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T­he following guidelines **must** be adhered to:

**Writing Style**Your report should be written from a third person, observational perspective. Do not use the following terms:

|  |  |  |  |
| --- | --- | --- | --- |
| I  Me  My  Mine  We  I believe  In my opinion  According to me | Our  Us  Ours  Myself  We're  I feel  As I see it | I'm  Ourselves  We've  I know  As far as I'm concerned  I think  Personally | I have  I will  We can  Our experience  From my point of view  In my perspective |

Do use or model from the following examples which are written from an observational third person perspective:

|  |  |
| --- | --- |
| "The researcher" or "the observer"  "It was observed that..."  "The data suggest..."  "The experiment revealed..."  "The results show..."  "One can infer that..."  "The study indicates..."  "The findings imply..."  "The evidence supports..."  "An analysis of the data" | "The procedure was executed as follows..."  "The measurements were taken..."  "The subjects/participants behaved in a certain way..."  "The test conditions were controlled..."  "The trends in the data"  "The observations were made by the team."  "The process was documented as..."  "The phenomenon was recorded."  "A statistical analysis was conducted."  "The data were collected and analysed." |

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**Report Layout and Style**

T­he following guidelines **must** be adhered to:

* All **text will be black** in the report unless in very exceptional circumstance.
* Main body text must be at least **11pt font** using either **Arial or Calibri** font.
* Main body text will have **1.5 line spacing**.
* **Margins** will be a minimum of **2 cm on each side**.
* All **pages** will be **numbered consecutively**.
* Start **each section on a new page**.
* **Figures** must have **captions** and be **numbered** (e.g., Figure 1).
* **Tables** must have **captions** and be **numbered** (e.g., Table 1).
* **Figures** may be **black and white**, or **colour**.

**Word Count**

* There is a **10,000-word limit** for the project. This is a maximum, not a target. Shorter is often better.
* All words in the main body, excluding words in figures and tables, will be included in the word count.
* Consider what can be removed from the main body and placed in an appendix to reduce the word count as not every detail may be necessary in the main document.

**Copyright and Intellectual Property Rights (IPR)**

Your report should be written considering that it will be within the public domain. Normally, you retain copyright over your written work and Intellectual Property Rights (IPR) over any technical work. There are rare situations where this might not be as simple, for example when working with a company, external client, or on a larger university project. There are strategies you can utilise:

* You can inform your supervisory team that the project cannot be made available to other students undertaking an MSc Project.
* You can provide a shortened report for sharing that does not contain the protected information.
* You can assign IPR to the external collaborator, although you should take great care when doing so. It is best to speak to your supervisor.
* Non-disclosure agreements can be made between the external collaborator and the supervision team.

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Summary of the project sections

1. **Introduction – setting the scene.**
   1. Problem statement.
   2. Aims and objectives.
   3. Motivation/background.
   4. Legal
   5. Social
   6. Ethical
   7. Professional
   8. Report outline.
2. **Literature - Technology review –** a thorough investigation of the problem background and options for solving it.
3. **Methodology –** Given the findings of the previous sections, which methods and approaches may be suitable for your problem, and which one will you choose?
4. **Implementation –** How was methodology described in the previous section applied in order to solve your specific problem? i.e. A description of what you did.
5. **Results –** What is the final outcome of results the of your implementation and evaluation?   
     
   **Evaluation –** How was your implementation validated? Described the steps that you took to evaluate the extent to which your implementation has met the aims of the project.   
     
   **Work of Others** - How do your results and evaluation compare to the work of others?
6. **Conclusion –** a summary of your main findings, a personal reflection and proposal for future work.
7. **References**
8. **Appendices**

Redefining Financial Flexibility

Deferred Payment Platform

By

Abigaela Popescu

Submitted to

**The University of Roehampton**

In partial fulfilment of the requirements

for the degree of

**BACHELOR OF SCIENCE IN COMPUTING**

**Date:** 03/12/2024

Signed (apply signature below)

**Declaration**

I hereby certify that this report constitutes my own work, that where the language of others is used, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of others.

I declare that this report describes the original work that has not been previously presented for the award of any other degree of any other institution.

Acknowledgements

Here it is customary to thank the people who have supported this work and your studies in general. It is up to you who you thank!

Abstract

GUIDANCE: Up to 300 words

A short summary of your project to include the problem, the main literature reviewed, your implementation and your findings.

Write this after you have finished the entire report!

