The design of a web application to act as a hub of services for the transgender community in Liverpool

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TM470 – TMA01 – 28th February 2023

A person holding a flag

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Figure 1 A transgender flag being waved at LGBT gay pride march by ‘ink drop’ used under Standard License from Adobe

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# 1. Preparation and planning

## 1.1 Title and description

### 1.1.1 Working title

The design of a web application to act as a hub of services for the transgender community in Liverpool

### 1.1.2 The problem

There are many vital services available to the transgender community in Liverpool, but it can be a challenge to find them. This is particularly the case for new members of the community who may be in a vulnerable situation, as the point of coming out is a huge life change that may be accompanied by mental health issues and the loss of relationships. This is compounded by transgender healthcare facing profound ignorance (and in some cases outright bigotry) from many GPs, who may attempt to block or delay attempts at medical transition, alongside extreme waiting lists for appointments at Gender Identity Clinics.

The trans community attempts to solve these issues in numerous ways, mostly informal (e.g. by word of mouth in group chats), but two more formal ways are the Liverpool Trans Wiki which catalogues and comments on many services that are available; and the Spirit Level peer support group which invites in guests from services to explain what they offer to the community. The proposed web app will seek to build on these solutions and incorporate this specialist knowledge into it.

The core features of the app will comprise a database of services, which is searchable and contains tags (e.g. peer support, mental health, sexual health), as well as a map which shows the services pinned on it. More information should be provided on each service if they are selected and a way to contact or use that service as appropriate. This may simply be a link to a website (e.g. for a self-referral for counselling) or sending a text message or email to (e.g. to the chair of a peer support group). Another planned feature is a calendar of events such as peer support meetups, with optional push notifications. Features that require some consideration are investigating the feasibility of providing directions to services on the map; and what the best way is to signpost users to essential medical services (some of which are not local). Ethical considerations are vital for this project, as some users may still be closeted and may need to conceal their use of the app. This must be considered at every stage, in every task and be at the forefront of the final product to reassure users that their identity is safe.

The project will focus specifically on Liverpool due to the ability to engage with services and their users directly and due to already existing knowledge. However, if successful the app could be expanded to cover the whole of the UK, it would be a matter of gathering the data rather than any technical challenges.

## 1.2 Tasks and subtasks

* Gather requirements
  + Write requirements
  + Create user stories
* Choose and implement a database
  + Undertake a literature review and make a choice
  + Setup the database and input enough data to test the functioning of app features
  + Program API calls to the database
* Map
  + Setup HTML wireframe
  + Program map
  + Program pins for map
  + Investigate a ‘directions’ feature and implement if feasible
* Search function
  + Program API calls for searches
  + Implement tags for each service
  + Program display of results on the map
* Contact with services
  + Elicit feedback from service representatives about their needs
  + Search for appropriate plugins for sending SMS/email from the app
* Calendar
  + Implement user accounts
  + Implement event creation
  + Search for appropriate plugin for push notifications
  + Implement personalised calendar
* Privacy
  + Implement a ‘closet mode’ (e.g. no notifications, conceal nature of app)
* User Interface
  + Work on improving the appearance of the UI

## 1.3 Project lifecycle

### 1.3.1 Lifecyle model

Whilst some of the project has similarities with the webapp developed as part of TM352, which involved a map and writing API calls to a database, many of the features will require learning and some trial and error to implement. Therefore, a lifecycle that features iteration and evaluation is essential to the project to ensure that non-routine tasks are properly implemented. Additionally, due my regular attendance at trans peer support groups, trans community events and being a member of the board of trustees of the transgender charity CMAGIC, there is an opportunity to gather regular feedback on the app during development. Adopting a user centred approach is a way to utilise these two essential aspects of the project and to evaluate the features on an ongoing basis.

Agile perspectives are important to keep in mind, that is to worry more about ‘doing’ than ‘documenting’ (“Working software over comprehensive documentation” is one of the four values from the Agile Manifesto (Beck et al, 2001)). However, the nature of the project is that documenting and explaining the development process is key and potentially more important that necessarily ending with fully working software (though of course that is an important goal), which runs counter to the Agile Manifesto. Also, much of Agile is focused on teams and collaboration, which is not relevant to this project since there is only one developer. However, some of the values and principles could be kept in mind, such as welcoming changing requirements (“Responding to change over following a plan”). Also, if the Agile principles are reframed slightly to include work necessary for the TMA & EMA reports, they become much more applicable.

