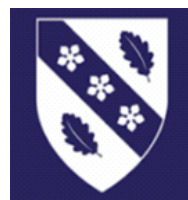


BSC Applied Computing

Changemakers: Creativity and Value Creation
Assignment 1: Innovation & Research
Module course ACCA5033

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Table of Content

Table of Contents

[Introduction](#)

[Task 1](#)

[Ideation & Mind Map](#)

[Task 2](#)

[Aim & Objectives and Research area](#)

[Task 3](#)

[Research Strategies](#)

[Summary](#)

[Appendix](#)

[Reference](#)

Introduction

Innovation and creativity are central to technological advancement in Computing.

This work demonstrates how innovative thinking, supported by conceptual understanding and rigorous research methodology, can be translated into a structured academic inquiry. By examining technological developments and applying appropriate research strategies, the study establishes a foundation for a contemporary network enabled solution that supports health and digital wellbeing.

Task 1 -Ideation & Mind Map

Question 1.

For Task 1, I created an academically structured mind map using Canva, a freely accessible digital tool designed for visual organisation and conceptual mapping.

This platform enabled the clear structuring of interconnected themes related to innovation, technological development, and discipline-specific project ideas.

The completed mind map may be accessed via the following link:

[Idea Mind Map Brainstorm Whiteboard in Purple Pink Modern Professional Style](#)

The visual artefact integrates key concepts from Unit 1, Topic 1: *How Innovation Shapes the World*, alongside project ideas relevant to my Computing pathway and personal interests. It outlines the historical foundations of innovation, emphasising creativity as a driving force behind scientific and technological progress.[1] The mind map highlights major milestones such as early scientific discoveries, space exploration, satellite technologies, human spaceflight, and the expansion of global communication systems.

A second branch maps the evolution of telecommunication technologies, from landlines to mobile phones and modern smart devices. This progression is followed by the rise of the internet and the digital revolution, which transformed communication, information access, and societal functioning. The development of computers, laptops, and global networking infrastructures demonstrates how digital innovation continues to reshape economies, social practices, learning, and individual identity.[2]

Integration of Cultural Theory

To deepen the conceptual dimension of the mind map, I integrated ideas from Reckwitz [3], particularly the concept of the *culture of the new*. author argues that contemporary societies operate within a system that values constant novelty, aesthetic stimulation, ongoing transformation, and the production of attention-capturing events. Although originally associated with cultural production, this framework is increasingly applicable to technological innovation. Modern communication technologies, digital platforms, wearables, and mobile systems operate within the same "regime of novelty," requiring continuous updates, new features, and aesthetic refinement to maintain user engagement in an overstimulated digital environment.

This cultural perspective strengthens the mind map's analytical grounding by showing that innovation is shaped not only by technical advancement but also by societal expectations for perpetual renewal. In the same way that cultural products must evolve to remain relevant, technological systems, particularly networking technologies

must continually improve interactivity, personalisation, and user experience.

This connection provides valuable theoretical insight into why modern digital systems evolve at such a rapid pace and why networking is central to contemporary innovation.

Discipline-Specific and Personalised Project Ideas

In line with the assignment brief, the mind map includes a selection of Computing-related project ideas, such as:

- network infrastructure analysis and optimisation
- cloud computing solutions
- web application development
- data communication protocols
- IoT integrations
- cybersecurity monitoring
- digital fitness and health-tracking software

These ideas reflect core areas of my academic discipline. Additionally, the mind map incorporates my personal interests specifically sport, fitness, and languages and demonstrates how these can intersect with computing. Examples include network-enabled sports analytics, wearable health sensors, digital fitness systems, and language-learning platforms. Their inclusion illustrates an understanding of how personal motivation can meaningfully align with academic development.

