

Project Proposal – Changemakers: Creativity & Value Creation

Project Title: Adaptive DVSA Test Route Navigation App with Real-Time Rerouting

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Introduction

This project proposal is developed within the Changemakers: Creativity & Value Creation module, which emphasises the role of innovation, research, and design thinking in generating meaningful value for individuals and society. Drawing on these principles, this proposal explores the development of an adaptive DVSA test-route navigation application, inspired by my experience as a driving instructor and the limitations of existing apps. The project aims to integrate creative problem-solving with applied computing methods to address real user needs through improved navigation accuracy, hazard awareness, and dynamic rerouting. By combining design thinking, research analysis, and user-centred planning, this proposal lays the foundation for a feasible and impactful future major project.

Task 1 Ideation and Mind Map for Adaptive DVSA Test Route Navigation App with Real - Time Rerouting

Ideation

Innovation is crucial in influencing society, altering individual interactions with technology, navigating settings, and addressing quotidian challenges. As emphasized in Topic 1 of the Changemakers module, innovation arises from the integration of creativity, problem-solving, and the capacity to identify value-generating opportunities in real-world scenarios (Tidd & Bessant, 2021). This mind map examines the interplay of innovation, individual interests, societal demands, and project development, culminating in the identification of a proposed initiative: an adaptive DVSA Test Route Navigation App for learner drivers and instructors.

The mind map initiates with Innovation & Creativity, highlighting its significance in worldwide technological advancement. Concepts like "creative destruction," "design thinking," and "user-centred innovation" illustrate how emerging technologies destroy obsolete processes, paving the way for more efficient alternatives (Schwab, 2017). Creativity facilitates the creation of original concepts, but innovation transforms those concepts into valuable solutions. Design thinking, emphasising empathy, ideation, prototyping, and continuous iteration, enhances this process by aligning solutions more closely with user needs (Brown, 2009).

The core innovation theme of the mind map examines Technology Trends, including mobile computing, AI-driven navigation, the rise of personalised digital services, and progress in real-time routing algorithms. These advances have revolutionised transportation, logistics, and daily navigation. Location-based services (LBS) and geospatial technologies support applications such as Google Maps and Waze, illustrating how adaptive routing, real-time feedback, and data-informed decision-making enhance user experience (Raper et al., 2007). These techniques can be applied to driving-test navigation tools.

A significant component of the mind map encompasses Personal Interests, derived from my experience as an Applied Computing student and a certified driving instructor. My interests encompass mobile application development, GPS technology, UX/UI design, machine learning, entrepreneurship, and a commitment to enhancing digital aids for learner drivers. These interests establish a robust basis for recognising opportunities for wealth generation.

My experience in instructing trainee drivers and my awareness of their difficulties with current test-route applications—such as technical malfunctions, obsolete routes, subpar user interfaces, and insufficient

adaptive corrections—enabled me to pinpoint unaddressed user requirements. This personal experience corresponds with the "opportunity recognition" phase of the innovation cycle (Drucker, 2002), wherein individual insight uncovers market deficiencies.

My Project Ideas branch arises from these interests and identified opportunities. Possible options encompass enhanced DVSA revision tools, route-simulation applications, instructor-student communication platforms, or a comprehensive adaptive navigation solution. Upon assessing feasibility, societal benefit, and congruence with your competencies, you identified the most viable project:

An advanced DVSA Test Route Navigation Application featuring adaptive rerouting akin to Waze or Google Maps.

This concept contributes to multiple supplementary elements:

Societal Value: alleviating learner anxiety, enhancing driving-test readiness, assisting teachers, and augmenting road safety.