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# **Introduction**

In the modern era of the World Wide Web, online shopping has gained immense popularity due to its convenience. Virtual shopping, unlike physically visiting a store, enables users to explore a wide range of products or services from the comfort of their homes and at their own convenience. Alongside this rapid growth, the Buy Now, Pay Later (BNPL) scheme has also been widely adopted across the globe with an estimated rise of 105% market growth from 2024 to 2028, which is estimated to reach a total of BNPL transactions value of $687 billion by 2028 [1]. This service provides shoppers with a flexible payment plan by allowing them to split the cost of their purchases into multiple instalments while receiving their items immediately. Notable examples include Klarna, Affirm, and Afterpay, which collectively cater to over 20 million users worldwide and are partnered up with 144,000 merchants [2]. Failing to make a payment on a BNPL plan may carry less severe repercussions compared to missing a credit card payment. Unlike traditional credit lending, BNPL services may not affect a user’s credit score, depending on the platform terms and conditions. Klarna, the Swedish-owned company, and other similar platforms, have started reporting data to credit bureaus, which could impact credit scores more directly.

The Problem

However, despite its popularity, the Buy Now, Pay Later model is not flawless, especially in the context of the current economic climate. One significant issue is the growing cost-of-living crisis, which has placed a financial strain on individuals, particularly those from younger, lower income households [3]. Many users turn to BNPL services as a means of purchasing not only non-essential goods but, alarmingly, sometimes even essentials such as groceries or household items. This creates a cycle of dependency, where individuals are drawn to BNPL schemes as a temporary solution to their financial constraints, only to face the payment obligations later. According to a study by Qualtrics on behalf of Credit Karma, 34% of Buy Now, Pay Later users have fallen behind on one or more payments [4] resulting in the application of late fees in addition to the original instalment payment. For those already struggling to make ends meet, the risk of extra fees and falling into a deeper financial hole must be considered, making it crucial to address this issue.

Another pressing problem lies in the lack of financial education surrounding BNPL schemes, coupled with insufficient transparency in terms and conditions. Consumers are often unaware of the hidden fees, potential penalties, or interest rates that may apply if payments are missed. This lack of clarity disproportionately affects younger generations and first-time users, who may lack the financial literacy needed to understand the long-term implications of using BNPL services. The result is an unintentional buildup of debt that could otherwise be avoided through clearer communication and educational efforts by providers.

Similarly, the lack of financial education surrounding BNPL schemes, coupled with insufficient transparency in terms and conditions is alarming. Consumers are often unaware of the hidden fees, potential penalties, or interest rates that may apply if payments are missed. This lack of clarity tends to affect younger generations and first-time users, who may lack the financial literacy needed to understand the long-term implications of using BNPL services. As a result, it creates an unintentional buildup of debt that could otherwise be avoided through clearer communication and educational efforts by providers. Furthermore, traditional credit systems are often inaccessible to users with limited or poor credit histories, leaving BNPL services as one of the few options available. Research [5] indicates that 58% of individuals use BNPL platforms primarily for their accessibility and speed in providing credit, while 67% consider them a favourable alternative to traditional credit card instalment plans. However, without financial education actively promoted on the platform, the users that are not familiar with credit lending may worsen their situation due to lack of better knowledge. Additionally, the absence of adequate safeguards and responsible lending practices within some BNPL platforms amplify this issue, especially in regions where government credit regulations are still catching up to the rapid rise of this payment model. Addressing these problems is crucial to fostering a more honest and sustainable financial ecosystem. By ensuring affordability, transparency, and accessibility for the users, we can ensure that BNPL platforms serve as tools for convenience rather than sources of financial strain.

## Aims

The project aims to develop a revolutionary BNPL platform that not only meets the needs of its users and stakeholders through inclusive financial assessments but also prioritizes their financial well-being through educational features that will gradually improve their financial literacy. The objective is to promote user awareness of personal spending behaviours and reduce the likelihood of debt accumulation through the implementation of a minimalist, user-focused design. Moreover, {platform name} emphasizes integrity and full transparency to empower users of all demographics to make well-informed decisions, thereby safeguarding them from deceptive business practices.