Question 2

Central Project Idea

Following the brief, I identified one central project idea that serves as the foundation for Tasks 2 and 3:

Network-Enabled Fitness and Health Performance Monitoring System

This project merges my academic interest in networking with my personal commitment to health and fitness. It proposes the development of a system that uses network-connected devices such as sensors, wearables, and mobile applications to collect and analyse real-time health and performance data. The system would employ secure communication protocols, cloud-based analytics, and user-centred design to provide meaningful feedback and personalised insights.

The project aligns closely with my Computing programme, as it involves networking principles, digital communication protocols, system architecture, and potentially machine-learning-based analysis. Its relevance and scalability also make it suitable for development into a Level 6 (Year 3) major project, consistent with broader discussions in Unit 1 concerning how innovation enhances wellbeing, personal development, and digital participation.

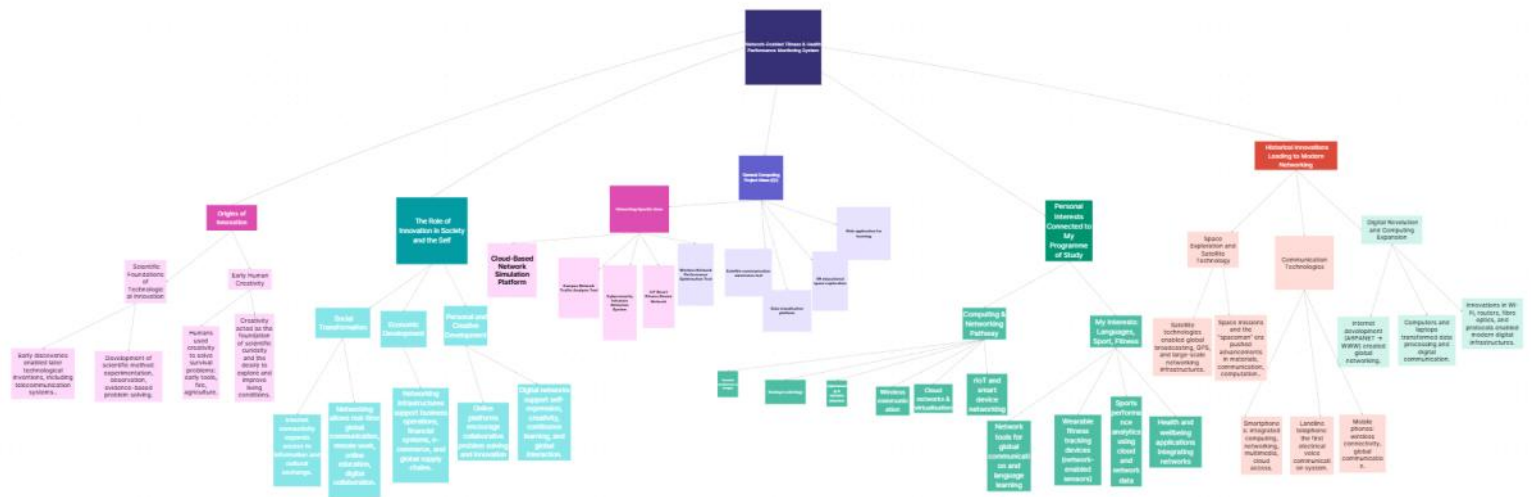


Figure 1. Mind Map-How innovation shapes the world.

Task 2-Aim & Objectives and Research area

Task 2

Aim & Objectives and Research area

This section presents the aim and objectives of the proposed project, outlines the research philosophy underpinning the study, and describes the search tools and strategies required to establish a robust and credible research foundation.

The work is based on the concept introduced in Task 1: a network-enabled fitness and health performance monitoring system that integrates wearable technologies with secure network communication and cloud-based analytical functionalities.

Question 1.

Aim and Objectives

The aim of this project is to design and evaluate a network-enabled fitness and health monitoring system capable of collecting, transmitting, and analysing real time physiological and activity data through wearable, network-connected devices.

The system is intended to generate personalised insights supported by secure data-communication protocols and cloud-based analytics.

