

Project: Emergency Communication & Safety App

26 February 2026 15:49

Name: Joaquin Alexander Canales Garcia

Student Number: 2427434

Course: Changemakers Creativity and Value Creation.

Code: ACCA5033

Lecturer: Dr Osman Elgawi



Project Indications

26 February 2026 15:47

The **Changemakers: Creativity & Value Creation** module helps students develop important skills such as identifying opportunities, creating ideas, conducting research, thinking critically, and producing value for society. The module explains how **design thinking** and **research methods** work together to generate solutions that benefit both individuals and communities. It also prepares students for the **Emerging Trends** and **Independent Project** modules in the final year of study.

Students must create a **Project Proposal** using **Microsoft OneNote**. A new notebook should be created with a title page including the student's name, student number, and course. Each task must be completed on a separate section or page. When finished, the **entire notebook** must be exported as a **PDF file** and submitted to Turnitin, ensuring all task answers are included.

Task 1: Ideation & Mind Map

Students must create a **mind map** (around 600 words) with citations and a reference list (4–5 sources). The mind map should be created using a free mapping tool or an Office 365 application.

The task requires:

- Exploring concepts from **Unit 1 Topic 1: How Innovation Shapes the World**.
- Showing how creativity and innovation influence society and personal development.
- Including project ideas connected to the student's programme of study.
- Selecting one project idea to continue developing.

Task 2: Aim, Objectives and Research Area

This section also requires about **600 words** with citations and references. Students must:

- Define **one clear aim** and several objectives for their chosen project.
- Identify a suitable **research philosophy** explaining how they approach problem-solving (Unit 1 Topic 2).
- Describe research tools and databases used to find academic information and explain search strategies (Unit 1 Topic 3).

Task 3: Research Strategies

Another **600-word** section focusing on research planning and analysis. Students need to:

- Explain how they will ensure **validity, reliability, generalisability, and ethical research practices** (Unit 2 Topic 2).
- Choose appropriate **data collection methods** and design a **pilot study**, including feedback placed in an appendix.
- Describe both **quantitative analysis** (numerical data) and **qualitative analysis** (themes and opinions) methods using concepts from Unit 4 topics.