## Objectives

The objectives of this project are centred around the development and analysis of a Buy Now Pay Later (BNPL) platform that addresses both ethical and technical issues. The process begins with conducting research on existing BNPL platforms to identify and record ethical and technical challenges. Following this, personas and use cases will be created to better understand the user base and inform the design process. A web application framework (MVP) of the Deferred Payment Platform will be developed using Figma, gathering user feedback to refine the design. The application will then be built using CSS, HTML, and Node.js on Visual Studio Code. To support efficient task management and ensure timely progress, a task management tool will be utilized throughout the project. Additionally, a focus group will be scheduled to brainstorm potential features for the application. Additionally, the creation of a UML diagram will be used to visualise the system and software architecture which can be found within the Methodology section of this report, followed by the completion of a report to thoroughly analyse and discuss the project in detail.

## Legal

The legal considerations for this project encompass a broad range of issues, from intellectual property rights to data protection and consumer privacy. To protect intellectual property, copyright must be granted and registered upon creation, and trademarks should be registered in relevant jurisdictions to prevent unauthorized use. Trade secrets will be protected through non-disclosure agreements (NDAs) with employees, contractors, and business partners, and access will be controlled using encryption. Consumer data will be safeguarded by restricting access and only allowing reproduction or reuse under licensing agreements. Documentation for all open-source components will be maintained to ensure compliance with licensing terms, and any modifications or derivative works will adhere to these terms. If innovative features or algorithms are developed, a patent will be sought. Regarding third-party integrations, such as the Plaid API, only datasets with clear redistribution rights will be uploaded, and API keys will be managed responsibly. The platform will comply with data protection regulations like the General Data Protection Regulation (GDPR), ensuring users have full rights to their data, and will implement strong authentication and encryption practices for user accounts. The project will also adhere to accessibility guidelines, such as the Web Content Accessibility Guidelines (WCAG 2.1), to ensure inclusivity for users with disabilities, and will maintain compliance with relevant legal frameworks, including the Equality Act (2010), the Americans with Disabilities Act (ADA) and the European Accessibility Act (EAA), etc. Regular security audits, incident response plans, and transparent communication with users about data collection and processing will be fundamentally carried out to maintain legal compliance and consumer trust.

## Social

The project addresses several significant social considerations, aiming to foster inclusivity and enhance accessibility for diverse user groups. It bridges the socio-economic divide by offering affordable, flexible payment solutions, enabling individuals from lower-income backgrounds to access essential goods and services, such as education-related devices. The platform incorporates disability-friendly features, complying with the Web Content Accessibility Guidelines (WCAG), to ensure usability for individuals with visual, auditory, and cognitive impairments. Additionally, it promotes financial literacy through educational tools, budget trackers, and real-time spending insights, which help mitigate financial mismanagement. By incorporating ethical AI algorithms and diversifying user feedback during design and testing, the project ensures fair treatment of all groups. The use of sustainable development practices, including energy-efficient cloud services and minimizing e-waste, further supports its long-term positive environmental impact. Job creation opportunities are embedded through the need for skilled professionals in areas such as data analysis, cybersecurity, and customer support. Furthermore, the project promotes open-source contributions, with public repositories on GitHub, and advocates for open data initiatives, such as using anonymized data to study BNPL usage and its socio-economic impact. These efforts contribute to a more inclusive, sustainable and socially responsible platform.

Ethical

To ensure the ethical integrity of this project, several steps have been taken to address privacy, transparency, and inclusivity while complying with the University's ethical standards. All focus group participants and contributors' privacy and confidentiality have been strictly upheld, and no copyrighted or proprietary information is shared without proper permissions. The platform follows GDPR standards, limiting data collection to essential information and allowing users to access, modify, or delete their data. Transparency is prioritised by providing clear explanations of algorithms, processes and terms, as well as maintaining a public repository for non-trademarked information on GitHub. Measures to mitigate algorithmic bias include using diverse training datasets, regular audits and a human review process for flagged cases, ensuring fair and impartial decisions. Accessibility is enhanced through WCAG-compliant features such as keyboard navigation, text resizing, and voice assistance, along with multilingual and low-end technological support. Environmental impacts are minimised by hosting on energy-efficient cloud services, optimising software for energy efficiency and exploring carbon offsetting in hopes of minimising long-term environmental effects. These ethical considerations aim to create a platform that is inclusive, fair and sustainable, while educating users by promoting responsible digital practices.

## Professional

All projects will have professional considerations. You are marked on your ability to identify them and take any actions necessary.

Consider the issues that your project has under each heading. Discuss with your supervisor if you are not sure. If your project required ethical clearance, then this must be clearly stated in this section, including how the ethical considerations were managed.