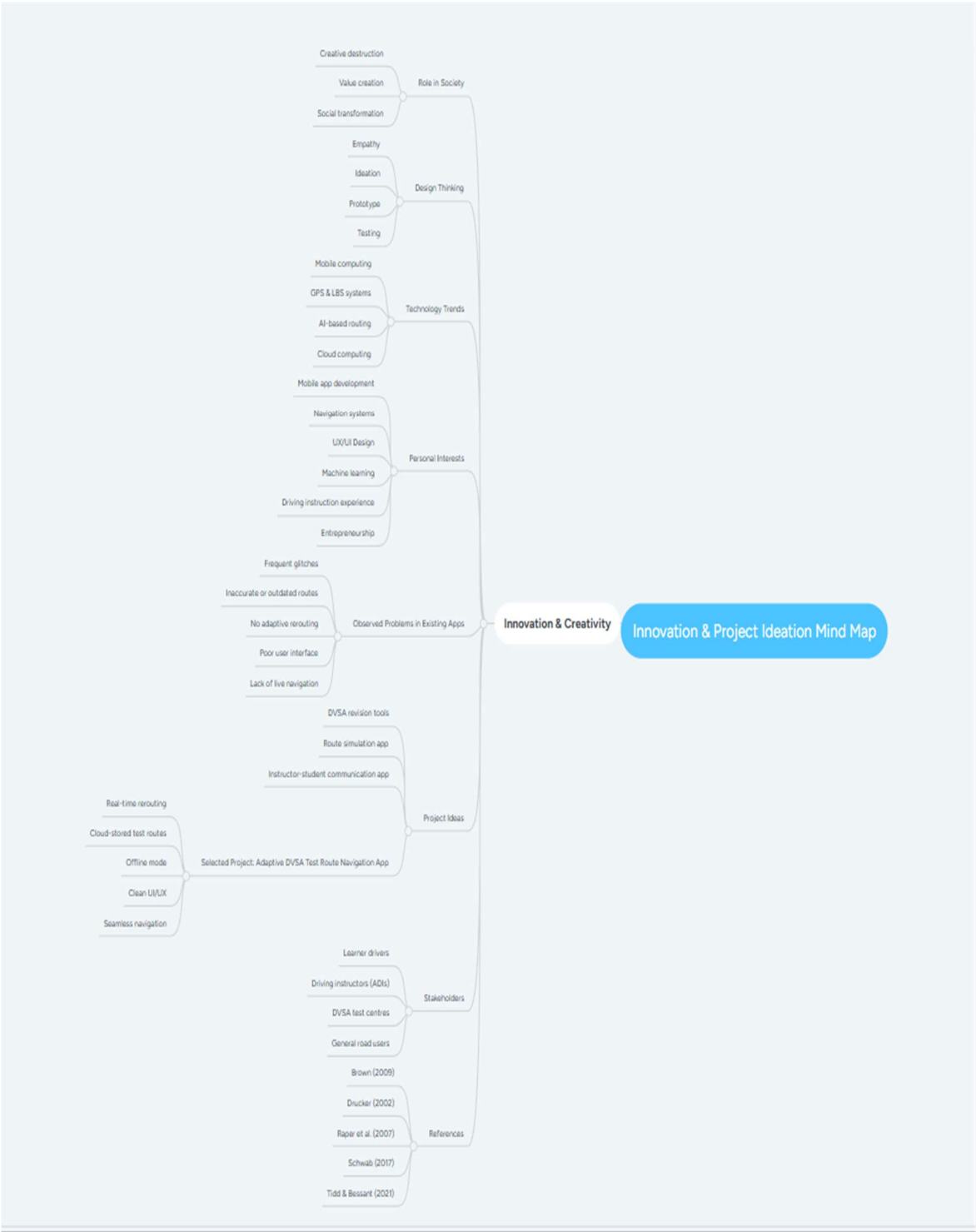
Technical Specifications: GPS integration, real-time rerouting, cloud-based route storage, offline caching, flawless user interface, and machine-learning route optimisation.

Stakeholders include learner drivers, instructors, DVSA test centres, and maybe the broader road-user community.

The mind map contains a designated References node to fulfil academic standards. This node comprises academic resources on innovation, geospatial technology, design thinking, and mobile navigation. These sources substantiate the philosophical underpinnings of the project and reinforce the academic framework for Tasks 2 and 3.

The mind map delineates the relationships among personal experience, applied computing concepts, global innovation trends, and the selected project idea. These interconnected components illustrate how creativity and research-based ideation culminate in the creation of a significant, practical technology solution that enhances value both socially and professionally.

Mind Map



TASK 2 — PURPOSE, GOALS & RESEARCH DOMAIN (≈600 words)

Question 1: Aim and Objectives

Objective of the Project

This project aims to design and develop an adaptive, seamless DVSA Test Route Navigation mobile application that offers learner drivers and Approved Driving Instructors (ADIs) dependable, real-time route guidance and automatic rerouting—akin to systems employed by Waze and Google Maps—while enhancing usability, precision, and learner-driving readiness.

