



University  
of Glasgow | School of  
Computing Science

Honours Individual Project Dissertation

STUDENT SKILLS & EXPERIENCE  
EXCHANGE: [LOOPSIO.COM](https://loopsio.com)

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## Abstract

This work investigates the potential opportunity for a digital platform to allow students to exchange technical skills for work experience from real-world clients with a view to enhancing their theoretical knowledge through practical applications. After gathering requirements from key stakeholders, designing of information and system architectures for the platform, and implementation, an evaluation was conducted that determined student and client demand exists for such a platform to compliment existing services within and outwith The University of Glasgow.

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Signature: Omar Tufayl Date: 9 March 2019

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# 1 | Introduction

The importance of effectively interacting with others and efficiently managing oneself in collaboratively based projects is vital in today's working environments. [1] Practical and so called soft-skills, are particularly relevant for students in a technical discipline, such as Computing Science, where the variance in knowledge between stakeholders in a project can be vast. [2] The ability to bridge technical expertise gained in a formal context to successful application in real-world environments is a fundamental requirement for students to be fully equipped to handle opportunities and challenges of the workplace.

Providing students therefore with easily accessible avenues to establish a breadth and depth of experience in developing, deploying and managing projects with real-world clients during their studies would enhance their understanding and ability to effectively utilise and apply technologies and software engineering practices being learned. [3]

Additionally, offering industry access to work with students while they are still at university can potentially increase engagement with the student-body and enable relationships and modes of mentorship that may lead to future employment and other opportunities. By building up a portfolio of easily accessible real-world work while at university, students can be empowered to simultaneously improve their skills and standing in the job market, with documented, relevant experience complementing their academic record.

This project will investigate, develop, evaluate and propose future work for a web-based platform that allows Computing Science students at The University of Glasgow to bid on software related jobs posted by real-world clients. Demand for and the effectiveness of the platform will be evaluated through usage and acceptance testing with students and clients.

## 1.1 Motivation

Recognising there is a need to supplement student learning with practical real-world applications, The University of Glasgow currently runs a number of initiatives [4] to introduce students to the multifaceted dynamics of delivering software solutions under real-world conditions.

The most noteworthy of these are services provided by The Internship Hub [5], which in collaboration with companies and organisations, arranges internship opportunities ranging from summer placements to part-time work. Another notable initiative is a year long engagement with real-world clients structured as a Team Project that takes place for Computing Science students in their third year. [6] Other activities students can also get involved with to gain real-world experiences are Compumatch [7] and Hacky Hour [8], collaborative and drop-in services run within the Computing Science department.

Options to gain experience for Computing Science students additionally exist outwith university in the form of freelancer websites where people from all over the world can advertise

their skills and connect with clients to undertake a range of services.

While the aforementioned solutions have their merits, this work is based on the premise that there exists an opportunity for an easily accessible and mainly self-serving digital service that is run from within the university, and which allows clients and students to engage with each other in the exchange of student skills for client experiences.

## 1.2 Aims

This project will develop a web-based platform that allows Computing Science students at The University of Glasgow to bid on software projects posted by real-world clients. The platform will cater primarily to two main stakeholders: students and clients.

Students ranging from undergraduate to postgraduate levels will be able to create profiles with information on their study program, current education level, technical and management skills they possess and a short biographical account of themselves. They will also be able to browse a list of currently available jobs, gathering information about the work being advertised and the client. Bidding functionality will be accessible to students to communicate to clients their interest in undertaking particular advertised jobs. A workspace will be developed to allow students to monitor and manage their bids and work they are currently engaged in.

Clients representing businesses and organisations will be able to create profiles detailing information about their activities and projects, with links to their websites for more information. Once they have created an account they will be able to post job listings, outlining the type of job, the estimated hours and financial remuneration available to students who complete the job. Clients will also be able to receive and monitor bids on their jobs and manage their posted jobs and work currently being undertaken by students.

Requirements will be gathered using questionnaires conducted with students, key department representatives within the university that manage current efforts to supplement student education with real-world experience opportunities such as Computing Science Business Development, the Enterprise Initiative and The Internship Hub.

Evaluation will be done through interviews with students and clients seeking to assess the website's usability and its capacity to provide the previously mentioned aims. Specifically, interviews will be arranged with potential clients who have shown an interest in the development of the proposed platform. These clients include those working within the university and businesses and organisations whose operations are external but who interact with the university on an as per needed basis.

Market demand will be measured through an analysis of the evaluation and an investigation of similar services that are available. Cumulative opinions and preferences that emerge from across the evaluation will be assessed to determine the feasibility of future work on the platform.

To undertake this project, the key problems that need to be addressed include an initial period of requirements gathering with key stakeholders, a preliminary design of the core functional and non-functional aspects of the website and paper-prototyping basic interface guidelines. Once the basic foundational elements have been completed successfully, implementation will be undertaken by choosing a set of technologies that best suit the aims of the project. An evaluation will then be conducted to determine the validity of the original hypothesis. The key project deliverable will be a website, accessible via a unique domain name.

## 1.3 Summary

This chapter presented the aims and motivations of this project, drawing attention to how it fits into already existing services in The University of Glasgow, with the objective of complimenting their activities by way of providing an additional component to the university's measures to endow students with a well-rounded, world class education that includes theoretical and practical experiences. The remainder of this work is organised as follows:

- **Chapter 2 - Background:** Reviews existing work experience resources for Computing Science students within The University of Glasgow and surveys popular third-party websites that offer freelance services.
- **Chapter 3 - Requirements & Prioritisation:** Identifies and analyses the findings from requirements gathering work undertaken in connection with Computing Science students and clients internal and external to The University of Glasgow.
- **Chapter 4 - Design:** Drawing on the work undertaken in requirements gathering, this chapter seeks to architect an approach to illustrate how the project will be implemented.
- **Chapter 5 - Implementation:** Describes the technologies and methods utilised to implement the project, and the design decisions made along with their rationale, so as to maximise the potential deliverable per the requirements.
- **Chapter 6 - Evaluation:** Details the evaluative measures taken to determine whether the project has effectively met its requirements and validated the original hypothesis.
- **Chapter 7 - Conclusion:** Completes this work, summarising the findings made here, exploring potential opportunities for future work and deliberating on the experience of undertaking this project.

## 2 | Background

*“Software engineering research is best informed by the needs and challenges experienced by practitioners.”* [48]

— Dr. Tim Storer, Senior Lecturer in Software Engineering, University of Glasgow

This chapter discusses the currently available opportunities open to students to gain work experience to supplement their academic learning. A number of initiatives are available within the university and also externally. We will review them here and discuss their strengths and weaknesses, and also look for possible openings to establish further complimentary resources for students.

### 2.1 University avenues

Many work experience initiatives for students exist within The University of Glasgow, we will examine some of the most prominent ones as follows.

#### 2.1.1 The Internship Hub

The recommended route to gaining work experience for students currently within The University of Glasgow is by applying for internship opportunities with a range of organisations and businesses through The Internship Hub. According to The Internship Hub [5], these roles take the form of a program to develop students skills by “enabling students to investigate a particular role or industry” during summer, through on-campus engagements and local part-time positions.

What sets this initiative apart from job applications made through an external job board or directly to the employer, is that the internships are vetted by staff at the university and care is taken to support and advise the student during their time in employment.

#### 2.1.2 Team Project 3

Whether students have been able to secure internships or not, the Computing Science course introduces them to real-world experience through a team project that they encounter during their third year of study (TP3) [6]. This is a year long project, covering two academic terms, where students engage with real-world clients gathering requirements for a diverse range of projects initiated by the clients, developing solutions in partnership and collaboration with the

clients. The university provides a basic structure to the program, with students primarily being encouraged to organise themselves within team roles, develop and execute agendas, communicate effectively with the client, and build leadership and management skills during the experience.

### **2.1.3 Student Startups**

While the above two examples are formal routes for students to gain real-world experience, other schemes exist within the university that allow for a more unstructured approach to applying skills and gaining experience in the real world.

The first of these is the Computing Science Business Development [9] efforts oriented towards creating startups, taking cue from the abundance of examples in the real-world of technology related businesses. The second being the Enterprise Initiative [10] which is focused towards all university students regardless of their degree program. Both provide a means for students looking to set-up their own business with legal and financial planning, alongside access to funding sources and professional advisers and area-specific specialists.

### **2.1.4 Compumatch & Hacky Hour**

Other avenues to gain experience that are more informal and flexible are also available, namely Compumatch and Hacky Hour, both provided as drop-in services for networking between computer scientists and interested collaborators from other disciplines to engage in and solve technical and domain specific problems.

## **2.2 Alternative routes**

There are also many services external to the university that allow students to gain work experience, in particular the rise of freelancing websites has been gaining in recent years, and is our focus as it relates directly to the proposed platform in this work. We will review two of the more popular websites, Upwork [11] and Fiverr [12].

### **2.2.1 Upwork**

An online freelancer marketplace, Upwork is one of the most popular websites that allows clients to hire freelancers for various types of work including web and mobile development, design, writing, marketing and more. They claim to be used by more than 5 million clients, with businesses such as Microsoft, Dropbox and Airbnb using their services. Their success has been considerable, mainly due to freelancers being "an increasingly sought-after, critical, and expanding segment of the global workforce." [13]

### **2.2.2 Fiverr**

Another popular platform for freelancers to offer their services to clients is Fiverr. The name for the website originated from their original pricing structure where every service, called a gig [14] on Fiverr, would cost \$5. They have recently revised their pricing to allow freelancers to charge more or less, for varying levels of service.

## 2.3 Analysis

While the aforementioned initiatives function as an effective network of services that compliment each other providing students with needed real-world experience, this project is initiated on the hypothesis that there is an opening for a platform that allows students and clients to establish interaction on a digital platform taking advantages of a moderated, self-serving exchange, that can scale university wide, inline with university protections for students catering to a variety of job complexity for monetary and/or experiential gain.

A platform such as this would allow students to seek the type of work that provides the best interest for them and allow them to experience the full-range of practical and soft-skills required in completing a project of their choosing from start to completion with the added benefit of keeping the student squarely at the centre of design and development through an extension of the university's duty of care policy towards students.

The options that have been reviewed above are however currently insufficient in themselves or together to fully serve students in the dramatically changing jobs and education market. While the TP3 initiative allows students to interact with clients, it is only till their third year of study that students are able to take advantage of this. The Internship Hub on the other hand requires a longer-term commitment to gain experience and may not be convenient for students who are not able to devote the necessary time required especially during term time. Compumatch and Hacky Hour mainly suffer from not being mainstream enough in the university student-body awareness and due to their passive approach to onboarding students and clients. They are available but only if you're looking for them and even then they are not scalable initiatives that can expand university wide. Lastly, efforts geared towards more entrepreneurial students only appeal to a small percentage of students. [15] A service that caters to a wider student population is therefore proposed, that sits as a compliment to the already provided services by the university.