## Background

The development of this BNPL platform is motivated by both personal experience and a desire to address socioeconomic and technological challenges in accessing financial services. Having relied on BNPL services during times of financial difficulty, I understand firsthand the significance of these platforms in enabling access to non-essential goods and enriching experiences that would otherwise be out of reach. This project aims to extend these benefits to a broader audience, particularly older individuals who may lack digital literacy or awareness of these services. By tackling these challenges, the platform offers an inclusive approach to bridging the digital and financial gaps between the different demographics. Rooted in my personal journey and an understanding of user needs, this project seeks to enhance digital literacy, promote responsible financial practices and empower users from diverse socioeconomic backgrounds, thereby offering flexible and affordable options to a happier life.

## Report overview

This report is structured to provide a comprehensive analysis of the project. The Introduction includes the Problem Description, Context and Motivation, followed by the Aims and Objectives, and further explores the Legal, Social, Ethical and Professional Considerations, along with Background information. The Literature and Technology Review will evaluate existing research and technologies relevant to the project, while the Methodology outlines the approach taken to develop and implement the solution. The Implementation section describes the development process, and the Results section will include the Evaluation and Related Work as sub-categories to assess the project’s outcomes and robustness and compare it with similar initiatives. The Conclusion will also be divided into Reflection and Future Work to summarize key findings, assess the project success and suggest potential improvements. Finally, the References and Appendices will be providing supporting materials and documentation. This structure has been designed to offer a clear and in-depth analysis of the project and showcase the process transparently.

# **Literature - Technology Review**

## Literature Review

This literature review evaluates the ethical challenges associated with Buy Now, Pay Later (BNPL) platforms, focusing on four key themes: encouraging over indebtedness and impulsive shopping, limited protective measures for BNPL lenders, lack of transparency and deceptive tactics, and the exacerbation of financial strain due to the rising cost of living. These themes are critical in understanding how BNPL platforms impact user behaviour and financial stability, aligning with the project's objective to create an ethical and transparent BNPL alternative.

Impulsive Decision-Making

Buy Now Pay Later (BNPL) platforms are renowned for promoting impulsive spending habits through targeted advertising and gamified interfaces. Mohammed T. Nuseir describes impulse buying as a “phenomenon borne by artificial needs or overbearing desires of customers to own something” [6]. He discusses how social media plays a significant role in fostering impulsive buying behaviours. The research highlights that targeted advertising and persuasive techniques often create an environment that encourages consumers to make unplanned purchases. Similarly, in the Buy Now, Pay Later (BNPL) sector, platforms like Klarna and Afterpay leverage such tactics, encouraging unplanned purchases through persuasive techniques. These practices reflect a clear connection between the use of digital engagement tools and an increased likelihood of impulsive shopping. A 2023 study by Consumer Insights revealed that 62% of BNPL users admitted to purchasing items they did not initially plan to buy [7], suggesting a direct correlation between BNPL services and impulsive shopping dependency on these services, creating a dangerous financial situation for users already susceptible to economic pressures. Addressing this issue requires the integration of financial education and responsible lending practices into BNPL platforms to promote ethical, informed decision-making and reduce reliance on impulsive purchasing behaviours.

Limited Protective Measures for BNPL and Unethical Practices

The rapid growth of Buy Now, Pay Later (BNPL) platforms highlights significant risks users may face due to inadequate consumer protections. Unlike traditional credit systems, BNPL services often employ rigorous credit checks which increases the likelihood of financial vulnerability. For instance, research by Credit Karma revealed that 34% of BNPL users have fallen behind on payments, with many lacking a clear understanding of the associated late fees and repayment terms [8]. This statistic underlines a key issue with BNPL: many users engage with these platforms without fully grasping the financial obligations, such as penalties or charged repayment schedules. This issue is particularly concerning given the accessibility and marketing of BNPL as an effortless alternative to credit cards.

Furthermore, another trend identified by the Consumer Financial Protection Bureau (CFPB) found that late fees among BNPL users have risen significantly. In 2020, 7.8% of users reported incurring at least one late fee, a figure that grew to 10.5% by 2021 [9]. This increase highlights the growing financial strain among BNPL users and suggests an industry level issue where customers may not have been provided with the resources needed or reminders to manage timely repayments. The rising late fees also point to a potential profit-based motive for providers, as a significant portion of their revenue comes from user penalties.