The objective is to rectify the deficiencies of existing DVSA test-route applications, which often exhibit obsolete routes, subpar user interface design, restricted adaptation in the event of navigational errors, and recurrent technical malfunctions. The project aims to develop a solution that incorporates location-based services (LBS), GPS tracking, and contemporary mobile UI/UX practices to facilitate learning, improve driving-test preparedness, and provide value to instructors, students, and the broader driving community.

Objectives of the Project

To evaluate current DVSA test route applications and ascertain critical concerns pertaining to usability, reliability, and navigational precision.

To provide an enhanced mobile interface employing UX concepts that promote clarity, accessibility, and user-friendliness for both trainee drivers and Approved Driving Instructors (ADIs).

To execute real-time adaptive routing utilizing GPS and LBS technologies, allowing the system to recalibrate directions if the student diverges from the designated test route.

To create a prototype mobile application utilizing a suitable programming framework (e.g., Flutter, React Native, or Kotlin).

To analyze the prototype via user testing with a cohort of trainee drivers and instructors to evaluate usability, performance, and efficacy.

To evaluate comments and enhance the system to increase navigation precision, reduce malfunctions, and optimize user experience.

These objectives facilitate a systematic, research-oriented development cycle aligned with Applied Computing project endeavours.

Question 2: Suitable Research Philosophy

Due to the practical and applied nature of this endeavour, the most appropriate research philosophy is Pragmatism. Pragmatism prioritizes practical solutions to tangible issues and endorses mixed-methods strategies for evidence collection and concept testing (Saunders et al., 2019). In contrast to positivism, which emphasizes quantifiable evidence, and interpretivism, which prioritizes subjective experience, pragmatism offers adaptability by employing approaches that yield the most valuable insights for the specific issue being addressed.

This philosophy corresponds with the creation of a mobile application designed for actual users (learners and ADIs), wherein both quantitative metrics (e.g., route precision, navigation efficacy, error reduction) and qualitative feedback (e.g., user frustrations, preferences, and usability experiences) hold significance. Pragmatism corresponds with design thinking, which promotes incremental enhancements informed by user feedback (Brown, 2009).

Consequently, a pragmatic approach permits the student to collect empirical evidence while investigating user perceptions, facilitating the project's progression towards a viable, user-centred solution.

Q3. Search Instruments, Databases & Search Methodologies

To investigate pertinent research in mobile navigation systems, user experience design, route optimization, GPS technology, and user-centred innovation, several academic search tools and databases will be employed.

Search Instruments & Repositories

Google Scholar offers scholarly publications on location-based services, GPS algorithms, mobile application design, and navigation systems.

IEEE Xplore is vital for Applied Computing projects, encompassing research on mobile computing, routing algorithms, and geospatial systems.

ACM Digital Library – valuable for study in software engineering, human-computer interaction, and interface design.

ScienceDirect encompasses peer-reviewed research on mobile technologies, machine learning applications, and transportation technology.

The UWTSD Library ONE Search grants access to eBooks, articles, and conference proceedings pertinent to innovation and application development.

Search Methodologies

Search techniques will utilize Boolean operators, truncation, and keyword combinations to obtain specific results. Illustrations encompass:

"adaptive routing" AND "mobile applications" AND GPS

"location-based services" AND novice drivers AND navigation

“DVSA test routes” AND “driving instruction technology”

“UX design” AND “navigation systems” AND user experience

“geospatial algorithms” AND real-time recalibration

“innovation in driver education” OR “driver training applications”

Keywords will be amalgamated using Boolean operators (AND/OR/NOT) and constrained by date (2015-2025) to guarantee that the research aligns with contemporary LBS and mobile design trends.

TASK 3 — RESEARCH STRATEGIES (about 600 words)

Q1. Approaches to Augment Validity, Reliability, Generalizability, and Ethical Considerations

Ensuring rigour in an Applied Computing research project necessitates explicit strategies that enhance validity, reliability, generalizability, and ethical integrity. Validity pertains to the precision of study findings and the extent to which the methodologies accurately assess the intended constructs (Creswell & Creswell, 2018). This project—creating an adaptable DVSA test-route navigation application—will improve validity by aligning the evaluation criteria with the genuine demands of trainee drivers and instructors. This entails creating test scenarios that replicate authentic driving-test situations and employing explicit usability measures, including error rates, response times, and task completion rates.