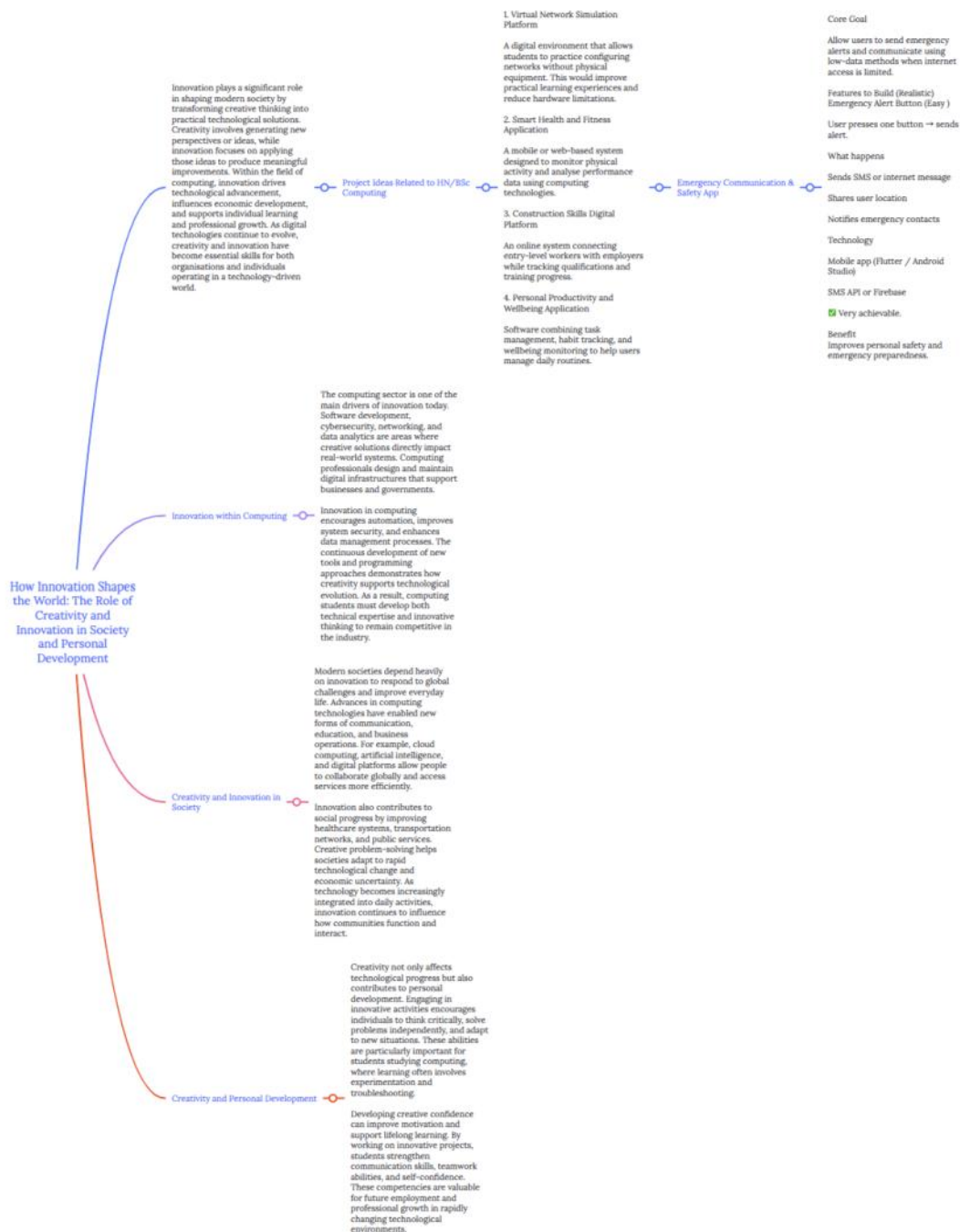
Overall Purpose

The assignment guides students through the full early stages of a project, including idea generation, research planning, and data analysis preparation. It helps develop skills needed to design and manage an independent computing project while applying creativity and research methods to real-world problems.

TASK 1

26 February 2026 15:55

Q1. Mind map



Link: <https://mm.tt/map/3954434366?t=ukZ5HDfgHp>

Q2. My Project idea is an Emergency Communication & Safety App

Core Goal

Allow users to send emergency alerts and communicate using low-data methods when internet access is limited.

Features to Build

1) Emergency Alert Button

User presses one button sends alert.

What happens

Sends SMS or internet message

Shares user location

Notifies emergency contacts

Technology

Mobile app (Flutter / Android Studio)

SMS API or Firebase

Very achievable.

Benefit

Improves personal safety and emergency preparedness.

2) Safety Check in System

User confirms they are safe during and emergency.

Example:

"I am safe" button

Contacts receive notification

Computing concepts

Database updates

User authentication

Notifications

3) Low Data Messaging

Instead of true offline networking:

Simulate low data communication

Options:

Text only messaging

Compressed messages

Works on slow connections

4) Location Sharing

Use phone GPS

Share coordinates

Show map location

Store last known position

Using: Google Maps API or OpenStreetMap.

Features we are not going to Build (Too Advanced)

We are going to Avoid:

Bluetooth mesh networking

Peer-to-peer radio protocols

End-to-end encryption systems like Signal

Real emergency service integration

These are postgraduate or industry-level systems.

TASK 2

04 March 2026 06:06

Aim & Objectives and Research Area

Project Title:

Development of an Emergency Communication and Safety Mobile Application

Q1. Aim and Objectives

Aim

The aim of this project is to design and develop a mobile-based Emergency Communication and Safety Application that enables users to send emergency alerts, share location information, and perform safety check-ins using low-data communication methods, improving personal safety during emergency situations or limited network connectivity.

Objectives

To achieve the stated aim, the following objectives will guide the project development:

1. **To analyse user needs and existing emergency communication solutions** in order to identify limitations in current safety applications and determine functional requirements.
2. **To design a user-centred mobile application interface** that allows quick access to emergency features, ensuring usability under stressful conditions.
3. **To implement an emergency alert system** capable of notifying predefined contacts through low-data communication methods such as SMS or internet-based notifications.
4. **To integrate GPS-based location sharing**, allowing users to transmit their real-time or last known location during emergencies.
5. **To develop a safety check-in feature** enabling users to confirm their wellbeing and update emergency contacts efficiently.
6. **To test and evaluate system performance and usability**, ensuring reliability, accessibility, and effectiveness in simulated emergency scenarios.