BNPL users have been found to often be younger and lower-income individuals, with 41.6% of users under the age of 36 and earning less than $75,000 annually [10]. This demographic often lacks financial literacy and experience with such services, making them more susceptible to overextension beyond their means. The convenience and accessibility of BNPL contribute to impulsive spending habits, as users are often drawn to instant gratification without considering long-term financial implications. Studies show that 69% of BNPL users turn to these services to meet immediate needs when short on funds, further illustrating how the platform is marketed toward financially vulnerable populations for the gain of the company [5]. Additionally, 58% of users favour BNPL for its ease of access compared to traditional credit systems [11]. While this convenience is an advantage, it lays a trap for those with limited means to recover from their uninformed decision-making.

From a business perspective, BNPL providers benefit from fast transaction settlements and reduced chargeback risks, making the model highly appealing to merchants and partnering retailers. However, the lack of transparency further heightens user risks. Ethical Consumer reported that 18% of BNPL providers’ revenue comes from late payment fees, suggesting that user penalties are a deliberate and significant component of the BNPL revenue model [9]. The reliance on user errors raises ethical concerns about the sustainability of the business model and its long-term effects on its financially vulnerable users. However, few regulators have started responding to these risks. In the United States, the CFPB now requires BNPL platforms to provide dispute resolution, refunds for voided services and transparent billing and contracts between the provider and users [9]. Implementing affordability checks and financial counselling features can further mitigate risks and help ensure responsible use of BNPL services.

Financial Strain Due to Cost-of-Living Crisis

The cost-of-living crisis has highlighted the detrimental effects of BNPL platforms on their primary demographic: lower-income populations. These platforms are frequently marketed as an accessible solution for financial shortfalls with studies showing that 69% of users rely on BNPL to cover essential expenses like groceries and utilities when funds are insufficient [5]. While this convenience offers short-term relief, it often leads to long-term financial instability, particularly for individuals already struggling to manage their finances.

For those living paycheck to paycheck, the accumulation of multiple BNPL payments can exacerbate financial hardship. Missing payments not only incurs late fees but also creates a snowball effect where individuals fall further behind on obligations, increasing their risk of bankruptcy. In extreme cases, this can lead to the loss of essential property or services, such as housing or utilities, as financial priorities become misaligned. As previously mentioned, according to the Consumer Financial Protection Bureau (CFPB) 10.5% of BNPL users were charged at least one late fee in 2021, up from 7.8% the previous year [9], illustrating the financial strain these platforms can place on users who are least equipped to recover.

This demographic vulnerability is further compounded by BNPL providers’ marketing strategies, which often downplay the risks of using such services. By targeting low-income groups who may already lack financial literacy or resources, BNPL platforms contribute to a vicious cycle of debt that can have severe consequences. During periods of economic crisis these risks become even more pronounced, as individuals face increasing pressures to prioritise immediate needs over long-term financial stability.

To address this issue, this project will focus on adopting measures to support users more responsibly and providing them with a safety net in these hard times. Implementing affordability checks, offering financial counselling, and ensuring transparent communication about risks can mitigate some of these challenges. Without these changes, BNPL platforms risk further harming the very populations they claim to support.

## Technology Review

As for the technical side of the project, I will consider a variety of technologies that can be utilised to develop and deploy the platform effectively. To begin with, the project will use Visual Studio Code as the Integrated Development Environment (IDE) and may explore Google Colab as a supporting platform. These guarantee a wide range of programming languages and tools, offering flexibility and ease of use for development. For version control and project management, GitHub will be employed to track tasks, maintain a clean digital workspace and share materials and any licenses required publicly.

The framework suited best to the project is the Node.js framework, using JavaScript. It will power the backend logic of the platform, providing scalability and efficient handling of concurrent requests. Consequently, frontend of the application will be built using React, a popular JavaScript library that enables the creation of dynamic and responsive user interfaces. Not only is React an open-source framework that allows for contributions from both the developer and the broader community, but it also as a result, fosters collaboration and further ethical development inspired by the project. To store user data and handle transactions, MySQL or Azure SQL Database will be used, allowing for robust, scalable and secure database and transaction processing. Deployment will heavily rely on Microsoft Azure as it offers a free tier with limited services and resources within a certain bandwidth limit. This makes it particularly suitable for a university project. To factor in for scalability, Microsoft Azure recommends switching over to the paid model that is able to host larger projects and businesses and would pair ideally with Azure SQL Database. The integration of Plaid API will be considered for handling financial data securely, enabling seamless bank account connectivity for users, ensuring compliance with financial regulations. The decision to use Plaid API is driven by its history of fintech developments and focuses on secure financial integrations, an essential feature for a BNPL platform.