Whereas external platforms, such as Upwork and Fiverr are rapidly growing, [16] their primary disadvantage in a university based setting is that they do not fully cater to the unique needs and wants that exist for students [17] and are completely outwith the control structures of the university making it impossible to work in collaboration with them to tailor experiences specifically for students. Further, compensation is usually lower than for traditionally educated professionals on freelancer websites, [18] with the lowest bids usually winning, leading to a well-below-minimum-wage race to the bottom scenario alongside no oversight into client working conditions and practices. Also, on the whole, students are not fully-equipped to compete with global professionals in the market as yet, but nevertheless are still able to undertake projects with clients looking to engage specifically knowing that they are collaborating with students, who are advantageously exposed to the latest methodologies and technologies, [19] and importantly are available within a local context to clients. This specific aspect of locality which is often an off-putting element of existing platforms in that outsourcing on them can mean interacting with professionals who are not fully in harmony with clients needs, expectations and importantly culture. [20] There are also issues of a lack of laws to protect freelancers, especially the responsibility universities undertake to ensure students best interests and well-being. [21]

## 2.4 Summary

This chapter examined the various options available to students to gain work experience while at university. We also surveyed the most popular websites that connect clients with service providers and analysed their respective advantages and disadvantages.

## 3 | Requirements & Prioritisation

The requirements gathering phase of this project involved a process of several interviews with students and clients within and outwith The University of Glasgow to document their impressions of the proposed project alongside their specific opinions of the general scope of the project and key intended features to act as a source of reference before initiating the design stage. This requirements gathering phase also drew on research into existing similar platforms and insights gained during the authors summer internship experiences at the following companies: Clear Returns, Liberty Home Stores and CCRS Brokers.

### 3.1 Requirements elicitation

Students interviewed included four Computing Science undergraduates in their fourth year of study. They were asked to share their thoughts about previous experiences using similar platforms, whether they would be interested in a platform specifically designed with the unique needs of students like themselves in mind and how they would prefer to be compensated for services rendered. Questions concerned with what they thought would be the core requirements of such a platform were also asked together with how they thought the platform could be financially self-sustaining. Additionally, questions on how best to incentivise students to use the platform were asked along with discussions on the most effective strategy to maintain quality of service on the platform.

After interviewing students, clients who had expressed an interest in the project within the university were approached. These included key personnel at The Enterprise Initiative, Computing Science Business Development, and The Internship Hub. All three had valuable perspectives that enhanced the unique requirements and constraints as viewed from their respective vantage points.

Existing platforms that were researched comprising of Upwork, a global freelancing platform, and Fiverr, an online marketplace for freelance services. The majority of attention was given to Upwork which was formed through the merger of Elance and oDesk, the two most popular online freelance service websites.

Finally, drawing on insights gained during the author's own internship experiences, reflections were made on the knowledge and understanding acquired working at three companies: Clear Returns, a startup focused on helping businesses make better commercial decisions through the use of machine learning, Liberty Home Stores, a multi-million pound ecommerce operation, and CCRS Brokers, an insurance broker making the transition to digitising its core business operations as a foundation for future innovation in the insurance sector.

### 3.1.1 Students

A questionnaire was designed to elicit requirements preferences from students. This questionnaire had overlapping elements with that used to elicit requirements from clients but also included questions specific to students concerns and specific needs when addressing the suitability of the proposed platform.

An interview was arranged with each student whereby a series of questions were asked ranging from whether they had any experience using online freelancing platforms, if they would be interested in a platform specifically designed with students in mind and their thoughts and opinions on how such a platform should function to best incentivise student usage and deliver the most value for them.

Following is a summarisation of the answers received for each question asked to the students.

- **Have you ever used a freelance contracting site like Upwork, Fiverr etc?**  
All the students had heard of such sites but none of them had actually used their services.
- **Would you be interested in a service, exclusive to The University of Glasgow where you could see jobs and bid on those jobs to show interest in undertaking them?**  
Most students expressed their interest in using such a service, with one student wondering if they would have enough time to devote to being involved on the service particularly due to their lack of self-confidence in their skills and ability to provide any value.
- **How would you like to be compensated?**  
The majority of students said they would prefer to be paid a fixed amount per job, with one student choosing to be paid per hour. The final student stated that it would depend on the job size.
- **If you had an hourly rate, what do you think would be fair to you and competitive to attract employees?**  
An upper limit of being paid £10 per hour with a lower limit of £8 was stated. The majority chose the upper limit of £10 per hour as their desired rate of pay.
- **What else would you like to get out of such a platform?**  
The primary response to this question was wanting experience and learning opportunities through interacting with clients. Additionally, networking, CV building and gaining exposure were intents for using the platform.
- **What do you think of having mentors on the site to help you out and review your work?**  
All students agreed that they would welcome additional help and support through contact with a mentor available on the site. Mainly as a means of validating their activities and peer reviewing it to give them more confidence in the quality of their work.
- **What features do you think are important to have initially in such a system to make you want to use it?**  
Having a publicly available profile page with a unique url was the most important thing to incentivise students to want to use the platform. Being able to filter jobs to find opportunities to match their interests was also mentioned, along with being able to be paid directly through the platform.
- **Do you think a 10% transaction fee (paid by clients) is fair for the platform to func-**

**tion and continue to make it a success both for students and employers?**

A fair transaction fee between 5% to 10% was determined by the students, with all of them stating that the student should not pay the fee but rather it should be a paid by the client, or split between the client and the university.

- **Would you like your profile to act as proof of your experience alongside your CV?**  
All were in agreement that they would like work done on the platform to be used as experience on their CV.
- **What are the main incentives for students in such a platform?**  
Gaining experience and being able to interact with clients were the two main reasons stated by the students for wanting to use the platform. Being able to solve interesting problems was mentioned by one student as an additional incentive.
- **What are the main incentives for clients in such a platform?**  
Clients being able to get work done with low risk and having a direct line of communication with students were client incentives stated by students. Also, being able to engage with students early in their studies and being able to avoid networking events were seen as benefits.
- **What do you think of having a rating system for students and employers to review each other after a job?**  
A rating system for clients and students to mutually review each other's work was seen as a favourable idea to maintain quality on the platform, and in particular for students to be able to get feedback for their work.
- **Do you have any other suggestions?**  
A final suggestion from students was to have some of their degree coursework posted on the platform as jobs.

### 3.1.2 University Enterprise Initiative

An interview was arranged with the university Enterprise Initiative manager to determine their views and opinions concerning the platform from their unique perspective of dealing with students interested in setting up entrepreneurial projects. The feasibility of the platform and advice on how to best strategically position the services offered was given.

A need for such a platform was agreed by the manager, citing students from disciplines such as Business & Management having ideas that needed executed by others with technical knowledge. If the platform allowed the interaction of Computing Science students with Business & Management students, a gap in the market would be filled. Currently the manager stated that any such requirements are forwarded on, without compensation, to an external software development company.

Particular emphasis was paid to looking into the legality of students earning money through the platform, visa status in allowing international students to work, and how to best stay within self-employment laws. Intellectual property and rights of authors of work in relation to client expectations was also discussed.

- **Have you ever used a freelance contracting site like Upwork, Fiverr etc?**  
The manager knew about such sites but had never used them nor recommended them to students.

- **Would you be interested in a service, exclusive to the university of glasgow where you could see submit jobs and see a selection of student bids on those jobs?**  
 Questions were raised as to the role of IT Services within the university and whether this platform would conflict with their activities as they are the approved suppliers for software development for the university. Admitting that IT Services are not able to fulfill all the requests that such a platform would aim to do, the manager suggested that students be able to act as both providers and consumers of services.
- **How would you like to pay for the service?**  
 An example was given of how tuition service websites work, in that a fixed fee is paid to access the database of tutors. Similarly, a fixed fee could be charged to clients who could then contact students based on their profile information.
- **What information would you want to see about students?**  
 An ability to determine whether the student was capable and trustworthy of undertaking the work.
- **What else would you like to get out of such a platform?**  
 Case studies, testimonials and reviews. A way to determine the quality of service available on the platform.
- **What do you think of having mentors on the site to help students out and review their work?**  
 Having mentors on the site might not be a good idea in terms of being a sign to clients that students are not capable to undertake work on their own. There needs to be a basic level of competence allowed on the site for students to be able to register as service providers, otherwise they should be on a lower rate of payment.
- **What features do you think are important to have initially in such a system to make you want to use it?**  
 An ability to quickly determine if a student is the right person to do a job, getting more information on their background and experience would be beneficial and confidence inducing to go ahead and use the platform.
- **Do you think a 10% transaction fee (paid by clients) is fair for the platform to function and continue to make it a success both for students and clients?**  
 A 10% transaction fee, paid by clients, was thought to be quite average and acceptable.
- **What are the main incentives for students in such a platform?**  
 The main incentives cited were being able to get a variety of experience, networking with clients, to be able to develop and show skill sets, earn money and learn new things.
- **What are the main incentives for clients in such a platform?**  
 Incentives for clients would be the ability to hire students on a flexible basis and get work done faster rather than have to wait for in-house suppliers. Also being seen to be interacting and supporting students is a reputational benefit for clients.
- **What do you think of having a rating system for students and clients to review each other after a job?**  
 The idea of a rating system was welcomed, with clients and students being able to see the best from each group. This would add a level of transparency and quality control to the platform and also act as a motivating incentive to do good work.

### 3.1.3 Computing Science Business Development

Computing Science Business Development at The University of Glasgow aims to “extend the impact of the School’s work, forging links with companies, public sector and 3rd sector organisation; identifying technical challenges, innovative solutions or opportunities for creative use of digital resources.” [25] As such they are ideally placed to assess the viability of the proposed platform. An interview was arranged to speak with their executive manager and gain an insight into their thoughts for the platform.

The interview was planned to be a series of questions, identical to those posed to the Enterprise Initiative, however the conversation took on a stream-of-consciousness mode with several key in-depth understandings surrounding the platform being shared.

To the question if they had ever used a freelance contracting site, the manager said yes, in particular for a tradesperson, which was used multiple times. Their experiences had been mixed, with several good and bad experiences being had. They had in the past also tried Gumtree which was reported as being their worst experience, and to make matters even worse there was no reporting tool on the site to counter false claims and advertisements. This line of questioning is important to our project as while the services being proposed are different to many similar websites, the underlying mechanics of being able to source service providers safely and securely to undertake work is the same. As such, researching and gaining insight into people’s experiences with similar services is highly valuable to our investigation and efforts.

When asked how the services used were being monetised, the manager said that the service provider uploads their services announcement, when a new job is added that matches their services, they pay a fee to access the job details and client contact information. The client at this point pays nothing. The first three service providers to respond get their bids sent to the client who then can decide which one to choose to undertake the work.

Asked whether they would be interested in a service, exclusive to The University of Glasgow, where they could submit jobs and see a selection of student bids on those jobs the manager responded that they personally did not have a need for a tool like this. They advised to identify businesses who have a need for software development, who are looking to develop prototypes or websites and mobile applications. Once they have been identified, to ask them how often they need those services and what the typical size of such projects usually is. To then further question them on things that matter to them, their values and constraints, and also to elicit their frustrations with how things currently are structured within their organisations and their experiences outsourcing work to contractors.

The main realisation from this was that deep stakeholder analysis would yield a clearer vision for the proposed platform, helping to identify pain points that exist in the market and to then aim to resolve them through the platform.