To fulfil this aim, the project establishes the following objectives:

1. To analyse the technical requirements for real-time data acquisition, including sensor performance, communication protocols, network bandwidth and reliability constraints.
2. To formulate a system architecture that effectively integrates wearable devices, data-communication layers, secure transmission methods, and cloud-based analytical components capable of delivering real-time performance feedback.
3. To develop a user-centred interface that presents personalised fitness and health information in a clear, accessible, and motivational manner.
4. To evaluate the technical performance of the system using established networking metrics such as latency, throughput, accuracy, and packet loss to determine the reliability and stability of data transmission.
5. To examine user experience and usability, investigating how the system influences user engagement, motivation, and self-efficacy in the context of fitness-related behaviours.

Together, these objectives reflect recognised principles of structured project management and demonstrate the project's dual focus on technical robustness and human-centred design.

Question 2.

Research Philosophy

This project is grounded in a pragmatic research philosophy, well suited to studies that integrate technical evaluation with user-centred inquiry. Pragmatism avoids the

rigid divide between positivism and interpretivism, emphasising practical problem-solving, methodological flexibility, and the selection of approaches that best serve the research aim.[4]

Its principles align with the concepts discussed in Unit 1, Topic 2, particularly creative confidence—understood as the capacity to think innovatively without fear

or self-judgement, and to recognise uncertainty and discomfort as inherent to creative and research processes. Developing awareness of one's mindset, emotional responses, identity, and self-efficacy enables the researcher to navigate ambiguity without adopting limiting assumptions.

Pragmatism reinforces this mindset by:

- rejecting strict methodological boundaries (e.g., exclusively quantitative or qualitative designs),
- supporting exploration of uncertain or unfamiliar areas without fear of failure,
- encouraging iterative experimentation central to networking and software prototyping,
- prioritising practical outcomes and real-world relevance over theoretical rigidity.

Accordingly, the project adopts a mixed-methods strategy, integrating quantitative measures (e.g., network latency, sensor accuracy) with qualitative insights

(e.g., user experience, perceived usability, behavioural responses). This balanced approach reflects the essence of creative confidence: working effectively across both the known and the uncertain.

Question 3.

Search Tools and Search Strategies

Unit 1, Topic 3 introduces the widely recognised framework articulated by [5], categorising knowledge. Academic literature reinforces the usefulness of this model; for example, **Donlan** [6] discusses how distinguishing between these categories assists researchers in mapping their knowledge boundaries and assessing areas requiring further investigation.

- known knowns – information already understood.
- known unknowns – identifiable gaps in existing knowledge.
- unknown unknowns – gaps not yet recognised by the researcher.

This framework provides a useful structure for mapping the research landscape of this project. For example:

- Known knowns include fundamental networking principles, sensor operations, and the role of health monitoring systems.
- Known unknowns include the accuracy of specific sensors, optimal communication techniques, and the most suitable cloud-analytics models.
- Unknown unknowns may surface during prototype development, such as unanticipated usability challenges or network constraints.

To address these categories, a systematic literature search will be conducted using high-quality academic databases, including:

- IEEE Xplore (networking, IoT, sensors),

- ACM Digital Library (system design, HCI),
- ScienceDirect (applied computing, health technologies),
- Google Scholar (broad academic coverage), and
- PubMed (physiology and wearable validation).

Boolean search strategies will refine search precision using operators such as AND, OR, NOT, phrase searching (“ ”), and truncation (*). Examples include:

- “wearable sensors AND network latency AND health monitoring”
- “digital health OR fitness technology OR performance analytics”
- “monitoring **NOT** clinical diagnosis”

A thematic, systematic approach will then organise findings around key categories, such as #networkperformance, #real_timemonitoring, #wearables, #cloudanalytics, #digitalhealth, #usability, and #selfefficacy. This reduction of complex questions into concise, keyword-driven units aligns with Topic 3’s emphasis on computationally efficient and conceptually focused research. Establishing a clear set of search criteria and thematic categories is consistent with wider methodological guidance on structuring academic research.[7]

Task 3-Research Strategies

Task 3

Research Strategies

This section sets out the strategies that will be used to enhance validity, reliability, generalisability and ethical integrity in the project, describes the research and data-collection methods (including a pilot), and outlines the quantitative and qualitative analytical approaches that will be applied to the collected data.