As there is a well-defined set of users with a well-defined set of needs, that are accessible, the user-centred lifecycle will be used for this project. Agile principles such as being adaptive to change and focusing on the end product will inform the approach where appropriate. This means that time to prototype, gather feedback and iterate on the results must be incorporated into the schedule. But also, the schedule must be a living document that is regularly updated to adapt the changing nature of the project.

## 1.3.2 Schedule of tasks

![Chart, waterfall chart

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Figure 2 Schedule of tasks part 1

![Table, waterfall chart

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Figure 3 Schedule of tasks part 2

![Graphical user interface, application, table, Excel

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Figure 4 Schedule of tasks part 3

## 1.4 Resources, skills, and methods

* Liverpool Trans Wiki <https://transliverpool.com/>
  + Run by local member of the community River Wright, a lot of data needed for the app is covered in the wiki, and with permission from her I will quote from and link to the wiki regularly.
  + **Risk** (medium impact, low likelihood): R Wright refuses permission. To mitigate this, she will be asked as soon as possible.
  + **Risk** (low impact, high likelihood): The information on the wiki may be incorrect or out of date. To mitigate this, anything used from the wiki will be checked and updated as necessary.
* Representatives of services e.g. manager of a laser hair removal clinic
  + Can offer feedback about the events system and the ways in which users can contact their service.
  + May offer vital perspectives of how the app effects the community
  + **Risk** (medium impact, medium likelihood): They may be busy and do not wish to engage with giving feedback or may only engage in a limited way. To mitigate this, try to identify which people will be willing to provide feedback and be respectful of their time, to get as much out of any engagements as possible.
* Members of the Liverpool trans community
  + Different members of the community may have different needs regarding accessing services.
  + Could offer feedback on prototypes of the app.
  + May be a source of information about services that should be included.
  + **Risk** (medium impact, high likelihood): Feedback may be not useful or relevant. To mitigate this, care must be taken when designing questionnaires with a balance between closed and open questions.
  + **Risk** (high impact, low likelihood): They do not wish to engage with giving feedback or only engage in a limited way. To mitigate this, likely contributors will be engaged with early on. If necessary, a change to the project lifecycle could be considered.
* CMAGIC (Cheshire & Merseyside Gender Identity Collaborative) board of trustees
  + This includes representatives from many local trans services and medical professionals.
  + May offer vital perspectives on the app
  + **Risk** (low impact, high likelihood): They may be too busy to offer feedback or may only be able to do so in a limited way. To mitigate this, when engaging with them, respect their time and keep any questions short and to the point and plan around a limited at best engagement.
* Programming languages
  + JavaScript – proficient enough to tackle much of the proposed features, but some learning may be required as it will likely extend beyond current knowledge.
  + HTML – reasonably proficient, significant problems are not anticipated.
  + CSS – only minimal experience, may need some time to learn and to use trial and error to achieve goals.
  + SQL – a small amount of experience that should be sufficient for a simple database, but for anything more complex some learning may be required.
  + **Risk** (medium impact, high likelihood): Delays due to attempting to code non-routine tasks. To mitigate this, the schedule will regularly be re-evaluated and features will be prioritised, so that significant time is not spent on a less essential task.

# 2. Project work completed

## 2.1 Literature review

The focus of the literature review was on sources relating to databases, DataBase-as-a-Service (DBaaS) products and security and privacy issues relating to databases. The database is key to the functioning of the app and will be implemented early in development. It also lies slightly outside my expertise as when developing a web app for TM352, the database was already setup and provided, with the focus on the API calls. The search took into account the date that the sources were written, as for some of them there would be a risk of being obsolete, since cloud technology is a relatively recent innovation with the term being coined in 2006 around the release of Amazon Web Services (Regalado, 2011) and has experienced a rapid expansion since then. The source was also considered, with a strong preference given to papers published in journals or from conferences; textbooks; and official documentation.

Poljak et al (2017) compare three popular relational database management systems, MySQL, PostgreSQL and Oracle database 11g using criteria such as differences in syntax and performance. It concludes that Oracle is the best option where speed and performance of complex operations is important, but that MySQL is a good open-source alternative if the cost of Oracle is prohibitive. This may help form a conclusion around which database technology to use for the web app and understand what the trade-offs are since there is no budget for the project. The paper was from a MIPRO conference and has been cited in other published works.