References were made to a similar project at The University of Aberdeen, called The Software Factory, [26] which explains itself as a “student-run software house started so that students can gain experience working on larger software projects. Students benefit from work experience, while clients will benefit from a flexible, cost effective solution in which their application is developed to suit their needs.”

The Software Factory recruits students to work on client projects, for a fixed fee, through a process managed by staff at the university. Benefits cited for clients are “another avenue to acquire software” and also to be able to “tap into a wealth of knowledge around the university.”

Questions were raised by the Business Development manager as to why The University of Glasgow does not have a similar initiative, since it has proven to be successful in other places, running at The University of Aberdeen since 2009.

The main challenges however in creating such a service as proposed here according to the manager, would be the need for a digital platform to facilitate the interactions between clients and students, as there would be a lot of in-person meetings required particularly for software development. Also, that the success of such a project would be determined by how well it aligns with the university's aims and objectives, which are primarily to increase research quality, institutional performance scores, and student satisfaction surveys.

Despite the challenges, the manager expressed their belief that the benefits of such a project warranted further investigation into how best to make the proposed project a reality.

Asked what in their opinion would be foreseeable causes of failure for the project, the manager said that there is an intersection of different problem spaces that the platform is seeking to solve and that serving the needs of all stakeholders will not be possible. Also, there could be conflict from within the university towards such a system and those will need to be rectified for the project to succeed.

Their parting advice was to position the project as an independent business, working in partnership with the university and to create a marketplace for software development services.

### **3.1.4 The Internship Hub**

Requirements were also elicited from staff at The Internship Hub to take advantage of their experiences dealing with students looking to secure employment positions and their hands-on efforts in collaborating with employers, making them go through a verification process to determine their suitability, and also offering employers advice in how to best advertise their positions to students.

Again, the same questionnaire format as used previously was intended to be used in this interview, however the conversation veered towards matters such as duty of care towards students and proper vetting of employers so that students would be sufficiently protected from unscrupulous employers and working conditions. This was deemed to be an important contribution to the requirements gathering phase and so the questionnaire was disregarded for this interview. Following is a summary of the key points raised by the staff of The Internship Hub.

Questions were raised as to who would be responsible for dealing with and vetting clients, especially issues surrounding matters of health and safety and adequate client liability insurance in the event of unforeseen circumstances and events. Advice was given to look into the legal aspect of setting up such a platform, particularly the insurance aspect of connecting clients and students to undertake work.

They advised that students cannot be given cash in hand, and must instead be employed on a contractual basis, with international students being unable to undertake work as they cannot be self-employed and engage in work for monetary gain through the platform.

Finally, a minimum wage must be enforced they strongly recommended. The idea of having a mutual review and rating system on the site was welcomed as a means to maintain high standards and quality control.

### 3.1.5 Internship experiences

The author would like to draw on their experiences during several internships taken during summer periods with companies in various sectors all dealing with issues concerning effectively integrating technological solutions to their already existing business practices with a view to streamlining their processes and ensuring a greater level of productivity and innovation. These experiences have informed the design and implementation of the proposed platform and are deemed worthy of inclusion for that reason, detailing the thinking that has led to the direction and intent of the platform.

- **Clear Returns** [22]: This was a startup concentrating on assisting businesses make better commercial decisions based on analytics generated using machine learning techniques. They regularly employed students from The University of Glasgow to build out their technological infrastructure, however acquiring students with the necessary skills was a time consuming effort that the CEO would have to intervene in personally and guide. If a platform existed that allowed them to quickly post jobs and receive bids from interested students in an easily accessible and convenient manner, it would have reduced the friction they experienced in acquiring the right talent to grow their company.
- **Liberty Home Stores** [23]: A multi-million pound ecommerce operation, built successfully through key decisions and hard work, which undertook daily operations administration manually however using spreadsheets in an extremely time-consuming and error-prone process. This task was conducted daily by senior management to organise orders received from various online shops and channels. A team of undergraduate software engineers were enlisted to help build an automated solution to make this daily process more effective and efficient. Had an online platform existed where the owners could outline their issues and seek consulting advice they would be better prepared to deal with the ongoing technological barriers they faced due to not having any in-house software development expertise.
- **CCRS Brokers** [24]: An insurance broker taking the step towards digitising their operations to be more competitive in the market, especially due to the growth of artificial intelligence in the sector, they struggled with understanding the key strategic decisions to be made, again due to having no previous experience with software development. A platform such as that being proposed would be an excellent tool for a business like this to leverage the wealth of software engineering talent that already exists within the university.

### 3.1.6 Upwork

A review was made of the most popular online freelancing website, Upwork. While it is not specifically targeted towards students, and is available to professionals regardless of background, it warrants researching as many of its core features are similar to the proposed platform. Investigating how it manages to cater to clients and freelancers is vital for our efforts not to be duplicated and to learn from the experience of others successes, adapting it to our specific purposes. We aim not to reinvent the wheel here, only to enhance it for a specific context. [47] Following are the key features identified in the Upwork website.

- **Job posting:** Clients are able to easily add jobs to the website.
- **Profile browsing:** Clients can search and filter through freelancer profiles.
- **Job bidding:** Freelancers can bid on jobs easily.

- **Bid reviewing:** Clients are able to narrow down the freelancer selection process.
- **Send and receive files:** Users are able to send and receive files on the platform.
- **Interviews:** Clients can interview freelancers before hiring.
- **Billing/invoicing:** Financial administrative tasks are built-in.
- **Work diary:** Freelancers can keep a diary of work completed which clients can access.
- **Payment system:** Clients can make payments to freelancers through the platform.
- **Notifications:** Users receive email notifications for key events.

## 3.2 Prioritisation

To prioritise the responses received during requirements gathering, we will utilise the MoSCoW Method, [27] allowing the most important requirements to be given the highest precedence so as to be implemented first. The MoSCoW Method is an acronym composed of the first letters, with the two 'o' letters being added to make the acronym easy to memorise and pronounce. The letters relate to the following meanings:

- **M:** Must-have
- **S:** Should-have
- **C:** Could-have
- **W:** Won't-have

This method will next be applied to order the requirements gathering responses into a manageable and focused list of functional requirements i.e. how the system behaves, and non-functional requirements i.e. how that behaviour performs. Simply put, functional requirements are *what* the system should do, and non-functional requirements are *how* the system will do that. [28]

### 3.2.1 Functional requirements

Using the MoSCoW Method, the functional requirements will be organised in order of importance.

- **Must have:** Requirements without which the system is unusable.
  - **Web interface:** Platform must be easily accessible and not require third-party software or hardware that users do not already possess.
  - **Web address:** Users must be able to access the system through a web browser.
  - **Signup:** Users must be able to register their details with the system.
  - **User types:** There must be two classes of user implemented in the system: Clients and Students.
  - **Login:** Users must be able to authenticate themselves and access their particular resources.
  - **Core workflow (1):** Clients must be able to upload jobs.
  - **Core workflow (2):** Students must be able to view jobs.
  - **Core workflow (3):** Students must be able to bid on jobs.

- **Core workflow (4):** Clients must be able to contact students to initiate work.
- **Should have:** Requirements whose inclusion will greatly enhance functionality.
  - **Open to all student levels:** Students from undergraduate to postgraduate level should be able to participate.
  - **Contact:** Users should be able to contact platform maintainers for help and assistance.
  - **Different signup flows:** Clients and students should be able to input their relevant details depending on their user type.
  - **Data validation:** Unrecognised information formats should not be inserted to the data store.
  - **Notifications:** Users should be notified of key events via email.
  - **Profiles:** Users should be able to create profiles of themselves with contextually relevant information.
  - **Job posting restrictions:** Students should not be able to post jobs.
  - **Job bidding restrictions:** Clients should not be able to bid on jobs.
- **Could have:** Requirements that will be implemented time-permitting.
  - **Login reminder:** Self-serve login details reminder sent to email.
  - **Edit jobs:** Ability for clients to make modifications to their job postings.
  - **Delete jobs:** Clients could be allowed to delete jobs they have posted.
  - **Payment:** Clients could make payments to students via the platform for work completed.
  - **Search:** Clients could search for students matching specific criteria.
  - **Filtering:** Students could filter jobs matching relevant skill tags.
  - **Mobile access:** The platform could be made available in a format accessible to mobile devices.
- **Won't have:** Requirements that will not be included in the first prototype but may be in future iterations.
  - **Review and rating:** Users will not be able to review and rate each others performance.
  - **Messaging:** There will be no functionality for sending and receiving messages.
  - **Verification and validation:** There will be no verification or validation of users.
  - **Case studies and testimonials:** There will be no social proof or assurances provided.
  - **Billing and invoicing:** Users will not be able to carry out financial administration.

### 3.2.2 Non-functional requirements

These requirements are not essential to the functioning of the platform, however their incorporation will greatly enhance user's experience and satisfaction which are critical factors influencing future usage.

- **Language:** Minimal use of technical jargon to allow clients to feel supported and secure.
- **Aesthetics:** should be visually pleasing to both clients and students, inducing an emotional state of calm.

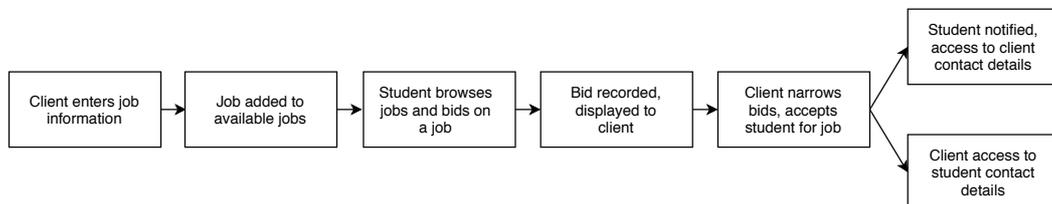
- **Simplicity:** should be easily understood without recourse to help and documentation.
- **Error messages:** the platform should notify users of errors and how to rectify them.
- **Security:** Forms that write to the database should be protected requiring users login.
- **Privacy:** Users private data should not be viewable to others that have not been authorised.
- **Usability:** The platform should be intuitive and allow users to perform their tasks effectively, efficiently and to their satisfaction.
- **Encryption:** Data sent by users to the server should be encrypted for data protection.
- **Nudging:** The platform should incorporate soft-language prompts to encourage users to take the next appropriate action.

### 3.3 Summary

This chapter detailed the requirements gathering efforts undertaken through interviews with students and clients, to understand their opinions and motivations of potential use for the proposed platform. General and specific questions were posed to users, previous internship experiences were evaluated, along with a review of the most popular freelancing platform, all with a view to eliciting and creating a list of requirements that were then prioritised according to the MoSCoW Method to rank their importance for design and implementation.

## 4 | Design

The design phase of this work was initiated on project acceptance through thinking through what core dynamics the system would need to deliver to be a functional prototype. Drawing on experience with usage of similar websites, the central process of allowing clients to post jobs and for students to be able to bid on those jobs as a show of interest in undertaking the work was formulated as in Figure 4.1.