Q2. Research Philosophy

The research philosophy adopted for this project is **pragmatism**. Pragmatism focuses on solving real-world problems using practical methods and combining both theoretical understanding and applied experimentation. This philosophy is appropriate because the project aims to create a functional technological solution rather than purely analysing theoretical concepts. Pragmatism allows the integration of qualitative and quantitative approaches, including user feedback, usability testing, and technical performance evaluation.

In computing projects, problem-solving often requires iterative development, testing, and improvement. The pragmatic approach supports experimentation through

prototype development and evaluation, enabling continuous refinement based on results. This aligns with software engineering practices where solutions evolve through testing and user interaction rather than fixed assumptions.

Furthermore, pragmatism emphasises outcomes and usefulness, which is relevant for an emergency safety application designed to provide practical benefits to users. By focusing on effectiveness and usability, the research philosophy ensures that the final product addresses real user needs and demonstrates applied innovation within the computing discipline [6].

Q3. Search Tools, Research Databases and Search Strategies

To support the research and development process, several academic search tools and databases will be used to identify reliable information related to emergency communication systems, mobile application development, and safety technologies.

Search Tools and Databases

The following resources will be used:

- **Google Scholar** – to access peer-reviewed academic papers and citations related to mobile safety applications.
- **IEEE Xplore Digital Library** – for research on networking technologies, mobile communication systems, and software engineering practices.
- **ScienceDirect** – to locate studies related to human–computer interaction and mobile usability.
- **ACM Digital Library** – for computing-focused research including application design and system architecture.
- **University Online Library Resources** – providing access to journals and e-books relevant to computing research.

Search Strategies

Effective search strategies will be applied to locate relevant literature, including:

- Use of **keywords and Boolean operators**, such as:
 - “emergency communication app AND mobile safety”
 - “low-bandwidth communication OR disaster messaging systems”
 - “mobile application usability AND emergency response”
- Filtering results by **publication date** to prioritise recent research.
- Reviewing reference lists of key articles to identify additional sources.
- Evaluating sources based on relevance, credibility, and technical contribution.

This structured research approach helps identify existing knowledge (“known knowns”) and gaps where innovation can be introduced within the project [7].

Conclusion

The Emergency Communication and Safety App project applies computing knowledge to address a meaningful societal problem. The defined aim and objectives provide clear development direction, while the pragmatic research philosophy supports practical problem-solving and iterative design. By using established academic databases and structured search strategies, the project will be supported by credible research, ensuring both academic rigour and real-world relevance.

TASK 3

05 March 2026 00:51

Research Strategies

Project Area:

Emergency Communication and Safety Mobile Application

Q1. Strategies to Enhance Validity, Reliability, Generalisability and Ethical Considerations

To ensure the research supporting the Emergency Communication and Safety App is academically rigorous, several strategies will be applied to improve validity, reliability, generalisability, and ethical compliance.

Validity

Validity refers to whether the research accurately measures what it intends to investigate. To enhance validity, data collection questions will directly relate to emergency communication needs, usability, and safety concerns. A pilot study will be conducted to test survey clarity and remove ambiguous questions before full data collection. Additionally, multiple sources of evidence such as user feedback and usability testing will be compared to confirm consistent findings, a process known as triangulation [11].

Reliability

Reliability ensures that results remain consistent if the study is repeated. Standardised questionnaires and identical testing conditions will be used for all participants. Clear instructions will be provided during usability testing to reduce variation caused by misunderstandings. Data collection procedures will be documented carefully so that another researcher could replicate the process and achieve similar outcomes.

Generalisability

Generalisability refers to how applicable findings are to a wider population. Participants will include students and mobile phone users with varying technical experience to represent typical application users. While the sample size may be limited due to project constraints, collecting feedback from diverse participants increases the relevance of findings beyond a single group.

Ethical Considerations

Ethical research practices are essential, particularly when collecting personal data. Participants will receive clear information explaining the purpose of the research and will provide informed consent before participation. Personal information such as location data will not be permanently stored during testing. Data will remain anonymous and used only for academic purposes, following data protection principles such as GDPR guidelines [12].

Q2. Research Strategies and Data Collection Methods

A mixed-method research strategy will be used, combining qualitative and quantitative data to provide a comprehensive understanding of user needs and application effectiveness.