Meanwhile, Figma is a tool that will enable the conception of the user interface prototype and final version of the application, establishing its aesthetic elements and functionality through visual means. Additionally, Google Forms will be utilised to gather insights from users during the development and testing phases. Figma and Google Forms both support the user-centred design process, allowing for iterative testing and feedback collection throughout the project lifecycle. The feedback gained will be used for improvement and informative insights into the usability of the current application state.

Regarding the physical aspect of the project, hardware for the development process will include a personal computer equipped with an Intel i7 processor and 16GB of Random Access Memory (RAM), ensuring optimal performance during development. The 16GB of RAM will ensure that the program can successfully scale without limitation, while the selected processor will improve the efficiency of the development stages. Additional smaller peripheral components needed include: a mouse, keyboard, Quad High-Definition (QHD) 144hz monitor for digital display. A high-definition monitor with a good refresh rate is also required as it can make the difference between seamless transitions within the web application and a jagged, slower experience. Moreover, a newer smart mobile device is required for testing the mobile application to ensure optimal functionality and user experience across different screen sizes and operating systems. This testing will help identify and resolve potential issues, ensuring the application meets the expectations of end-users equally on mobile platforms. Lastly and most importantly, the project requires an Ethernet cable or Wi-Fi router for reliable internet connectivity, ensuring seamless communication between the application and cloud services. This network infrastructure is essential for data transfer, user interaction and real-time access to key features and supporting the overall functionality of the platform. These careful technological choices ensure that the project is not only functional and user-friendly, but also robust in handling unforeseen challenges with a solid infrastructure that supports future scalability.

## Summary of Outcomes of Literature and Technology Review

|  |  |  |
| --- | --- | --- |
| **Technology** | **Benefits** | **Limitations** |
| Node.js with React | Enables scalable and efficient backend and dynamic, responsive frontend development. | The learning curve for advanced features that will be implemented may extend development time. |
| MySQL/ Azure SQL Database | Provides secure, scalable, and reliable database solutions. | Requires difficult configuration for seamless cloud integration with Microsoft Azure. |
| Plaid API | Ensures secure handling of sensitive financial data as per regulatory compliance. | May add complexity to the application’s development and testing phases. |
| Microsoft Azure | Offers scalable deployment and free-tier options for lower cost budget and management. | Free-tier limitations may require additional funding for scalability during the project. |
| Figma and Google Forms | User-centric design for best user experience and allows iterative testing for better usability. | User feedback might be limited to a smaller test group, potentially reducing broader applicability. |

Insights into impulsive decision-making suggest that incorporating user education features, such as financial literacy tips and spending analysis tools is essential. Gaps in consumer protection literature emphasize the need for prioritising transparency, affordability checks, dispute resolution mechanisms and other secondary protective measures in the project's methodology. The negative perspectives on BNPL highlight the importance of addressing ethical concerns while showcasing the benefits of the platform for informed users. These findings justify the project's focus on creating a user-centric and ethically transparent BNPL platform and stress the importance of designing features that comply with emerging regulations.

The methodology will also be influenced by the selection of Node.js and React for scalability, though additional time may be required to learn advanced features. The complexity of the Plaid API requires a modular development approach to minimise integration risks, while feedback from Figma prototypes and Google Forms will guide iterative improvements in user interface design and functionality. The project’s deployment on Azure offers a cost-effective solution during development but requires emergency planning for scalability in case of increased usage. Additionally, incorporating robust database solutions and regulatory-compliant APIs aligns with the project's goal of ensuring ethical financial data handling for users and retailing partners both.

# **Methodology**

The methodology this project will follow is Agile project management and is designed to create a user-centric, ethical and transparent Buy Now, Pay Later (BNPL) platform. After each round of testing improvements will be made based on the findings and the platform will be re-tested to ensure it is evolving in the right direction. The approach will combine thoughtful selection of technologies, a user-centred design, iterative testing and continuous evaluation. This section outlines the key steps involved in the project, including design, testing, project management and the chosen technologies and processes, in alignment with the findings from the literature and technology reviews.

**Design**

The design phase centres around developing a transparent BNPL platform that minimises the ethical concerns identified in the literature review. This includes addressing impulsive buying behaviours, limited consumer protections and financial strain due to the cost-of-living crisis. The platform will incorporate features to promote responsible financial decision-making, such as integrated financial education tools, real-time spending analysis and transparent repayment schedules. A special feature will be implemented that will allow users to deposit a percentage of their monthly payments into a ‘Buffer Bag’ every time they make a payment. Later it can be used to contribute to upcoming instalments as a safety measure for vulnerable users. The platform must be easy to use and intuitive by all demographics – younger and older. Multiple languages will also be integrated into the application so that important information can be clearly relayed to the user base.