*Figure 4.1: Core workflow*

### 4.1 Empathy as a principle

Our core design principle is to maintain empathy for the user as a central tenant guiding all decisions concerning the development of the platform, namely all functional and non-functional mechanisms and elements available to the user as they interact with different aspects of the system.

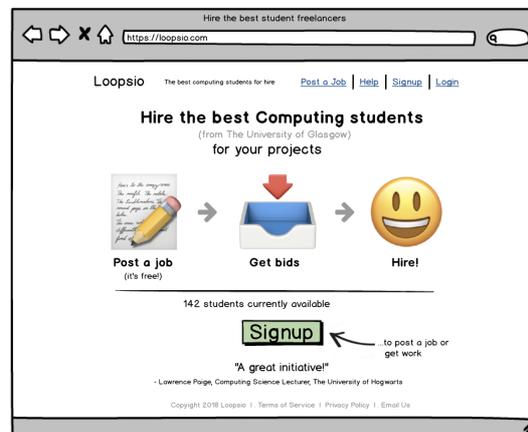
Empathy is defined as "the ability to understand and share the feelings of another." [29] This quality allows the system designer to emotionally place themselves in the person of others, seeing and experiencing artefacts and events as they would, which is crucially important in understanding certain aspects of user needs and wants when designing interactive systems, especially where users from a non-technical background can interpret and interact with systems differently to someone who has knowledge of their inner workings. [30]

For these reasons, empathy will feature as a key principle in designing the platform, explicitly in the areas of interactions on the platform, transitions from one state to another, visual elements and the tone of language used by the platform as it communicates itself to users. The effect of this intangible design component it is assumed will be revealed in users evaluation of the platform.

### 4.2 Wireframes

Using the findings from the requirements gathering phase of this project to inform the core workflow, a paper prototype was prepared using Balsamiq, [31] a wireframing software that

makes sketching screen designs simple and straightforward. A mockup was created of the home page (see Figure 4.2) to get an idea of the different elements required and to expand on what other sections would be required in the website.



*Figure 4.2: Initial paper prototype*

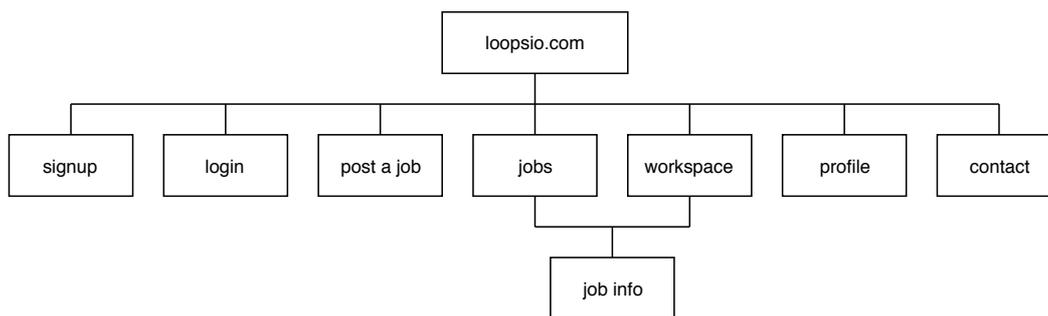
A name for the project was also chosen: loopsio. A play on the programming construct of looping (loops) control flow statements and also input/output communication between a computer and the outside world (io). The name has a rhythmic sound to it and is easily spoken by non-technical users, with a little backstory and depth for programmers users who understand the technical references. Also for non-technical users the word loop generally has the definition of meaning “a structure, series, or process, the end of which is connected to the beginning”, [32] a “feedback loop” [33] which are all positive connotations to associate with the website. A domain name to host the website was also acquired at www.loopsio.com. [34]

Once the paper prototype had been developed, work began on increasing the fidelity of the prototype to a static implementation utilising only HTML to layout the website in a browser. At this stage the sections that comprise the website were elaborated with a description of the intended functionality for each section.

### 4.3 Information architecture

Organising and arranging information in a coherent, effective and efficient manner is central to the goals of usability and findability, without which information environments can be cumbersome to interact with, leading to a potential diminishing user experience, affecting user legibility, productivity and proper usage of the system. [35] Good information architecture puts the needs of the user front and centre. We will now detail (also see Figure 4.3) how the proposed platform will be organised from an information perspective.

- **Home:** Landing page with core value proposition aimed at clients, and a prominent call to



*Figure 4.3: Site information architecture*

action “Signup” button, with further value propositions for students as you scroll down the page, ending with a listing of the latest jobs available.

- **Signup:** A form to gather user data such as name, password, user type (client or student), biographical information and a profile photo. In the case of a client, further information will be gathered regarding the clients company or organisation, and in the case of a student user type, information on the course being taken, current level of study and technical skills acquired will be required. See Figure 4.4.
- **Login:** An authentication mechanism to validate users and allow them to access their particular resources, whether they are a client or a student. Each user type has specific functionality associated with their type.
- **Post a Job:** Only clients can access this section, and it allows them to post job information to the website, including job title, description, hours estimated to complete the job and total monetary budget available to a student on completion of the job.
- **Jobs:** While there is a listing of the latest jobs on the home page, this section with the complete list of available jobs is only accessible to students. Here they can see all the jobs currently available in the system and can get basic information from the listings, such as job title and client name. Upon clicking any one job listing, the student will be taken to a job information page with further details about the job such as job description, hours estimated to complete job and total allocated budget for the job. Links will also be available to the client’s profile page.
- **Workspace:** This section differs depending on the user type. For students, they see a list of jobs they have bid on and jobs they have been accepted for. For clients, they see a listing of their jobs with three colour-coded status types: jobs with no bids as of yet (grey), jobs with bids (yellow), and jobs that have bids and have a student working on them (green).
- **Profile:** Here user information is displayed, again depending on user type. For students, a photo, their course name, level of study, technical skills and a short biographical account. For clients, the only difference is that instead of course related information and skills, their company or organisations details are listed with links to their website for further information.
- **Contact:** A simple page with an email link to [hello@loopsio.com](mailto:hello@loopsio.com) for students and clients to use as needed.

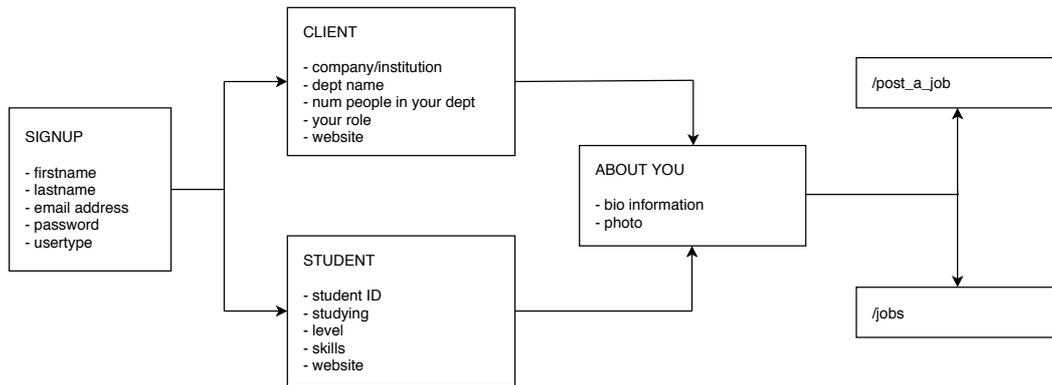


Figure 4.4: Signup flow

## 4.4 System architecture

To accelerate development, the use of a framework will be essential in building the proposed platform. Designing a system architecture in line with the most popular frameworks will allow us to adopt almost any well-used programming language to implement our system and still be able to adhere to our design principles. Keeping with this approach, the Model View Controller (MVC) [36] software pattern will best serve our needs.

### 4.4.1 Model View Controller

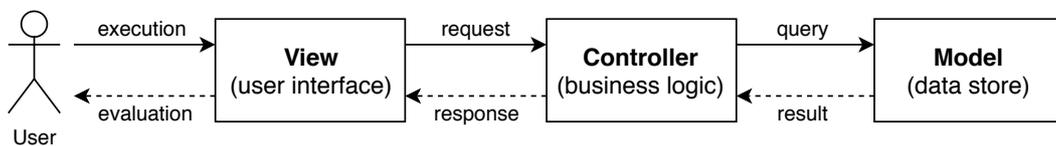
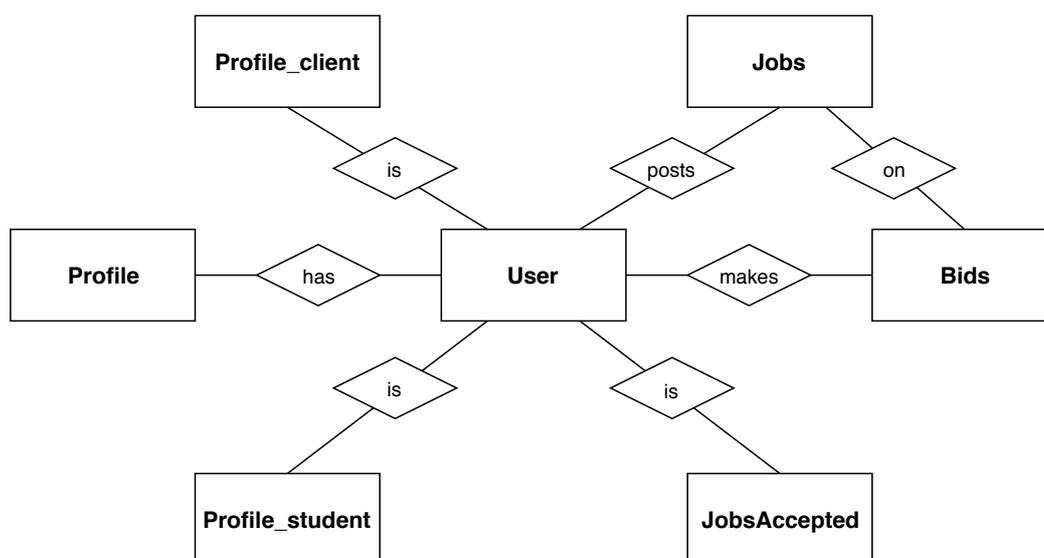


Figure 4.5: Model View Controller, incorporating user interactions

There are three main components of the system we intend to implement: the frontend user interface, a data store of information, and a controlling logic component that is able to combine both the interface and the data store, implementing the required business logic in line with the system aims and objectives. MVC is ideally suited for these needs.

As well as being widely implemented, MVC has advantages such as allowing for a faster development speed due to the separation of concerns which prevents duplication of efforts and makes the system easier to maintain. [37] By separating concerns in this way, the system is more flexible, such as for example, being able to interchange different views to the same model. Figure 4.5 illustrates the various components of MVC alongside incorporating Norman's interaction model [38] of the user evaluating the system and executing actions.



*Figure 4.6: Data store schema with entity relationships*

#### 4.4.2 Data schema

The importance of organising the information the platform will handle to ensure efficient storage and retrieval leads us to creating an outline of our data storage model. At the centre of all activity is the User, who has a Profile, and can be either a Client or a Student. A User is able to post Jobs (if they are a Client) and can Bid on Jobs (if they are a student). A User can be accepted for a Job if their Bid is selected by a Client. That in essence is how our data storage is modelled. See Figure 4.6 for a visual representation in the form of an entity-relationship diagram.

