Homeless Records in Observatory Improvement District (OBSID)

TEAM Cape Analytica

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UCT KNOWLEDGE CO-OP

The UCT Knowledge Co-op facilitated this collaborative project with OBSID.

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Part 1: Business Case & Project Outcomes

Introduction

As part of the INF3011F (Project Management) 2019 course, students were separated into groups and put into contact with an external project sponsor to provide a solution to a problem faced in their organization. The purpose of this project is to give students a real-life project where they can apply their knowledge of Project Management. Cape Analytica was tasked by OBSID, a non-profit organization, to come up with a scalable database solution for their data entry and analysis.

Improvement Districts, also known as Special Rating areas, are formed when a certain percentage of property owners in a specific community get together and decide to collect money to be used for the overall improvement of the area. This money is collected by the city, and they keep a percentage, but the rest goes to an organization such as OBSID. OBSID provides three specific services to the Observatory area: cleaning, safety, and social development.

This project is focused on the social development aspect of OBSID. In order to ensure social development in Observatory, OBSID aims to provide help and support to the local homeless community. As part of their day-to-day operations, field workers go out to speak to the local homeless community and get information from them to bring them the help they need. The information collected can include skills, family, description of the person so that they can be found again, common sleeping locations, any documentation they may have and more. OBSID uses the collected information to try and place willing participants in programs that will either teach them new skills or provide them with assets in an attempt to make them employable. Furthermore, this allows them to keep a record of interactions with each homeless person, what services are being offered to them and which of those they are using. The benefit of this is that if a person approaches another organization offering the same services, they already have a record and there is no need to recapture any information.

OBSID is currently using a system comprising of an Excel spreadsheet, Word documents, physical case files, and a OneDrive cloud storage solution. These packages are inefficient particularly if OBSID wishes to perform analyses of the data they have. Furthermore, this also means that

finding a case file for a specific person they have met a while ago is a tedious process, and the data they do have is difficult to share.

Due to the current issues of inefficiency and more, OBSID has tasked Cape Analytica with the development of a scalable database solution.

Problems Identified

After the team acquainted themselves with the situation and its intricacies, there was a need to uncover what the various problems within the organization were. This acted as a starting point for thinking of potential solutions and what the scope of these solutions would need to be.

The current data tracking, keeping and recording system of OBSID is inefficient for their purposes. It is difficult to use and access existing records. This makes it difficult to analyse data they have on the system, and that data is nearly impossible to clean. Furthermore, it is very difficult to share this data to participating organizations that may encounter the same homeless person, and this can lead to frustration as all the same information will have to be collected again for the same person. This system also has no form of access control, meaning that anyone that can access their physical files or their computers in the office can see all the case files and the details therein. This is problematic because it means that anyone can access personal information such as drug history, family history or prison history and more, which results on the loss of privacy of the homeless people. This personal information needs to be secured because there is no need for everyone in the organization to access all this information, only qualified people, such as the social workers, need to access it. Finally, there is a lack of accountability. When there is a new person added to the system, in theory a Social Worker should organize a meeting with them to get more sensitive case file details. However, in the current system there is no way to ensure that this communication takes place, therefore it is common for people to fall between the cracks and become unmonitored instead of being acknowledged and ultimately helped by OBSID. This means they are unable to successfully pursue their goal of social development.

The problem statement can be summarized as follows: OBSID lacks a centralized and scalable database, there is a lack of follow-through due to a lack of accountability, and finally there is a lack of efficiency in their reporting and entering of data.

Business Objectives

To ensure that any solution proposed by Cape Analytics would be able to add enough value, whilst also keeping OBSID on its path to their company objectives, an analysis of OBSID objectives was conducted. This analysis was used to determine how our solution added value to OBSID in a suitable manner.