Patil et al (2017) explain the differences between relational databases (which feature linked tables) and non-relational databases (also referred to as NoSQL, it is a more flexible type, including in a document with JSON style structure) and then compares the performance of them primarily using MySQL (relational) and MongoDB (non-relational), among the most popular of each type respectively. They found significant performance advantages for the non-relational database for performing basic operations, as shown in figure 5 below, which shows the number of records inserted and the time each database takes to load them, with MongoDB being the faster of the two.

Chart, line chart

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Figure 5 Time taken to load records by two databases

Al-Refai et al (2021) lays out some of the challenges facing Database-as-a-Service (DBaaS) service model; unavailability, interoperability and confidentiality and proposes solutions to tackle them. If a DBaaS solution is used for the project, understanding the implications of that is important. The paper also includes its own literature review, which is a useful jumping off point to further reading on the subject. The paper was from an ACIT conference and has been cited by another published work.

The official documentation (e.g., from Amazon (2023) and Openstack (2020)) for the DBaaS’s will be important for comparing them and deciding which one to use. Additionally, they will be a crucial resource for setting up and using it. Although the Trove/Openstack DBaaS was used in TM352, this had been setup ahead of time so some learning may still be required if that is chosen.

Security is another important consideration when using databases and is particularly crucial for this project as protecting users’ privacy is essential both from a moral point of view and to maintain user confidence. Mehak et al (2014) outline the challenges of DBaaS security in detail, including confidentiality, integrity, availability, and privacy. They conclude that further research is needed into the topic, and it should be noted that since this book was published in 2014 more recent literature should be considered to supplement this. The book ‘Cloud Computing: challenges, limitations and R&D solutions’ was described as a “comprehensive overview” by Beidler (2015) for Choice Reviews and the book and the relevant chapter has been widely cited in published works.

Some important factors when choosing database technology are whether to use a relational database or a NoSQL database; whether the database is free; familiarity with the database and the performance of the database. There are multiple solutions that could be viewed as equally correct, or with only marginal differences, so in some instances an arbitrary decision must be made because the time to consider the differences in detail could be used to on more important work. As currently conceived the database would not require interlinked tables since each service would only have properties associated with itself, so a better performing (Patil et al, 2017) NoSQL database such as MongoDB could be used. The OpenStack Trove DBaaS is free and open source, whereas an AWS solution may have costs associated depending on length of use and options chosen (Amazon, 2023). Additionally, having already some familiarity with OpenStack Trove makes it a good choice for the project.

## 2.2 Project work

### 2.2.1 Gathering Feedback

As outlined previously, the trans community in Liverpool are a crucial resource for the project and utilizing them may be key to its success. In the early stages of the project some preliminary feedback gathering was undertaken, with informal chats with community members about what sort of features they would like to see in an app for them and what concerns they might have. Once the idea was more solidified, an explanation of the proposed app was posted in local trans Facebook groups which invited feedback & comment. Additionally, regular conversations have been had with River Wright of Liverpool Trans Wiki, someone previously identified as a stakeholder. Appendix 1 shows the Facebook post that was made and some of the responses.

The nature of this preliminary feedback gathering was open-ended and unfocused to get the widest possible range of views before ideas and features became more fixed. The downside of this is that the results were broad and some of it ultimately not relevant, and a more structured approach in future may give more useful feedback. Nevertheless, a lot of useful information was gathered and is summarised below:

* Concerns around privacy and whether the app would inadvertently out someone.
* Suggestions made about different sorts of apps for the community including an app to record audio during hate crimes.
* The proposed app was received with greater enthusiasm by people new to the community (who need to discover these services) than people who are more established.
* Suggestions about specific content for a (now dropped) media section.
* Expand the database & map to include businesses (such as café’s, bars, and shops) and indicate whether they have gender neutral toilets or have some other indications of trans-inclusivity.
* The inclusion of organisations that have the Navajo Chartermark (a Merseyside & Cheshire accreditation for good practise of LGBTQIA+ inclusion).

