were <3ms, averaged 27 ms - Game embedded in Flutter app utilized 67 MBs of RAM - Average FPS is 21 FPS	Partial Success	Joey Raphael	10/26/2025
6	Nonlinear progression (High School Subsystem)	The user can navigate back to preivous tabs that have already been accessed	Progress through the high school subsystem. Using the appbar on the top, confirm that previous 'tabs' may be accessed, then return to the most current tab.	N/A	Untested	Jackie Villanueva	10/26/2025
7	Flutter and Unity	Test that the Unity WebGL game runs properly inside the Flutter app, responds to touch input, and displays the correct scenes, buttons, and animations without distortion or delay	Click Elementary and middle school tabs from Flutter base. Play through the individual games for both.	- Apps currently respond to user input - Elementary scenes do not transition correctly	Partial Success	Joey Raphael	10/26/2025
8	Learning Outcomes (Elementary)	Students demonstrate improved understanding of foundational concepts after playing.	Pre- and post-game quizzes, teacher feedback, observation.	N/A	Untested	Aidan Petropoulos	11/10/2025
9	Learning Outcomes (Middle School)	Students demonstrate improved understanding of targeted concepts after playing.	Pre- and post-game quizzes, teacher feedback, observation. - Adminster quiz before students play game, quiz will consist of questions from the game, record what questions were answered correctly or incorrectly on a per-student basis. - Adminster quiz after students play game, quiz will consist of same questions, record what questions were answered correctly or incorrectly - Determine overall accuracy of questions, identify which questions were difficult, determine "learning" by assessing if students were able answer question correctly after getting question initially wrong in pre-game quiz - Output bar graph of questions answered correctly, determine percentage of students who had increased test scores, determine average test score increase	- Output accuracy data and test scores as .csv files - Process into bar graphs to compare testing accuracy among different questions, students, etc.	Untested	Joey Raphael	11/10/2025
10	Learning Outcomes (High School)	Students demonstrate improved understanding of advanced concepts after advancing through the curriculum.	Post content quiz, teacher feedback, observation	N/A	Untested	Jackie Villanueva	10/26/2025

Thank you for your time!
Questions?