- Develop and sustain a safer, cleaner and smarter public space throughout observatory.
- Nurture the ambiance, charm, and diversity of Observatory village as a meeting place of artists, intellectuals, professionals, workers, residents and visitors.
- Contribute to a commercially attractive, artistically vibrant, ecologically sustainable and family-friendly environment.
- Foster cooperation between residences, ethical businesses, other stakeholders and the City.

Assumptions and Constraints

Following an analysis of the organization and the project scope, there was a need to determine any constraints and assumptions that would limit the potential solution. Without this, solutions may be unrealistic or impossible for OBSID to achieve, and this section helped to keep the solutions realistic.

Cape Analytica has assumed that OBSID is willing and able to pursue this project, due to their expression of interest in approaching us. A second assumption is that once a solution is implemented, OBSID will be able to operate and maintain it after given proper training to use the solution. It was also assumed that all users of the same job type (e.g. Social workers, data collectors) will have the same level of access to the database.

The largest constraint is cost. The CEO of OBSID, Amanda Kirk, has relayed to Cape Analytica that OBSID has been saving for this project and has a budget set aside for this project. Amanda also mentioned that the organization is not technologically savvy and is currently using older software. The solution must, therefore, be easy and not require too much technological literacy, or it will be useless for them. The solution must also be useful to various organizations performing

similar functions, and as such the solution need to be easily scalable. Another important constraint is connectivity. To have a database that can be used by multiple organizations, it must be hosted and be accessible online. It must be taken into consideration that people submitting to the database may not always have internet access when connecting to the database and that the database may go offline for various reasons. We were also constrained by the inability to meet a Social Worker to get a better insight into their work, but Amanda gave us a good description of the role of a Social Worker. Those constraints were factored in when coming up with a solution to make sure that the proposed solution is still viable given those constraints.

Stakeholder Analysis (External)

An analysis of the external stakeholders to the project was conducted. This analysis helped to define who the key stakeholders are and how they affect the project, and how the project affects them. This analysis was completed diagrammatically in the form of a context diagram.

They key stakeholders are as follows:

1. Amanda Kirk

   As the CEO of OBSID Amanda Kirk is the most important external stakeholder to the project. Her approval will validate the project as a success or failure. She also acted as our main view into the organization, through several meetings with her we were able to get a view into the necessary components of a new database, how it would integrate with other organizations and more insightful information. Her interactions with the system will be limited to data entry, seeing a few unimportant details and seeing analyses of the information in the system.

2. Social Workers

   These will be the main users of the system, and as such, the system needs to work for them. As they will interact directly with the homeless people, they are the only users that have full access to all information and functionality in the system. According to Amanda, there is an NDA (Non-Disclosure Agreement) in place for them. The system will also interact with them to ensure when a new person is added to the database, they will be

notified so that they can organize a meeting with the new person to acquire more information and find out how OBSID can help the person.

3. Field Workers

   Field Workers gather data from new people in Observatory. They have very limited accessibility to the database. They will be able to enter data for new homeless people in Observatory, that they get by going out into the area and talking to the people.

On the following page is figure 1 which is a context diagram of the external stakeholders.