The suggestion of having the app show whether businesses have gender neutral toilets (possibly expanding to other metrics of trans inclusivity) may add more appeal to more established members of the community. Additionally, it may not require much additional work to add this feature aside from gathering the data.

### 2.2.2 User Interface sketches

Three initial ideas for UI layout have been very roughly hand sketched in Figures 4, 5 and 6 with Figure 4 using Google Maps for inspiration, Figure 5 having menus that swipe in from the sides and Figure 6 being a much simpler and more basic. The advantage of the layout in Figure 4 is that it will be familiar to users, since Google Maps is such a ubiquitous app any app using a similar layout should feel natural and easy to use. The layout in Figure 5 would have a clean and pleasant interface, keeping it uncluttered, particularly for smaller devices. This style is quite common, including in apps such as Twitter and Discord. However, it runs the risk of users not realising the menu is there without some visual cue, so care must be taken to carefully gather feedback.

As previously stated, current experience with CSS and visual styling is limited and both the designs in Figures 4 and 5 may require some time learning how to implement them. Time has been allocated in the schedule for this, but it is possible that delays will mean that this is not possible and could be pursued after this project is complete. Figure 6 shows a more simplified layout that could be used in the interim.

Diagram, engineering drawing

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Figure 6 Rough sketch of UI using Google Maps as inspiration

A piece of paper with writing

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Figure 7 Rough sketch of UI with menus that swipe in

Diagram

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Figure 8 Rough sketch of UI in a simplified style

# 3. Review and reflection

## 3.1 Review of progress

Some ideas proposed for the app initially, were subsequently dropped such as a section for trans related media or articles and could have included users being able to add their own. However, on reflection, this did not quite fit with the core ideas of the app. An alternative could be to add a ‘useful links’ section, which would require minimum effort and could include some essential or useful things. Another idea that was initially considered was to allow users to leave comments about events or services, but after consideration this was also dropped. Comments would require moderating for hate speech and spam and without a critical mass of users, it may end up skewing to very individualised opinions rather than being reflective of wider trends.

The feedback gathering exercise resulted in feedback of mixed usefulness, which was in retrospect predictable since the method of gathering it was informal and open. Nevertheless, useful information was gathered and reflected upon, and will help iterate on the ideas to shape the app going forward. The idea to add gender neutral bathrooms to the map is one that add more ongoing interest in the app for users more established in the community, who have already got past the struggle of finding the services they need. Future feedback gathering exercises may need to be in the form of a more formal questionnaire or interview to aim to get more specific information and should be carefully considered.

The literature review resulted in finding some useful information that helped form a decision about the database and will be essential for the early part of the project when the database is being set up. Additionally, security and privacy issues will require serious consideration over the coming weeks and will likely form part of future reports. However, the literature review took longer than had been anticipated resulting in other planned work being delayed. This was partially due to the search being challenging due to databases being a fundamental part of so many other entirely unrelated topics and areas of research. This meant that there were many results for every search that were either entirely unrelated or only partially related to the topic, and the latter of which it could be a further challenge to determine how useful they might be. It was also a challenge to know when enough literature was enough, as only 5 sources were discussed in this report but over 20 were found and considered for inclusion so in retrospect less time could have been spent on this. This meant that plans to begin implementing the database had to be delayed until after the report was complete and it highlights the importance of time management for the project and that the schedule must be regularly re-evaluated.

## 3.2 Tutor feedback

Areas for which specific feedback is requested:

* Is the schedule and proposed set of features over ambitious?
* One area that has not been considered in detail is the events calendar, do you think there any pitfalls that need to be thought about early in the project?
* Is the choice of database sensible, or is there a reason to choose a relational database instead?
* Is the balance right in terms of the amount of time allocated to prototyping and iteration?
* Is there a significant difference in using REST API for NoSQL databases rather than for a relational database?

It has been agreed that Zoom chat will be the primary method of communication, with Zoom calls if required. So far this has proved effective, with advice being offered in relation to the database used for TM352 and updates provided on the progress of the project. Additionally, a suggestion was made that the database be the topic for the literature review which proved to be very useful and has helped get to a point where the database can be implemented.

*Word Count: 3578*

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# 5. Appendix 1 – Feedback from Facebook posts

![Text

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Figure 9 Post made to Facebook inviting feedback

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Figure 10 Feedback received from Facebook pt 1

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Figure 11 Feedback received from Facebook pt 2