### 4.5 Business model

It is thought the services rendered through the website can potentially create enough value for students and clients that some of that value can be captured and converted into revenue streams to allow the platform to become a self-sustaining and eventually, profit-generating business.

Various business models were considered, more exploration on this will be undertaken during evaluation with clients and students to get their thoughts on how best to position the business model so as to be in line with their needs and expectations and in also attempting to fulfil the website's business potential.

### 4.6 Summary

In this chapter we considered various design components that were used to plan and structure the proposed platform from considering the use of empathy as an effective device to shape interactions, look and feel to sketching initial wireframes enabling a first look at how the platform will appear and behave. The information architecture of the platform was detailed alongside the technical aspects of system architecture, looking at the Model View Controller pattern and the organisation of data. We ended with a brief note on the revenue generating potential of the platform.

## 5 | Implementation

This chapter details the actual implementation of the website, detailing the various software development technologies and methodologies utilised and how they were applied to achieve the desired aims and objectives of the project alongside taking into consideration the feedback received during the requirements gathering phase of this work.

### 5.1 Methodologies

The greatest challenge the author faced throughout this project was how best to self-organise to maximise productivity and effectiveness considering the limited timeframes and the authors own technical capabilities. Previously the author has been involved in multi-person software development teams in the role of project leader, managing the vision of projects, communicating that to team members, breaking down large unmanageable mission statements into controllable chunks along timelines set to multiple deadlines. This while liaising with several stakeholders of varying domain expertise and making sure technical and business aims and objectives were being continually met.

But how to transfer that to a one person project? Several productivity and project organisational methods were attempted, and discarded, with a final custom built dashboard (see Figure 5.1) to overview the entire project being used throughout implementation and final deployment. This dashboard comprised of a minimal functionality instance of a command line terminal, split into three panes: 1) a calendar 2) a list of upcoming tasks 3) a self-care habit list that was executed daily to maintain physical and mental well-being. For the author, it was the only thing that worked. In a single glance, everything to do with the project could be seen in one place, with details available if needed in local storage.

### 5.2 Technologies

Several technologies were utilised to realise the envisioned platform. The primary of these is Django, “a python-based free and open-source web framework.” [39] The main reason this was used as the core of the platform was previous usage and experience by the author. The main goal was to achieve the conceived prototype as a functional and usable system by students and clients to evaluate. Time constraints not permitting, effort was decidedly focused on deployment rather than experimentation with new or unknown technologies that would take time to be proficient with.

To create a database to store user and site information, PostgreSQL [40] was used a complementary fit for Django. Again, previous experience with this database allowed for a quick and relatively pain free implementation so that the larger picture could be focused on with greater clarity. To style the frontend, Bootstrap, [41] a free open-source frontend framework that utilises HTML, CSS and JavaScript was used for rapid prototyping and layout generation. Finally,



- **Vecteezy:** Vector icons and illustrations.

## 5.3 UI & UX

Particular emphasis was placed on the design of the user interface and the interactions throughout the website. In that view, a minimalist design philosophy [44] was adhered to with as mentioned previously an empathic design principle for how the user would experience interactions and elements on the website, from link to button placement, colour choices and page interactions and transitions. Prompts to gently nudge users were implemented so that the next logical step to take would be intuitively understood without having to second-guess.

In addition, the main navigation is context sensitive, and displays elements depending on the type of user that is currently using the site, either Client or Student, showing them links to sections that are relevant for their user type e.g. Students don't see 'Add a Job' and Clients don't see 'Jobs' while they are logged in so as to focus them towards tasks that are conducive to their respective workflow.

User-specific redirects are applied to give a sense of ease and flow while using the website e.g. after signing up, Clients are suggested they add jobs, and Students are suggested they bid on jobs to get the most out of the platform. Also, when users login, they are automatically redirected to their 'Workspace' so that they can get a quick status update on their Jobs. The workspace incorporates a colour coded scheme to allow users to be able to scan the page quickly and understand at a glance the status of their Jobs.

Royalty-free illustration and images, and soft language are used throughout the website to smooth the overall tone, making practical efforts to induce a sense of safety and security in the user during their usage of the website.

All these methods were utilised to reduce user anxiety and maximise their perceived and actual level of competence throughout the website.

## 5.4 Prototype development

### 5.4.1 Static implementation

To implement the frontend Bootstrap was used in designing the layouts for all the various sections of the website. The core Bootstrap codebase was implemented and extended with Django's template engine to realise the visual aspects of how the site would render on the user's screen.

The layout of the website was predominantly divided into three main components: header, body and footer. A base template was developed that includes the primary navigation, a placeholder for the body and then a footer element with administrative links to terms and conditions, policy statements and a contact link. Each section within the site was then designed and dynamically included into the body placeholder using Django's template language allowing the body to change according to the section being requested by the user.

At this stage, the website looked as envisioned, linked to the different sections but was otherwise static in that no data was being requested from the database. This static implementation laid the interface foundations for the next stage of readying the website to read from the database.

### 5.4.2 Semi-functional read-only

While Django installs and configures the SQLite [45] database automatically, it is not sufficient for a production environment mainly as it lacks support for concurrency i.e. more than one user cannot access the database which would prohibit use of the platform beyond development making it unscalable. Another database, PostgreSQL, was chosen as the database to develop to, mostly because of previously positive experiences using it and it is generally considered a powerful and comprehensive data store in the Django/Python community.

At this point, database models were written in Django and migrated to create the relevant tables (see Appendix G for full database schema model). The database was then populated with dummy data and views were extended in Django to retrieve this data to particular sections where appropriate. As a result, the website was able to read from the database and display data as required, but was as yet unable to accept user input and write to the database. This functionality was built in the next stage of full database integration.

### 5.4.3 Full database integration

With the site reading successfully from the database, write functionality was implemented into Django's controller functions to allow users to input information to the database such as user details, job information and bidding records, have that data validated and then inserted into the appropriate tables in the database. Once full database read and write functionality had been implemented, the site was manually tested several times for bugs and inefficiencies in function, interaction or aesthetics. These were noted and corrected accordingly. This process was repeated several times to make sure no obvious inconsistencies or oversights remained.

## 5.5 Notifications

To keep users up to date of important activity on the website, an email notification service was used provided by SendGrid. [46] Several emails are sent out to users, triggered by specific events that take place, including the following:

- **Signup:** After a user signs up, they are sent a welcome email message with more information on the website and the services it offers.
- **New job added:** When clients add new jobs, a notification email is sent to all students currently recorded in the database.
- **Someone bid on your job:** When a student bids on a job, the client who posted the job gets an email notification with a message to check the website for details of the bid.
- **You were accepted for a job:** Students who have been accepted for a job by a client are sent an email notifying them of this.

## 5.6 Deployment

The website was deployed on the Ubuntu distribution of the Linux operating system, using Nginx as a web server, and Gunicorn to bridge Django's output to Nginx.

The following steps were taken to deploy the website on the server:

- Installed packages from the Ubuntu Repositories
- Created the PostgreSQL database and admin user
- Created a Python virtual environment to protect dependencies
- Created and configured a new Django project
- Tested Gunicorn's ability to serve the default project
- Created systemd socket and service files for Gunicorn
- Checked for the Gunicorn socket file
- Tested socket activation
- Configured Nginx to proxy pass to Gunicorn
- Implemented a Bash script to pull the website from GitHub
- Configured the DNS to point to the server IP address
- Implemented HTTPS protocol to encrypt data in transit
- Requested loopsio.com from a browser to make sure it worked

As mentioned above, to continually deploy the site and as there was only one developer, time was not taken to implement a fully automated continuous integration environment. Instead, once local changes have been pushed to the repository on GitHub, the custom written Bash script is executed which pulls the repository code and deploys it automatically on the website server at loopsio.com.

## 5.7 Screen captures

See following pages for screen captures of the website.

- **Figure 5.2:** Home page
- **Figure 5.3:** Various sections

## 5.8 Summary

In this chapter, the implementation of the platform was presented, detailing the development methodology, the technologies put into practice in building the platform, the various considerations and attention to detail that was adopted in developing the UI and UX. Next, the various stages of the prototype development were detailed with the website moving from a static implementation, to a semi-functional state and then being fully functional. Email notifications were elaborated on together with the events that trigger them, ending the chapter on how the site was deployed. Screen captures were provided to showcase the user interface in the prototype version as seen by clients and students.

loopsio | [Signup](#) [Login](#) [Jobs](#) [Post a Job](#) [Contact](#)



## Hire the best Computing Science students from the University of Glasgow

- 1 Post a job (any size)
- 2 Get bids from students
- 3 Hire and get started

[Signup now](#)

...and get going 🚀

### Students

- ✓ Get experience while you're at university
- ✓ Pick projects that interest you
- ✓ Build relationships with clients

### Clients

- ✓ Find the best students before they graduate
- ✓ Submit small or large jobs
- ✓ Bring new energy to your projects

### New Jobs

- Create a QA framework | Engineering, Craneware >
- Mobile phone app development | N/A, Private >
- React Developer | Digital, Agile CIC >
- Seeking React Engineer | Medical School, University of Glasgow >
- Pythonista needed asap | Medical School, University of Glasgow >
- Linux admin needed | Medical School, University of Glasgow >
- JavaScript programmer required asap | Medical School, University of Glasgow >
- iOS Software Engineer required | Medical School, University of Glasgow >

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*Figure 5.2: Home page*

(a) Sign up form

(b) Prompt for further action

(c) Job view (student)

(d) Workspace (client)

(e) Job view (client)

(f) Student accepted for job (client)

(g) Student profile

(h) Client profile

Figure 5.3: Screen captures from various sections of loopsio.com

## 6 | Evaluation & Analysis

We now move on to evaluating the system implemented to determine whether it meets its expected requirements and also if it is a service clients and students can see themselves making use of and paying for. In line with the approach taken during requirements gathering, several interviews were arranged with clients and students, in addition to the requirements gathering phase, more fourth-year Computing Science students were interviewed than before (six in total) for an indepth interview alongside a demonstration of the system which was deployed at loopsio.com.

In total eight clients were interviewed, including internal university staff from various departments and also external companies and organisations ranging from commercial operations to not-for-profit organisations. The client's internal to the university represented the Centre for Open Studies, the School of Medicine, Dentistry & Nursing and the School of Social & Political Sciences. Clients external included The Centre of Excellence for Sensor and Imaging Systems technologies (CENSIS), The Prince's Trust Scotland, Scriptate, Agile CIC and Craneware.

Both clients and students were asked to undertake a number of tasks throughout the website and then answer several questions pertaining to those tasks followed by a general question and answer session to register their thoughts, opinions and feelings regarding the website. Clients and students were generally asked the same questions except in a few instances where the question set diverged to address their specific use cases. Overall the questions focused on both clients and students initial impressions of the website, their thoughts about the workflow, the bidding process, the student selection process, how they manage their activities currently and how they would differ with the use of the website. Additional questions were asked regarding how the website could be improved and payment and business models for the site to be self-sustaining and able to make quality assurances.