Reliability denotes the consistency and reproducibility of data collection methodologies. To guarantee dependability, all prototype usability tests will adhere to a standardised testing script, ensuring uniform instructions and navigational challenges for each participant. In-app system logs will be utilized to reliably monitor performance across users. Repeated pilot tests will further enhance the precision of questions or tasks that yield inconsistent outcomes.

Generalizability pertains to the degree to which results can be extrapolated to a wider population. The pilot study will encompass a small cohort of learner drivers and Approved Driving Instructors (ADIs), employing ways to recruit participants with diverse driving-test experiences, including novice learners, those nearing test readiness, and instructors from various pedagogical backgrounds. This diversity enhances the application of findings outside a limited demographic. Nonetheless, the generalizability will be explicitly recognized as constrained due to the sample size—a prevalent limitation in prototype-oriented computing endeavours.

Ethical considerations are paramount, particularly when research engages human subjects. The initiative will adhere to the principles established by the British Computer Society (BCS) Code of Conduct, which prioritizes privacy, informed consent, data protection, and the mitigation of potential harm. Participants will be provided with an information sheet detailing the study's purpose and a consent form delineating their rights, including the option to withdraw at any time. No personal driving information, location data, or identifiable information will be retained beyond what is essential for testing purposes. Data will be anonymized and securely kept in compliance with GDPR.

Q2. Research Strategies, Data Collection Techniques, and Pilot Design

This project will employ a mixed-methods approach aligned with the pragmatic research philosophy outlined in Task 2. The subsequent research methodologies will be employed:

Collection of Primary Data

Usability Testing: Participants, including trainee drivers and Approved Driving Instructors (ADIs), will engage with the mobile prototype by executing tasks including adhering to a test route, rectifying a mistaken turn, and manoeuvring through intersections. Performance data, including accuracy, number of reroutes, and system reaction time, will be documented.

Observation: The researcher will monitor participants' interactions, documenting behaviours such as hesitations, errors, navigational disorientation, or user interface challenges.

Semi-Structured Interviews: Following usability testing, interviews will investigate user happiness, perceived reliability, recommendations for enhancement, and comparisons with current test-route applications.

The prototype will gather route performance metrics, error logs, and time data to facilitate quantitative analysis.

Collection of Secondary Data

The academic literature concerning mobile navigation, geospatial algorithms, usability design, DVSA test frameworks, and LBS technologies will be examined utilizing the resources specified in Task 2.

Design of Pilot Study

The pilot study will assess the clarity and efficacy of the preliminary data collection instruments prior to the comprehensive review.

Methodology for Piloting: Recruit two to three participants: one novice driver, one Approved Driving Instructor (ADI), and one general driver.

Request that they execute a brief route navigation with the prototype.

Construct a concise questionnaire incorporating both Likert-scale and open-ended enquiries.

Administer a brief reflective interview to obtain feedback.

Objective of the Pilot:

Assess the clarity of the duties.

Recognize ambiguous enquiries and enhance phrasing.

Verify that the prototype operates well for primary testing.

Verify that interview suggestions yield pertinent insights.

Integration of Pilot Feedback: Pilot findings will be incorporated into the Appendix section in OneNote and utilised to enhance the primary study design.

Q3. Categories of Quantitative and Qualitative Analysis

The project will employ a blend of qualitative and quantitative analytical methodologies to analyze data efficiently.

Quantitative Assessment

Appropriate methodologies encompass:

Descriptive statistics: mean, frequency distributions, error rates, and response durations.

Performance indicators: navigational precision, frequency of missed turns, rerouting velocities.

Task completion rates: assessing usability according to ISO 9241-11 criteria.

These methodologies correspond with the assessment of software performance and user engagement with mobile applications (Zhao, 2018).

Qualitative Assessment

Qualitative approaches will analyze user experiences and perspectives.

Thematic Analysis: identifying trends in user remarks, including disappointments or positive responses (Braun & Clarke, 2006).

Content Analysis: classifying criticism pertaining to UI design, clarity, navigation, or technical concerns.