Question 1.

Validity, Reliability, Generalisability and Ethical Considerations

Validity requires that the methods accurately measure the project's focus:

the performance and perceived usefulness of a network-enabled fitness and health monitoring system. Construct validity will be supported by recognised network metrics (latency, throughput, packet loss) and established indicators of physical activity

(step counts, heart-rate ranges), consistent with accepted measures in the field.[8]

Content validity will be ensured by developing survey and interview items aligned with usability, motivation and self-efficacy, guided by digital-health research.

Reliability will be improved through consistent procedures. Technical tests will be repeated under comparable conditions, while questionnaires and interview guides will be piloted and refined to remove ambiguity, then administered using the same protocol for all participants.[9]

Generalisability will be limited because of the small, targeted sample; therefore, the study aims for analytic rather than statistical generalisation, linking findings to broader concepts in digital health and networking.[10]

Ethical considerations include gaining informed consent, clearly explaining the study purpose and data use, enabling withdrawal at any stage, anonymising responses

and storing data securely.[11]

The potential influence of the Hawthorne effect will be acknowledged and mitigated

by emphasising that the study focuses on system design rather than personal performance. Purposive sampling will be used to recruit individuals with relevant fitness and technology experience, with snowball sampling as an optional extension where appropriate.[12] These sampling constraints will be fully reported as methodological limitations.

Question 2.

Research Strategies, Data Collection and Pilot Study

Research Strategies, Data Collection and Pilot Study The project adopts a mixed-

method strategy, combining quantitative and qualitative data. Quantitative data will be collected through system logs and structured questionnaires, capturing metrics such as frequency of use, perceived ease of use (e.g. Likert scales), and basic demographic information. Qualitative data will be collected via brief semi-structured interviews or open-ended survey questions exploring user experience, perceived benefits, barriers, and motivational aspects. A pilot study will be conducted

with a very small group of participants (for example, 3–5 users).

The pilot will test:

- clarity of survey items,
- feasibility of the data-collection process,
- technical performance of the prototype under real-world conditions

Feedback from the pilot will be used to refine question wording, adjust the length and structure of the instrument, and identify any technical or usability problems before the main data collection. The pilot questionnaire or interview guide, along with a short reflection on pilot feedback, will be included in the appendix and referenced in the methodology section.

Question 3.

Quantitative and Qualitative Analysis

In line with Unit 4, Topic 1, quantitative analysis will begin with descriptive statistics to summarise the data: means, medians, standard deviations, and frequency counts for key variables such as usage frequency, perceived ease of use, and satisfaction.[13]

These may be presented in tables, bar charts or line graphs to provide a clear “snapshot” of how users interact with the system. Where appropriate, simple inferential statistics (e.g. correlations) may be used to explore relationships for instance, between perceived ease of use and reported motivation to be active while acknowledging the limitations of a small sample size. For qualitative data, Unit 4, Topic 2: There’s a Theme Here supports the use of thematic analysis, in which interview or open-ended responses are coded and grouped into themes.[14] This approach will complement numerical results by offering deeper insight into user attitudes and experiences. Visual tools (charts, graphs and simple dashboards) will support clear presentation of both statistical summaries and thematic patterns.

Summary

In summary, this work shows how creative ideation, innovation theory, and systematic research methodologies collectively support the development of a rigorous computing project. By aligning conceptual insight with structured methodological planning, the study provides a robust foundation for ethical, evidence-based decision-making

in digital system design. Overall, it establishes a strong basis for future project development and reinforces the central role of research in advancing technological innovation.

Appendix

Pilot Data Collection Materials

Appendix A1: Pilot Questionnaire

Project: Network-Enabled Fitness and Health Performance Monitoring System

Instructions:

This short pilot questionnaire is designed to test the clarity, usability, and relevance of the survey questions. Your feedback will help improve the final version for the main data collection.