The key question that was underlying the complete evaluation was 'is there a space in the market for a website offering a service like this?' We will review the data gathered during the evaluation process before attempting to answer that question in our conclusion.

Where client and student questionnaires overlapped, they have been combined into one question and answer set, whereas the specific questions for each user group have been separately detailed. Quotes have been used to mark direct comments by clients and or students, but they remain anonymous as per the evaluation guidelines read out to participants before and after the evaluation was conducted.

## 6.1 Results

### 6.1.1 Clients & Students

#### Tasks

- **Have a browse around the site.**

Initial impressions of clients and students when browsing the website were favourable, stating that the site looked “professional”, “straight-forward”, “appealing”, “nice” and “modern.” Most participants interviewed thought the site was the effort of a team of people. The simplicity of layout and navigation was appreciated by all, with comments ranging from “intuitive, easy to understand” and “key info is clear, effective landing page” to “good UI” and “can see us using it.”

One client did mention that the colours used in the logo should be rearranged as they found them disconcerting as they were, other than that they thought the site was well designed. Another client said that working with young people is an incentive in itself for businesses and organisations involved in social good programs. The absence of pricing on the website was noted by a client who wondered if the service provided by loopsio was free or there were hidden charges yet to be discovered as they browsed the site. Overall, clients “immediately understood what the site does.”

A student stated that they weren’t clear that the site was intended for students to signup as the messaging at the top of the site was directed towards clients. This comment highlights a difficulty experienced when deciding on copy to use throughout the site. Who to target the messaging to? Clients or students? Prominent sites were looked at to take a cue from their already established lead, and most of them start by addressing clients and customers, rather than the service providers themselves.

- **Please signup.**

The signup process is divided into three steps, the first asking for basic information such as name, email, password and an option to choose their user type as client or student. Based on this choice the second step of the signup process diverges with clients being asked for information about their company or organisation and students asked about their studies, in particular their subject, level, and a list of skills they possess. The third stage converges for both clients and students asking for some biographical information alongside a photo to upload for their profile.

Almost every participant objected to having to input biographical information and upload a photo during the signup process and recommended that they would prefer if it was something they could do later in the style of LinkedIn.com where a basic profile is created initially and then prompts are made later to complete missing sections of the profile.

The second most stated objection was during the client signup process where a form field requests clients to enter “num of people.” The design intention here was for clients to give a rough indication of their scale, in order that students could make informed choices when viewing client profiles and “num of people” would act as a signal to students as to the size of the company or organisation. Most clients were however confused by this, and asked if it meant the size of their company or organisation, or the size of their department, or the number of people working on the project or job that they would later add to the

site.

Further comments made during signup included having helpful hints as part of the signup form, with clickable icons for each form field that would further explain what kind of information was being requested. A few bugs were also discovered for some users during signup when they entered non-alphanumeric characters in certain fields where they were not expected.

Other than the issues raised above, all participants completed the signup process successfully and appreciated the colourful illustrations and soft language style used to prompt them to take further actions on the site such as bidding or adding a job. One participant said “I like it, it humanises the app.”

- **View your profile.**

Most participants asked that profiles have more information on them, such as links to social media pages, and in particular for student profiles to have more background information so that clients could ascertain whether the student was a good fit for a job. Some clients asked that they be able to make their profiles private and only viewable to users that were logged in so as to avoid being indexed by search engines as they would like their activities on the site to remain confidential or perhaps a minimal profile could be made public with the rest of the information only viewable to logged in users.

#### Questions

- **What do you understand about this website from the home page?**

The messaging on the landing page was clear and effective in communicating the site’s intent and purpose according to every participant. Some questioned the use of the word ‘best’ in “Hire the best Computing Science students” asking how that claim was verified. Others suggested using “outsource” instead of “hire.” Most participants liked the layout of the landing page and recommended that the addition of testimonials, case studies and a short video to explain the benefits of the service would be a positive development.

- **Does this website solve a problem for you? If yes, what problem?**

The majority of students and clients answered in the affirmative to this question. Students mainly said that their main motivation for doing so would be to gain experience and get paid. Clients in the largest part said they would use the website as it would allow them to access software developers easily to work on projects that they would otherwise not be able to allocate resources to either due to not having inhouse capabilities or their projects were experimental and they wanted to test new ideas. One client said “If I have an idea, I now know who to approach,” with another saying “this seems like a soft way of getting into software development” with clients expecting the cost of engagement to be lower than normal routes they would take. Also, being involved with the university was seen as a positive aspect of using the website.

- **What additional features would you like in the system?**

Both clients and students had a variety of suggestions as to what additional features they would like to see on the website. One of the most requested features being a messaging system to allow all communications between clients and students to take place on the website so as to contain everything regarding jobs in one place. Participants said they would like for the ‘Workspace’ section of the website to act as their one-stop resource to

manage all aspects of their engagement on the website.

Tutorial type articles and videos were also requested by clients to help make using the site and getting the most out of services easier. Some clients with less technical backgrounds expressed wanting to be guided through the process of submitting and coordinating jobs that may be outwith their expertise, a “technology anxiety” was voiced by some clients, and they wanted the website to ease those fears by making it simple and straightforward to engage with Computer Science students to get the best work done possible, without having to decipher technical jargon along the way.

Case studies would be welcome clients said to enable them to see examples of successfully completed jobs and get an idea of how to manage their own jobs and interactions and also to estimate what their expectations should be.

Many clients expressed a desire to be able to hire students outwith Computing Science, from other disciplines such as business, marketing, and also from the sciences for research collaborations and consultation services. One client said at the end of the day what they really wanted from the website was to have their work reduced and “just want to find somebody with the skills, technical and social, to do the job.” Verification, vetting and aftercare of clients and students, particularly the content of their profiles was a popular request for future iterations of the website.

Sharing metrics from the website was another request, such as showing how many jobs had been posted and completed and being able to know how many students were available on the website. Mutual reviewing, students rating clients and vice versa was a common request, with all participants viewing it as an essential quality control metric.

Additionally, more legalese was requested on the website to know exactly the terms and conditions of contractual work between clients and students. Issues relating to health and safety and liability insurance were brought up in this regard.

- **How frequently do you envision using this service?**

Most participants said how frequently they would use the website depended on the level of activity such as for students it depended on the number of jobs available and regularly added, for clients the number of students available on the website to undertake work and past experiences of jobs would directly determine how often they used the website’s services.

- **Have you ever used such a service before? If yes, which, how was your experience?**

Freelancer websites had been seen or known about by most participants, with half of those having used similar services in the past not for software development but to find tradespeople. As previously mentioned, the core mechanics of such services are similar to loopio, as such further questioning was done to elicit experiences.

The main thing clients liked about those services was the ability to access a large number of people with the desired skills and quickly narrow down their selection to a few based on previous job reviews and vetting by the platforms themselves. Additional resources provided such as job managers who looked after clients was “reassuring to have human contact to help me.” The main reason for using such services was that the level of trust in being able to find a person with the needed skills would be greater than going through conventional routes such as contacting service providers directly. To have an intermediary

service to maintain quality and arbitrate in the event of disputes was a reassuring factor.

Students on the whole had heard of similar services but the majority had not used them because they did not feel the services were for students. One student had a negative experience saying that the jobs undertaken took much longer to complete than estimated by the client and also service providers won contracts by lowering their hourly rate of pay meaning that jobs were not very well paid for the amount of effort required to complete them.

### 6.1.2 Clients

We will now focus specifically on client responses to tasks and questions that surrounded issues and concerns that were particular to them.

#### Tasks

- **Add a job.**

Adding a job evoked the most “technology anxiety” especially in clients with no technical background. They were unsure how to title their jobs, were they using the right terminology they thought out loud. Would their job title and description be sufficient enough for students to understand? There was a considerable felt apprehension of looking or feeling foolish. They requested that more guides and helpful information tips be made available with examples of content to input into particular fields.

Two of the main concerns by all participants were the required fields estimating the “number of hours” and “budget” for the job. Most clients said that they did not know how many hours it would take to complete the job and they would rather leave that field blank, with the student suggesting in their opinion how many hours it would take them. As for the budget, many clients said they would prefer if they could input an hourly rate that they would be willing to pay rather than disclose the budget amount as students might then “work to the budget.”

A further recommendation made was to have more prompts to describe the jobs. As the website is, a text area requests a job description, but clients said that multiple job specific prompts for more information would be more helpful and also provide students with a greater understand of the job being advertised.

- **View your workspace, see bids, follow through.**

Once clients had added a job, the author simulated a student bidding on their job so that bids would show up under the clients job listing and in their Workspace. The main feedback from this was that clients said they would like to have more of a period between the students bid and accepting the student, to interview or chat with the students and get to understand their suitability for the job better. As the website was demonstrated, an ‘Accept’ button was placed next to each bid submitted. Clients said this button should be labelled ‘Contact’ with messaging features, so that they could get a feel for the students enthusiasm and competency for the job before accepting them to undertake the job.

The prototype did not allow for job listings to be edited or deleted and many clients pointed out this lack of functionality. Another suggestion that was asked for was a notifications system on the website navigation bar to highlight with a small red circle any sections that had new activity in them, such as new bids had been received on jobs posted

that clients could then be prompted to check and feel like they were getting updates as and when they were available.

- **View student bids, profiles, accept a bid, and follow through.**

Again clients said once they had viewed the bids received for jobs, that it was too soon to click the 'Accept' button for any of the students and they would like a period in between where they could get to know the narrowed down selection of students better through face to face meetings or video conferencing. More information on students profiles was requested to help clients shortlist the most desired students for the job listing. Information such as student's supervisors so that clients could contact them in the event of needing a reference, more detail on the particular modules the students were studying, and some sort of way of verifying the students skills through vetting or by way of seeing code examples from an external portfolio site.

### Questions

- **Would you be willing to pay to use this service? If yes, how much?**

A percentage of commission taken from the total amount paid to the student was seen as agreeable for clients to pay for the service along with paying for extra features to highlight their job listings and make them more prominent. An alternative suggestion was to have a fixed fee paid for small jobs, with an additional percentage commission being taken on larger jobs to maximise revenue potential. Allowing clients, companies and organisations to advertise on the site was another recommendation to generate income for the service. One client said to the question whether it was fair for the site to charge for its services "yes, you are providing a service, making my life easier."

- **How would you like to pay the students?**

Facilitating paying students would be a key advantage of using the website, if loopsio were able to manage all the human resource aspects of student eligibility to work and take care of all administrative details related to that. Clients said they would be happy for loopsio to act as an escrow service, whereby clients paid loopsio who then took their commission and forwarded the rest of the amount on to students.

- **How do you find the workflow of the site? Signup, add a bid, view bids, accept bid?**

Every client said that they thought the workflow as had been implemented was exactly as it should be, albeit with modifications specifically in making the period between bids and accepting greater. Other than this, clients said they liked the workflow, using words such as "simple," "logical" and "straightforward, very un-IT like" to describe the complete process.

- **How do you currently fulfil the jobs you have just now?**

For smaller jobs, and jobs that were more experimental, clients said they had difficulty finding competent people to undertake those jobs, or just did not take those jobs forward leaving them unfulfilled.