Observation logs: monitoring user behaviour during testing to detect usability challenges.

Integrating both methodologies enhances the credibility of the results and facilitates iterative enhancements to the prototype.

Conclusion

This proposal has outlined the ideation, research foundations, and methodological strategies required to develop an improved DVSA test-route navigation app that offers adaptive routing and enhanced usability. Through applying design thinking, pragmatic research philosophy, and robust data-collection strategies, the project demonstrates how creativity and research can work together to generate technological and societal value. The project also aligns well with future independent study in year three, offering strong potential for further development into a full mobile prototype. Overall, the proposal shows a clear pathway from problem identification to solution design, grounded in innovation and applied computing principles.

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Appendix

APPENDIX A — PILOT QUESTIONNAIRE (Ready to Use)

Title: *Pilot Usability Questionnaire for DVSA Test Route Navigation App Prototype*

Instructions:

Please answer the following questions based on your experience using the prototype. Your responses will help improve the final application design. All data is anonymous.

SECTION 1 — Participant Information

1. What is your role?
 - ☐ Learner Driver
 - ☐ Approved Driving Instructor (ADI)
 - ☐ Full Licence Holder / Experienced Driver
2. How familiar are you with DVSA test routes?
 - ☐ Very familiar
 - ☐ Somewhat familiar
 - ☐ Not familiar

SECTION 2 — Likert Scale Questions (1 = Strongly Disagree, 5 = Strongly Agree)

Question	1	2	3	4	5
The app was easy to understand and use.	☐	☐	☐	☐	☐
The navigation instructions were clear.	☐	☐	☐	☐	☐
The route matched what you would expect from real DVSA routes.	☐	☐	☐	☐	☐
The adaptive rerouting worked effectively.	☐	☐	☐	☐	☐
The user interface felt clean and professional.	☐	☐	☐	☐	☐
The app responded quickly when you made a wrong turn.	☐	☐	☐	☐	☐
I would use an improved version of this app in the future.	☐	☐	☐	☐	☐

SECTION 3 — Short Answer Questions

8. What part of the app did you find most useful?
Answer: _____
 9. What part of the app did you find confusing or difficult?
Answer: _____
 10. Did you experience any glitches or delays? If yes, please describe.
Answer: _____
 11. Were the navigation prompts timely and clear?
Answer: _____
 12. How could the app be improved?
Answer: _____
-

SECTION 4 — Final Comments

13. Any additional feedback or suggestions?
-

Opening Script

"Thank you for taking part in this pilot test of the DVSA Test Route Navigation App prototype. I'm now going to ask a few short questions about your experience. There are no right or wrong answers — I'm interested in your honest opinions so I can improve the design."

Interview Questions

1. Overall Experience

- *How would you describe your overall experience using the prototype?*

2. Navigation Performance

- *Did the app guide you accurately along the route?*
- *Did it recalculate effectively when you made a wrong turn?*

3. Usability & Interface

- *How easy or difficult was the interface to use?*
- *Were buttons and options clear and accessible?*

4. Real-World Alignment

- *(For instructors)* How well did the route reflect real DVSA test routes?
- *(For learners)* Did this feel similar to what you expect in a real test?

5. Technical Issues

- *Did you notice any glitches, slow loading, or unexpected behaviour?*

6. Suggested Improvements

- *If you could change one thing about the app, what would it be?*
-

Closing Script

"Thank you, that's all the questions. Your feedback will help refine the app and improve the usability testing process for the final prototype."

APPENDIX C – UI SKETCHES (ASCII / CONCEPTUAL)

1. Home Screen UI Sketch

less

```
| DVSA ROUTES
| -----
| [ Start Test Route ]
|
| [ Choose Test Centre ▼ ]
|
| [ View Saved Routes ]
|
| [ Settings ]      [ Help ]
```

2. Live Navigation Screen UI Sketch

sql

ROUTE NAVIGATION

← Turn Left in 150 yards

MAP

(GPS View)

● You Are Here

[End Route] [Recalculate]

3. Settings Menu UI Sketch

pgsql

SETTINGS	
• Voice Guidance:	ON/OFF
• Map Style:	Light / Dark
• Offline Mode:	Enabled
• Route Auto-Update:	ON