Section 1: Background Information

Age:

☐ 18–25 ☐ 26–35 ☐ 36–45 ☐ 46+

How often do you engage in physical exercise per week?

☐ Less than 1 day

☐ 1–2 days

☐ 3–5 days

☐ 6+ days

Do you currently use any wearable fitness devices?

☐ Yes ☐ No

If yes: Which device(s)? _____

Section 2: Ease of Use of Fitness Technology

Using fitness technology (apps, wearables, trackers) is generally:

☐ Very easy ☐ Easy ☐ Neutral ☐ Difficult ☐ Very difficult

I feel confident using mobile apps for tracking my fitness progress.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

Section 3: Perceptions of the Proposed System

A system that provides real-time feedback on health and fitness would be useful for me.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

I would be willing to use a wearable device if the data were securely transmitted and stored.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

The following features would motivate me to use such a system (tick all that apply):

☐ Real-time alerts

- ☐ Personalised feedback
- ☐ Progress tracking
- ☐ Goal setting
- ☐ Gamified challenges
- ☐ Data visualisation

Section 4: Open-Ended Questions

What concerns would you have about using such a monitoring system?

What features would make this technology more appealing?

Appendix A2: Pilot Interview Guide (Optional Short Version)

1. User Experience

“How do you currently track your fitness or health data, if at all?”

2. Motivation

“What motivates you to exercise, and how could technology support that?”

3. Data Concerns

“What are your thoughts on privacy and data security with wearable tech?”

4. System Feedback

“What type of real-time feedback would be most useful to you?”

Appendix A3: Pilot Feedback Summary

Three participants completed the pilot questionnaire. Feedback identified several areas for improvement:

- **Clarity:** Participants requested examples for “wearable devices” (e.g., Fitbit, Apple Watch).
- **Length:** The survey was considered “short and easy”, appropriate for the study.
- **Security concerns:** All participants emphasised the importance of secure data storage and transparent privacy practices.
- **Feature preferences:** Real-time alerts and personalised recommendations were the most selected features.
- **Open-ended responses:** Suggested adding a question about preferred interface layout (simple vs. detailed).

Based on this feedback, the main questionnaire will:

- include brief examples to improve clarity,
- add one further question on preferred visual design of the interface,
- expand privacy-related options to better capture user concerns.

References

References

- [1] M. Csikszentmihalyi, "Creativity: The Psychology of Discovery and Invention." 2014.
- [2] Brynjolfsson & McAfee, "The Second Machine Age," . 2019.
- [3] A. Reckwitz, "The Invention of Creativity: Modern Society and the Culture of the New. Polity Press." 2017.
- [4] Creswell, J., & Creswell, J. D, ". Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage." 2018.
- [5] Donald Rumsfeld, *Known and Unknown: A Memoir*, 2012.
- [6] Rebecca Donlan, "Known Knowns and Known Unknowns. Journal of Interlibrary Loan, Document Delivery & Electronic Reserve," pp.99–100, 04 Jul 2011.
Available: <https://doi.org/10.1080/1072303X.2011.586310>
- [7] Bryman, "Social Research Methods. Oxford University Press." 2016.
- [8] A. Bryman, ".. Social Research Methods. Oxford University Press." 2016.
- [9] Creswell, J., & Creswell, J. D., *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage.* 2018.
- [10] R. Yin, *Case Study Research and Applications: Design and Methods (6th ed.)*. Sage. 2018.
- [11] Saunders, M., Lewis, P., & Thornhill, A., . *Research Methods for Business Students (8th ed.)*. Pearson. 2019.
- [12] A. Bryman, "Social Research Methods. Oxford University Press." 2016.
- [13] A. Field, "Discovering Statistics Using IBM SPSS Statistics (5th ed.). Sage." 2018.
- [14] .Braun, V., & Clarke, V, ". Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2)," pp.77–101., 2006.