- **How would your day/job/task be different by using this service?**

Overwhelmingly all clients said their lives and jobs would be easier if a service such as that demonstrated was available. Clients said "this would make my life easier" and "it

would enhance our capability to find the right people in university to engage with our projects.” The association with the university was said to be very important along with verifying clients and students on the site to maintain high quality standards. One client said the service would “enable me to do that which I hadn’t thought possible.”

- **Is the current model of bids a good way to select the best student for the job?**

Clients said with more dialogue and face to face interaction in between bids and accepting students for jobs, that this model of student bids and clients making an eventual selection was the right way to initiate contact and then begin work on jobs.

- **What kind of jobs are you planning to advertise?**

A variety of responses were received to this question ranging from “IT, marketing, business” and “app development, web tech, data cleaning, odd jobs” to “exploratory stuff, quality assurance, consultancy” and “technical jobs, sensor work, imaging, IoT projects, transport/smart cities, medical imaging, hardware, comms, networking and algorithm development.”

### 6.1.3 Students

We will now focus specifically on student responses to tasks and questions that surrounded issues and concerns that were particular to them.

#### Tasks

- **View jobs.**

Most students liked the job listing layout saying it was intuitive and easy to understand. Some students suggested that the number of bids a job had already received would be a good metric to share in the listings as it could provide a number of signals, one being how popular a job was and also if a student was not feeling too competitive and wanted to bid on jobs that had not received many bids, they could filter out the most popular ones this way.

- **Bid on a job.**

When students undertook this task, one response that was frequently voiced was that the job descriptions were not detailed enough and more information about the specific requirements from clients would make judging and understanding the skills and effort required easier for students. Other than this, students found the bidding process to be “easy and straightforward.”

- **View workspace, see accepted bids, follow through.**

The colour coordinated method of differentiating different job states was appreciated by students who said it made scanning their jobs easier. Messaging functionality within the Workspace would be a welcome feature they added, allowing them to directly communicate with clients and know the latest updates for any of their jobs at a glance.

#### Questions

- **How do you find the workflow of the site? Signup, view jobs, bid, be accepted?**

All students thought the workflow was straightforward to understand.

- **Would you prefer being paid for your work or would you consider jobs for experience?**

A mixture of response were received to this question. Some students said they wouldn't feel comfortable accepting payment for their work, as they didn't think their skills were professional enough. Others said it depended on the job, if it was a small job or for a not-for-profit organisation, they would consider doing it for free, otherwise they would accept payment for their work. The main rewards for students were experience and getting paid. If jobs were able to provide a mixture of these two then students said they would continue using the website.

- **How many hours per week would you be able to contribute towards jobs?**

Early in their studies students said they would have much more free time to devote to working on jobs through the website. Later on, especially towards fourth-year students said they were primarily focused on coursework and getting the best degree possible and would therefore have less time to engage in jobs. When asked for specific number of hours that they would be willing to work, students ranged from "whatever it takes to do the job, even if it was 20 hours a week" to "depends on year you're in, 10 hrs in first year, 4th year no time, otherwise 5 hrs a week." Generally, the average amount students wanted to spend on working on jobs was between 5-10 hours per week.

- **Do you think this is a good way to get experience while studying?**

All students agreed that they thought this was a good way to get experience while studying, and that they would be interested in using the website, especially more in earlier years and then to supplement income and skills in later years of study.

- **Would the addition of a forum on the site to interact with students/mentors be helpful?**

Students on the whole reacted favourably to the idea of having a forum on the website accessible only to students, where they could post messages and receive responses from peers and mentors to assist in the jobs they were involved in. One student said they "personally stay clear of forums" but would consider reading the forum on the website, but not writing anything.

## 6.2 Analysis

Following are the key findings gained from the evaluation of the website.

- **Overall**
  - **Initial impressions:** All participants had favourable reactions when browsing and interacting with the website.
  - **Clarity of purpose:** All participants were clear as to the service available by the website.
  - **Problem solving:** The majority of users agreed the website solves a problem that they are currently experiencing.

- **Aesthetics and language:** Users commented on the look and feel of the website as being to their liking.
  - **Impact:** The website would make a significant positive difference to users daily work.
  - **Experience potential:** All students said the website would be a good way to get work experience.
  - **Workflow:** The general workflow of the website was well-received.
- **User behaviour**
    - **Frequency of visits:** Most users said they would visit regularly dependant on activity and experiences on the website.
    - **Similar websites:** Almost all users had heard of similar services but most had never used them.
    - **Paying for use:** Most users agreed that a transaction fee for enabling services on the website was fair, with disagreement as to who should pay the fee.
    - **Type of jobs:** Clients would expect to add a variety of jobs to the website.
    - **Hours available to work:** Students generally said that they would have more time to devote to jobs earlier in their studies.
- **Tasks**
    - **Signup:** The signup process was straightforward enough, with recommendations to remove the bio and photo requirements. This should be implemented as part of a profile building stage later if the user so chooses. Also, 'num of people' which clients are required to fill in was confusing, either the wording should change or helpful tips should be displayed next to this field. Helpful hints should be displayed next to almost all fields where there is any possibility of confusion.
    - **Add a job:** This was the most problematic of input tasks, the fields to estimate the job 'num of hours' and 'budget' were most misunderstood.
    - **Accepting bids:** The 'Accept' button was asked to be replaced by something to arrange a meeting or interview by almost all clients.
- **Feature requests**
    - **Messaging:** The most requested feature was a messaging system built into the website.
    - **Guides:** Instructional articles and videos, case studies and testimonials.
    - **Wider student base:** The ability to hire students outwith Computing Science was widely requested.
    - **Legal issues:** More clarification of legal issues and liabilities.
    - **Forum/mentors:** This was encouraged by almost all users.

- **Reviews/ratings:** Almost all users agreed this would be a good way to add transparency and quality control to the website.
- **Profile:** Users requested more information be put on profiles.

### 6.3 Weighted list

Students and clients were asked to describe the overall website in five words. A weighted list was generated using their responses. See Figure 6.1.



*Figure 6.1: Words participants used to describe the website*

### 6.4 Summary

This chapter detailed the evaluation process and results from clients and students. Both were asked to undertake a series of tasks and answer several questions regarding their thoughts and experiences using the website. Their responses were summarised and then analysed for key findings. A weighted list was also generated from participants responses.

## 7 | Conclusion

Here we summarise the whole project, concluding our study, making reflections on the project and considerations for future work.

### 7.1 Summary

The purpose of this project was to investigate whether there was an opening and demand for a digital platform that allows Computing Science students at The University of Glasgow to work on jobs posted by clients with a view to applying their technical skills, gaining in experience and being monetarily compensated, while at the same time to allow clients in turn to access the wealth of knowledge that exists within the university.

After introducing the topic of our study, its background, we gathered needs and wants from key stakeholders forming a list of functional and non-functional requirements prioritised using the MoSCoW Method. All of the 'Must-have' and 'Should-have' functional requirements were achieved, with none of the 'Could-have' requirements being implemented due to time restraints and a focus on the most important functionality. Of the non-functional requirements, all of them were achieved except for error messages not being clear as evidenced during user testing.

The evaluation phase of this work validated the original hypothesis with both clients and students reacting positively to the prototype demonstration of the platform and indicating they would be willing to use, and pay, for such a service in the future.

### 7.2 Reflections

This work allowed me to spend considerable time at the intersection of technology and human interaction research and application. It is the area I find the most rewarding, designing and shaping systems for use by people with a view to seeing them used and able to make a positive impact in the world. As technology becomes more ubiquitous and as artificial intelligence spreads, I think it is important that our interfaces and algorithms take on characteristics such as kindness and generosity. I have tried to instill little bits of that in this system and learnt much about myself and people along the way.

### 7.3 Future work

There is a considerable amount of work that can be undertaken in the future taking into consideration the positive reaction to the prototype demonstration and users requests for further features and enhancements to the platform. Of these, the functional 'Could-have' requirements are the most important, namely the following:

- **Login reminder:** Self-serve login details reminder sent to email.
- **Edit jobs:** Clients should be able to make modifications to their job postings.
- **Delete jobs:** Clients should be allowed to delete jobs they have posted.
- **Payment:** Implementing a payment system that is friction-free.
- **Search and filtering:** Allow user to manage their views of jobs.
- **Mobile access:** Refactor the existing code base to allow efficient access to the platform via mobile devices.

The next stage for future work would be to implement the functional 'Won't have' requirements, namely the following:

- **Reviews and ratings:** Allowing users to rate and review each others activity to increase quality control on the platform.
- **Messaging:** The ability for users to message each other via the platform.
- **Verification and validation:** To look into and implement forms of verification and validation of both students and clients.
- **Billing and invoicing:** To allow users to carry out basic financial administration.
- **Case studies and testimonials:** To project social-proof by interviewing satisfied users of the platform.

Also, a key priority throughout all this is to research and execute growth strategies to gain the widest possible engagement with the platform university wide. If this can be achieved, and the project is successful at The University of Glasgow, there is considerable imperative to spread it to other universities.

## A | Accessing the website

<https://loopsio.com/>

## B | Signed Ethics Form

**School of Computing Science  
University of Glasgow**

**Ethics checklist for 3<sup>rd</sup> year, 4<sup>th</sup> year, MSci, MRes, and taught MSc projects**

*This form is only applicable for projects that use other people ('participants') for the collection of information, typically in getting comments about a system or a system design, getting information about how a system could be used, or evaluating a working system.*

***If no other people have been involved in the collection of information, then you do not need to complete this form.***

*If your evaluation does not comply with any one or more of the points below, please submit an ethics approval form to the Department Ethics Committee.*

*If your evaluation does comply with all the points below, please sign this form and submit it with your project.*

---

1. Participants were not exposed to any risks greater than those encountered in their normal working life.

*Investigators have a responsibility to protect participants from physical and mental harm during the investigation. The risk of harm must be no greater than in ordinary life. Areas of potential risk that require ethical approval include, but are not limited to, investigations that occur outside usual laboratory areas, or that require participant mobility (e.g. walking, running, use of public transport), unusual or repetitive activity or movement, that use sensory deprivation (e.g. ear plugs or blindfolds), bright or flashing lights, loud or disorienting noises, smell, taste, vibration, or force feedback*

2. The experimental materials were paper-based, or comprised software running on standard hardware.

*Participants should not be exposed to any risks associated with the use of non-standard equipment: anything other than pen-and-paper, standard PCs, mobile phones, and PDAs is considered non-standard.*

3. All participants explicitly stated that they agreed to take part, and that their data could be used in the project.

*If the results of the evaluation are likely to be used beyond the term of the project (for example, the software is to be deployed, or the data is to be published), then signed consent is necessary. A separate consent form should be signed by each participant.*

*Otherwise, verbal consent is sufficient, and should be explicitly requested in the introductory script.*

4. No incentives were offered to the participants.

*The payment of participants must not be used to induce them to risk harm beyond that which they risk without payment in their normal lifestyle.*

5. No information about the evaluation or materials was intentionally withheld from the participants.  
*Withholding information or misleading participants is unacceptable if participants are likely to object or show unease when debriefed.*
6. No participant was under the age of 16.  
*Parental consent is required for participants under the age of 16.*
7. No participant has an impairment that may limit their understanding or communication.  
*Additional consent is required for participants with impairments.*
8. Neither I nor my supervisor is in a position of authority or influence over any of the participants.  
*A position of authority or influence over any participant must not be allowed to pressurise participants to take part in, or remain in, any experiment.*
9. All participants were informed that they could withdraw at any time.  
*All participants have the right to withdraw at any time during the investigation. They should be told this in the introductory script.*
10. All participants have been informed of my contact details.  
*All participants must be able to contact the investigator after the investigation. They should be given the details of both student and module co-ordinator or supervisor as part of the debriefing.*
11. The evaluation was discussed with all the participants at the end of the session, and all participants had the opportunity to ask questions.  
*The student must provide the participants with sufficient information in the debriefing to enable them to understand the nature of the investigation.*
12. All the data collected from the participants is stored in an anonymous form.  
*All participant data (hard-copy and soft-copy) should be stored securely, and in anonymous form.*

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**Project title** Level 4 Individual Project

**Student's Name** Omar Tufayl

**Student's Registration Number** 2027205

**Student's Signature** Omar Tufayl

**Supervisor's Signature** \_\_\_\_\_

**Date** 09-03-2019

## C | Requirements Questionnaire: Students

-----  
Have you ever used a freelance contracting site like Upwork, Fiverr etc?

