10 CM3050 Mobile Development

10.1 Project Idea 1: Developing a Mobile App for Local Disaster Preparedness and Response

What problem is this project solving, or what is the project idea?

Natural disasters and emergencies often catch communities off guard due to inadequate preparation and lack of access to reliable information. This project involves developing a mobile app to assist users in preparing for disasters, offering real-time guidance during emergencies, and connecting them with local support networks.

What is the background and context to the question or project idea above?

Climate change has led to a rise in natural disasters, making disaster preparedness more critical than ever. Many communities lack tools that provide personalised, actionable guidance during emergencies. This project will create a mobile app that gamifies preparedness (e.g., checklists, quizzes) while offering real-time features like location- based alerts, step-by-step response guidance, and access to local resources during emergencies. By leveraging gamification and real-time mobile capabilities, this app aims to make disaster preparedness engaging and effective.

Here are some recommended sources for you to begin your research.

Books: 'Emergency Management for the 21st Century' by Claire B. Rubin.

Papers: Research on gamification in mobile applications and disaster management tools

- Kankanamge, N., Yigitcanlar, T., Goonetilleke, A. and Kamruzzaman, M., 2020. How can gamification be incorporated into disaster emergency planning? A systematic review of the literature. International Journal of Disaster Resilience in the Built Environment, 11(4), pp.481-506.
- Matsuno, Y., Fukanuma, F. and Tsuruoka, S., 2021. Development of flood disaster prevention simulation smartphone application using gamification. Dynamics of Disasters: Impact, Risk, Resilience, and Solutions, pp.147-159.

Apps: Research popular disaster apps such as the UK Met Office Weather Alerts app, and British Red Cross Emergency app.

What would the final product or final outcome look like?

The final product will be a functional mobile app with:

- Disaster preparedness gamification (e.g., checklists, tasks, badges, rewards and quizzes).
- Location-based alerts and notifications for emergencies.
- A resource hub with local contact information and safety guidelines.

What would a prototype look like?

The prototype would demonstrate

- One gamified preparedness task (e.g. building a safety kit).
- Location-based notifications for a simulated emergency.
- A basic resource hub with static information.

What kinds of techniques/processes/CS fundamentals are relevant to this project?

- Gamification design principles.
- Iterative testing and user feedback.

What would the output of these techniques/processes/CS fundamentals look like?

- Functional app prototypes with core features.
- Documentation of gamification logic and API integration.
- Usability testing results and iteration reports.

How will this project be evaluated and assessed by the student (i.e. during iteration of the project)? What criteria are important?

Functionality: Stability and effectiveness of app features.
Engagement: Quality and effectiveness of gamified elements.
Educational Value: Accuracy and usefulness of disaster preparedness content.

For this brief, what might a minimum pass (e.g. 3rd) student project look like?

A basic app with minimal features and limited interactivity.

Evidence of effort but no iterative design or user feedback.

For this brief, what might a good (e.g. 2:2 – 2:1) student project look like?

A fully functional app with multiple gamified tasks and basic real-time features.

Documentation of user testing and iteration based on feedback.

For this brief, what might an outstanding (e.g. 1st) student project look like?

A polished app with advanced gamified features, seamless real-time alerts, and strong community resources.

Thorough documentation of testing, iteration, and impact on disaster preparedness.

10.2 Project Idea 1: Developing a Gamified AR App for Eco-Conscious Urban Exploration

What problem is this project solving, or what is the project idea?

Sustainability awareness is often low in urban populations, and there's a need for engaging tools to educate people about eco-conscious practices in their local environments. This project involves building a mobile app that uses gamification and AR to encourage users to explore their surroundings and learn about sustainability.

What is the background and context to the question or project idea above?

With urbanisation and climate change, fostering sustainability awareness is critical. The app "Sustainability Detective" will gamify urban exploration, assigning players missions such as identifying green buildings, energy-efficient practices, or recycling facilities. Using AR overlays, the app will display information and provide real-time feedback, rewards, and achievements. This approach blends education with fun to encourage active participation in sustainability initiatives.

Here are some recommended sources for you to begin your research.

Books: "Making Sustainability Measurable: A Practical Book for Sustainable Living and Working" by Michael Wühle.

Research on gamification and AR in mobile applications and Sustainability:

1. Spanellis, A., Harviainen, J.T., Fernández Galeote, D. and Thibault, M., 2024., "Gamification for Sustainable Development. Simulation & Gaming", 55(3), pp.361-365.
2. Scurati, G.W., Ferrise, F. and Bertoni, M., 2020. Sustainability awareness in organizations through gamification and serious games: a systematic mapping. DS 101: Proceedings of NordDesign 2020, Lyngby, Denmark, 12th-14th August 2020, pp.1-10.
3. Strada, F., Lopez, M.X., Fabricatore, C., dos Santos, A.D., Gyaurov, D., Battegazzorre, E. and Bottino, A., 2023. Leveraging a collaborative augmented reality serious game to promote sustainability awareness, commitment and adaptive problem-management. International Journal of Human-Computer Studies, 172, p.102984.
4. Cosio, L.D., Buruk, O.O., Fernández Galeote, D., Bosman, I.D.V. and Hamari, J., 2023, April. Virtual and augmented reality for environmental sustainability: A systematic review. In Proceedings of the 2023 chi conference on human factors in computing systems (pp. 1-23).

Apps: Explore apps like Pokemon Go for AR implementation.

APIs: Google Maps API, ARCore/ARKit.

What would the final product or final outcome look like?

- At least one mission using AR to highlight eco-friendly practices or spaces.
- A gamified system with points, leaderboards, and challenges.

- Educational content integrated into the app.

What would a prototype look like?

- A single mission demonstrating AR functionality (e.g., identifying recycling bins).
- A simple leaderboard and points system.
- Basic UI for navigation and mission display.

What kinds of techniques/processes/CS fundamentals are relevant to this project?

Gamification design principles.
Integration of sustainability datasets.
Mobile development using React Native.
AR development (ARKit, ARCore).

What would the output of these techniques/processes/CS fundamentals look like?

A functional AR-enabled app prototype.
Documentation of the points system and AR logic.
User testing logs for gamification effectiveness.

How will this project be evaluated and assessed by the student (i.e. during iteration of the project)? What criteria are important?

Functionality: Stability and effectiveness of app features.
Engagement: Quality and effectiveness of AR and gamified elements.
Educational Value: Accuracy and usefulness of sustainability content.

For this brief, what might a minimum pass (e.g. 3rd) student project look like?

A basic app with limited AR functionality and minimal gamification.
Evidence of effort but limited design iteration or user feedback.

For this brief, what might a good (e.g. 2:2 – 2:1) student project look like?

A fully functional app with multiple gamified missions and basic AR features.
Evidence of usability testing and design iteration based on feedback

For this brief, what might an outstanding (e.g. 1st) student project look like?

A polished app with advanced AR functionality, engaging gamification mechanics, and rich educational content.
Strong documentation of testing, design iteration, and impact on user engagement and learning.