The user interface (UI) design will prioritise simplicity and accessibility. The use of Figma for prototyping will ensure that the platform is easy to navigate and that feedback is incorporated iteratively into the design. Figma's collaborative nature will also enable the involvement of potential stakeholders during the design process, ensuring the platform's alignment with user needs and ethical standards. Google Forms is a tool that will be used for collecting feedback from early users to refine the interface and ensure a positive user experience.

On the backend, the platform will utilise Node.js which is ideal for scalable and efficient development. The backend will be responsible for managing user data, processing transactions securely and integrating with external APIs, such as the Plaid API, to facilitate financial data handling. React will be employed for the frontend development to create a dynamic and responsive user interface, ensuring the platform’s performance is optimal on both desktop and mobile devices as to promote user inclusivity.

**Testing and Evaluation**

Testing and evaluation are crucial to ensure that the BNPL platform functions as intended and meets the requirements set out in the design phase. The testing strategy will involve several stages: unit testing, integration testing, system testing and user acceptance testing.

* **Unit Testing**: Each module of the platform will be tested independently to ensure that it performs the expected functions. For example, the backend structure responsible for handling transactions will undergo rigorous unit tests to verify its correctness and reliability.
* **Integration Testing**: This phase will test how the various modules of the platform interact with each other. For instance, the integration of Plaid API will be thoroughly tested to ensure seamless and secure communication between the user’s bank and the platform.
* **System Testing**: The entire platform will be tested as a whole to evaluate its overall functionality. This will include checking for issues such as data synchronization, transaction processing, error handling and visual inconsistencies.
* **User Acceptance Testing**: The platform will undergo user feedback-based testing to ensure that it meets requirements and expectations. During this phase, feedback gathered from early users via Google Forms will be used to identify areas for improvement and further refinement.

**Project Management**

Effective project management is essential to ensure that the project is completed on time and within scope. The project will follow an Agile development methodology, which will allow for flexibility and continuous iteration based on feedback from stakeholders and users. Agile is particularly suited for this project due to its ability to adapt to evolving requirements, feedback-based improvements and its focus on iterative development and testing.

The project will be divided into sprints, each lasting three weeks. At the beginning of each sprint, specific tasks and goals will be outlined. These tasks will include both technical development work (e.g., coding, testing) and non-technical tasks (e.g., gathering feedback, refining designs, etc.). At the end of each sprint, the project will be evaluated and adjustments will be made as necessary based on the feedback and testing results. A kanban board will be used to track the progress of each task set and will be used regularly before, during and after a sprint is completed.

GitHub will be used for version control and occasional project management alongside the kanban board. It will enable efficient progress tracking, sharing code and collaborating efficiently with supervisors and partners. The use of GitHub’s issues and organisational structures will help maintain the repository organised, track occurring bugs and ensure that all aspects of the project are completed according to the timeline.

**Technologies and Processes**

The selection of technologies and tools has been guided by the need to ensure scalability, security and user-friendliness while also adhering to ethical standards for handling financial data. The key technologies chosen for this project include:

* **Node.js and React**: Node.js will power the backend of the platform, providing scalability and the ability to handle multiple concurrent requests efficiently. React, a popular JavaScript library, will be used for the frontend to create a dynamic and responsive user interface. Both technologies are widely used, well-supported, and have active developer communities, making them ideal choices for this project. Contributing to the communities is a minor side aspiration to come out of this project.
* **MySQL or Azure SQL Database**: MySQL or Azure SQL Database will be used to store user data and process transactions. Both databases offer secure, scalable and reliable solutions for managing large volumes of data, which is crucial for ensuring the long-term sustainability of the platform.
* **Microsoft Azure**: The platform will be deployed on Microsoft Azure, which offers a free tier that is suitable for the initial stages of development. As the platform scales, Azure’s paid models will be used to ensure that the infrastructure can support an increased user base.
* **Figma**: Figma will be used to design the user interface and prototypes. It allows for collaborative design, ensuring that the UI is aligned with user needs and feedback. The iterative design process facilitated by Figma will help ensure that the platform is both user-friendly and meets ethical standards. Following conception, user feedback will be requested for each step of development.
* **Google Forms**: Google Forms will be used to collect feedback from users during the development process. This tool will enable the team to gather insights on the usability of the platform and make informed decisions about design and functionality improvements.