-----  
Would you be interested in a service, exclusive to The University of Glasgow where you could see contract jobs and submit to undertake them?

-----  
How would you like to be compensated?

-----  
How would you like to be paid? per job? per hour?

-----  
If you had an hourly rate, what do you think would be fair to you and competitive to attract employees?

-----  
What else would you like to get out of such a platform?

-----  
What do you think of having mentors on the site to help you out and review your work?

-----  
What features do you think are important to have initially in such a system to make you want to use it?

-----  
Do you think a 10% transaction fee is fair for the platform to function and continue to make it a success both for students and employers?

-----  
Would you like your profile to act as proof of your experience alongside your CV?

-----  
What are the main incentives for students in such a platform?  
-----

What are the main incentives for employers in such a platform?

---

What do you think of having a rating system for students and employers to review each other after a job?

---

Any suggestions?

## D | Requirements Questionnaire: Clients

-----  
Have you ever used a freelance contracting site like Upwork, Fiverr etc?

-----  
Would you be interested in a service, exclusive to The University of Glasgow where you could submit contract jobs and see a selection of student bids on those jobs?

-----  
How would you like to pay for the service?

-----  
Would you like to pay per hour? per job?

-----  
What information would you want to see about students?

-----  
Would else would you like to get out of such a platform?

-----  
What kind of jobs would you post?

-----  
What do you think of having mentors on the site to help students out and review their work?

-----  
What features do you think are important to have initially in such a system to make you want to use it?

-----  
Do you think a 10% transaction fee (paid by clients) is fair for the platform to function and continue to make it a success both for students and employers?

-----  
What are your thoughts on having the students profile as as an accompaniment to their CV as work experience?

-----  
What are the main incentives for students in such a platform?

---

What are the main incentives for employers in such a platform?

---

What do you think of having a rating system for students and employers to review each other after a job?

---

Any other suggestions?

## E | Evaluation Questionnaire: Students

# Intro / Tasks / Debrief: Student

## loopsio.com evaluation

Date: \_\_\_\_\_

### Introduction

The aim of this evaluation is to investigate the suitability of this service, loopsio.com, specifically in allowing clients to post jobs and receive bids from students. We are performing this demonstration to get your feedback and overall impression of the prototype with an aim to using the data collected to further improve the service. Interactions on the site will be associated with your email address. I will ask you to perform a number of tasks and then answer some questions afterwards. The data collected from the questionnaire will be anonymous. Please ask any questions if you need. Also, please remember that it is the system, not you, that is being evaluated. You are welcome to withdraw from this evaluation at any time. Do you have any questions before we start?

1. Have a browse around the site.

2. Please signup.

3. View Jobs.

4. Bid on a job.

5. View Workspace, see accepted bids, follow through.

6. View your profile

### Debrief

The aim of this evaluation was to investigate the suitability of this service, loopsio.com. Interactions on the site will be associated with your email address. The data collected from the questionnaire will be anonymous. You have my contact details, please contact me or my supervisor, Dr Tim Storer ([timothy.storer@glasgow.ac.uk](mailto:timothy.storer@glasgow.ac.uk)) for any reason concerning this evaluation. Thank you.

# Questionnaire: Student

loopsio.com evaluation

1. What do you understand about this website from the home page?

2. Does this website solve a problem for you? If yes, what problem?

3. Would you prefer being paid for your work or would you consider jobs for experience?

4. How many hours per week would you be able to contribute towards jobs?

5. How do you find the workflow of the site? Signup, view jobs, bid, be accepted?

6. How frequently do you envision using this service?

7. What additional features would you like in the system?

8. Have you ever used such a service before? If yes, which, how was your experience?

9. Do you think this is a good way to get experience while studying?

10. Would the addition of a forum on the site to interact with students/mentors be helpful?

11. How would you describe the service overall (design and functionality) in five words?

12. Do you have any questions?

## F | Evaluation Questionnaire: Clients

# Intro / Tasks / Debrief: Client

## loopsio.com evaluation

Date: \_\_\_\_\_

### Introduction

The aim of this evaluation is to investigate the suitability of this service, loopsio.com, specifically in allowing clients to post jobs and receive bids from students. We are performing this demonstration to get your feedback and overall impression of the prototype with an aim to using the data collected to further improve the service. Interactions on the site will be associated with your email address. I will ask you to perform a number of tasks and then answer some questions afterwards. The data collected from the questionnaire will be anonymous. Please ask any questions if you need. Also, please remember that it is the system, not you, that is being evaluated. You are welcome to withdraw from this evaluation at any time. Do you have any questions before we start?

1. Have a browse around the site.

2. Please signup.

3. Add a Job.

4. View your Workspace see bids, follow through.

5. View student bids, profiles, accept a bid and follow through.

6. View your profile

### Debrief

The aim of this evaluation was to investigate the suitability of this service, loopsio.com. Interactions on the site will be associated with your email address. The data collected from the questionnaire will be anonymous. You have my contact details, please contact me or my supervisor, Dr Tim Storer ([timothy.storer@glasgow.ac.uk](mailto:timothy.storer@glasgow.ac.uk)) for any reason concerning this evaluation. Thank you.

# Questionnaire: Client

loopsio.com evaluation

1. What do you understand about this website from the home page?

2. Does this website solve a problem for you? If yes, what problem?

3. What additional features would you like in the system?

4. Would you be willing to pay to use this service? If yes, how much?

5. How would you like to pay the students?

6. How do you find the workflow of the site? Signup, add a bid, view bids, accept bid?

7. How frequently do you envision using this service?

8. Have you ever used such a service before? If yes, which, how was your experience?

9. How do you currently fulfil the jobs you have just now?

10. How would your day/job/task be different by using this service?

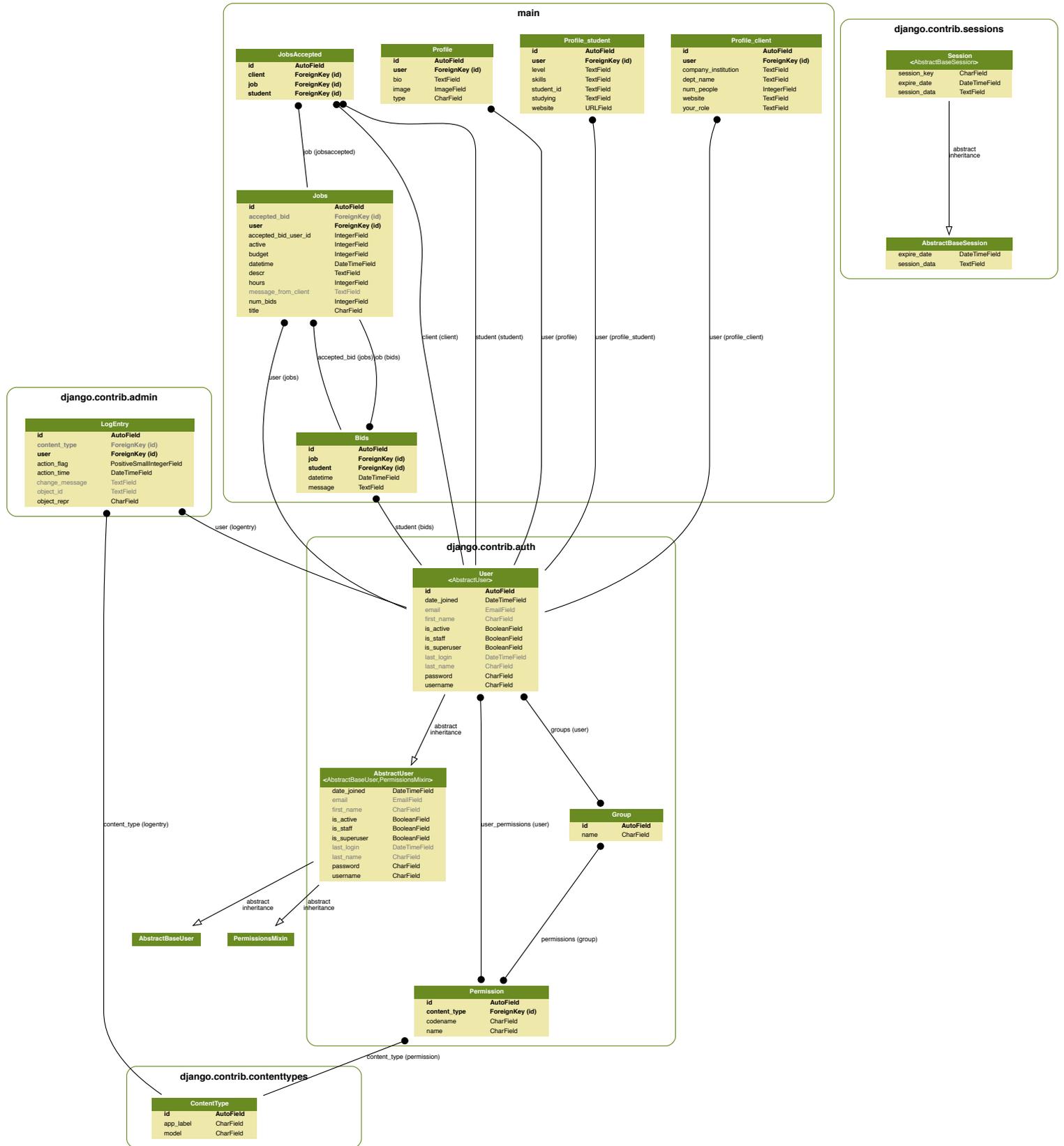
11. Is the current model of bids a good way to select the best student for the job?

12. What kind of jobs are you planning to advertise?

13. How would you describe the service overall (design and functionality) in five words?

14. Do you have any questions?

## G | Database Schema



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