Data Collection Methods

1. Online Questionnaire (Quantitative)

A structured survey will collect measurable data regarding:

- User perceptions of safety apps
- Preferred emergency features
- Ease-of-use expectations

This method enables efficient collection of numerical data from multiple participants.

2. Semi-Structured Interviews (Qualitative)

Short interviews will explore user experiences and opinions in more depth. Participants will discuss concerns related to emergencies, communication barriers, and usability expectations.

3. Usability Testing

Participants will interact with a prototype and complete tasks such as sending an emergency alert. Observations will identify usability issues and design improvements.

Pilot Data Collection Method

Before full research implementation, a pilot questionnaire will be conducted with 3–5 participants. The pilot aims to:

- Identify unclear questions
- Measure completion time
- Evaluate relevance of questions

Initial feedback suggested simplifying technical terminology and reducing survey length to improve engagement. Adjustments will therefore be made before wider distribution.

Q3. Quantitative and Qualitative Analysis Methods

Both quantitative and qualitative analysis techniques will be applied to interpret collected data effectively.

Quantitative Analysis

Quantitative analysis focuses on numerical data and statistical patterns. Methods include:

- Descriptive statistics (percentages, averages)

- Frequency analysis of responses
- Graphical visualisation using charts

For example, survey responses will identify the most requested emergency features and measure perceived usability levels. Statistical summaries help identify trends and support objective conclusions [13].

Qualitative Analysis

Qualitative analysis explores meanings and themes within participant responses. Thematic analysis will be used to identify recurring ideas from interviews and usability feedback.

Steps include:

1. Reviewing responses
2. Coding key statements
3. Grouping codes into themes
4. Interpreting user needs and concerns

This approach helps understand user experiences beyond numerical data, providing deeper insight into design improvements [14].

Conclusion

The selected research strategies combine structured data collection with user-focused evaluation to support the development of the Emergency Communication and Safety App. By ensuring validity, reliability, ethical practice, and balanced analysis methods, the research process will produce credible findings that inform both application design and usability improvements. The integration of quantitative and qualitative approaches strengthens the overall research quality and aligns with best practices in computing project development.

REFERENCES

04 March 2026 06:07

- [1] OECD, The Innovation Imperative: Contributing to Productivity, Growth and Well-Being. Paris: OECD Publishing, 2015.
- [2] P. F. Drucker, Innovation and Entrepreneurship. Oxford, UK: Routledge, 2007.
- [3] R. Florida, The Rise of the Creative Class. New York, NY, USA: Basic Books, 2019.
- [4] K. Robinson, Out of Our Minds: Learning to Be Creative. Chichester, UK: Wiley, 2011.
- [5] Design Council, "The Double Diamond Design Process," Design Council UK, 2019. [Online]. Available: <https://www.designcouncil.org.uk>
- [6] M. Saunders, P. Lewis and A. Thornhill, Research Methods for Business Students, 8th ed. Harlow, UK: Pearson, 2019.
- [7] J. W. Creswell and J. D. Creswell, Research Design: Qualitative, Quantitative and Mixed Methods Approaches, 5th ed. Thousand Oaks, CA: Sage, 2018.
- [8] IEEE, "Emergency communication systems and mobile technologies," IEEE Xplore Digital Library, 2021.
- [9] A. Dix, J. Finlay, G. Abowd and R. Beale, Human–Computer Interaction, 3rd ed. Harlow, UK: Pearson, 2004.
- [10] R. Pressman and B. Maxim, Software Engineering: A Practitioner’s Approach, 9th ed. New York, NY: McGraw-Hill, 2020.
- [11] J. W. Creswell and J. D. Creswell, Research Design: Qualitative, Quantitative and Mixed Methods Approaches, 5th ed. Thousand Oaks, CA: Sage, 2018.
- [12] European Union, "General Data Protection Regulation (GDPR)," 2018.
- [13] A. Field, Discovering Statistics Using IBM SPSS Statistics, 5th ed. London, UK: Sage, 2017.
- [14] V. Braun and V. Clarke, "Using thematic analysis in psychology," Qualitative Research in Psychology, vol. 3, no. 2, pp. 77–101, 2006.
- [1 5] R. Pressman and B. Maxim, Software Engineering: A Practitioner’s Approach, 9th ed. New York, NY: McGraw-Hill, 2020.