The development and testing process will be closely monitored using project management tools, ensuring that deadlines are met and that the platform is continuously improved based on stakeholder feedback.

# **Implementation**

GUIDANCE: Up to 3000 words

Finally, you can tell us WHAT you did, i.e. How did you apply the methodologies you have described in the section above to your actual problem.

This part can be very descriptive but please avoid excessive detail.

Some strategies that can help you write this part:

* Choose a writing style (e.g., first, second, or third-person perspective).
* Start this section with any design work you might have done e.g., System design/architecture, UX design artefacts etc.
* If you divided your work into sprints, that can be a good structure for this section.
* Only include code snippets for particularly challenging parts of your implementation.
* Pick out a few difficult problems you had to solve and tell us in detail how you solved them. This brings your experience to life.

**Refer to the Project Report Builder on Moodle for content that you should include in this section.**

# **Evaluation and Results**

GUIDANCE: Up to 2000 words

This is an important section where you weigh up the strengths and weaknesses of your artefact.

Guidance: If your project has a user-facing element, we expect to see some kind of evaluation of this with representative intended users, for example a ‘think aloud’ usability test.

You can also apply standard metrics for the domain you are working in and see how you have done against them. **Your project does not have to be perfect -- indeed the outcomes might have been bad.** The point is you must evaluate the outcome and discuss its strengths and weaknesses.

This section should include the following subheadings:

* Related Work

**Refer to the Project Report Builder on Moodle for content that you should include in this section.**

# **Conclusion**

GUIDANCE: Up to 1500 words

The conclusion summarises the project. Start by summarising the overall outcome of your project and to what extent the aims and objectives have been met. You need to highlight your key outputs and/or discoveries.

The following subsections that must appear in your conclusion.

## Future Work

Answer the question -- **What next?**

You've completed a significant piece of work -- perhaps the largest piece of work you have ever done. But no project is ever 100% complete, and you will have found new ideas along the way. If someone were to pick up your project, what avenues should be explored next?

This is an important section, and it helps us understand what you have learned by doing the project and allows you to show you understand what a more ideal solution might look like, outside the constraints of the MSc Project timeframe.

## Reflection

You must critically reflect on the entire project process and how well you have worked on the project. What particular things have you learned during the project? Why were you able and unable to meet project goals? What would have you done differently in hindsight?

**Refer to the Project Report Builder on Moodle for content that you should include in this section.**

# **References**

In this section, you **must** reference any sources used in your work. Typically, these sources will have come up during the investigation and related work sections. Your referencing must use the IEEE referencing style [IEEE Citation Guidelines2.doc (ieee-dataport.org)](https://ieee-dataport.org/sites/default/files/analysis/27/IEEE%20Citation%20Guidelines.pdf) .

It is **highly** recommended that you use reference management software such as RefWorks that is provided by the university. Your project should have as many references as is required. However, having few references indicates that no thorough investigation has occurred.

It is your responsibility to ensure that you have actually read all the material you reference, and that the references provided in your report are legitimate and **NOT AI generated**.

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[9] “CFPB Study Details the Rapid Growth of ‘Buy Now, Pay Later’ Lending,”, *Consumer Financial Protection Bureau*, Sep. 15, 2022. https://www.consumerfinance.gov/about-us/newsroom/cfpb-study-details-the-rapid-growth-of-buy-now-pay-later-lending/ (accessed Dec. 27, 2024).

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[2] T. Akana, “Buy Now, Pay Later: Survey Evidence of Consumer Adoption and Attitudes,” Federal Reserve Bank Philadelphia, Jun. 2022, doi: <https://doi.org/10.21799/frbp.dp.2022.02>. (accessed Dec. 03, 2024).

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# **Appendices**

Appendices appear after references. Your appendices depend on the nature of your project. **Do not assume people will read your appendices.** Even if you direct them to do so in your main text, appendices are considered additional information and should not be relied upon to understand your main body of work. Refer readers to an appendix using a phrase such as *see Appendix A for further details*.

The following documents **must** be included as references:

* Your Project Proposal.
* Evidence of your use of a project management tool.
* A description of how to access any technical output. **It is strongly recommended you use GitHub or something similar to do this.**

Any important communications between you and external stakeholders -- **please ensure private data is removed and communications anonymised.**