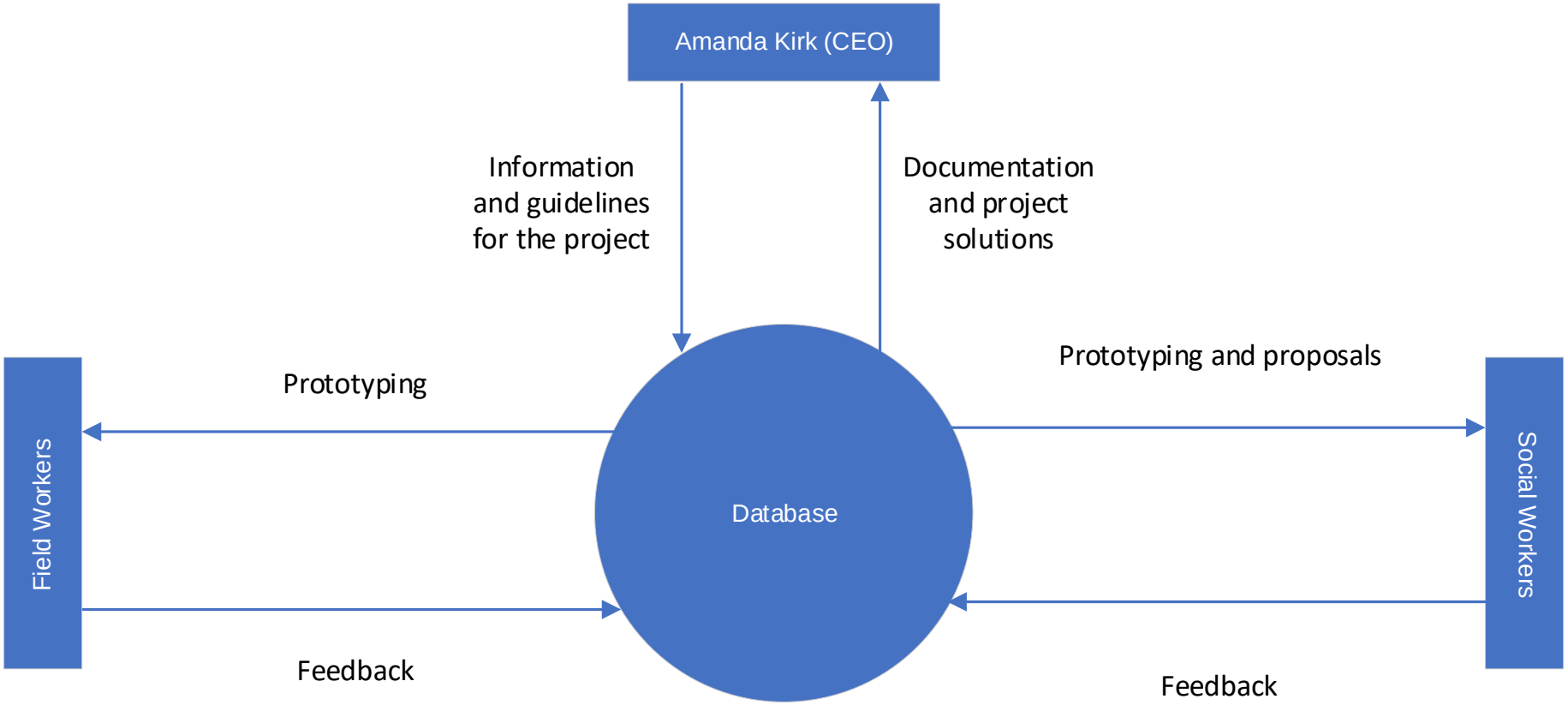

Figure 1: Context Diagram of External Stakeholders

Solutions

Alternative Solution: Custom Made Platform

This solution adopts the approach of creating a custom-made platform. A platform specifically made for OBSID will be planned and developed from the ground up. Different components will be developed such as a website, database, and application, all of which are strictly for OBSID and their affiliated organizations to use.

OBSID Website

A website will be utilized over a desktop application as this allows easy access from any device across all organizations who wish to use the platform. The website provides all functionally needed to input the data and access it remotely while on the streets.

Features of the website:

- Secure login
- Data input
- Data access restricted to user type
- Analysis and Reports
- Add new users and organizations

The website will allow users to securely log in and access data. Importance will be placed on security as the data is confidential and not to be made public as this may harm individuals. Data input will be used by field workers and social workers alike. This will be done at a desktop computer as they transfer physically written notes into the input forms of the website. Once data is captured for an individual it can be then accessed at a later date. The importance is placed on data access restriction. Instances such as the access of private case file information, things such as drug history, family history, etc. will only be accessible by social workers, while field workers may access basic information such as names etc.

Other organizations may also be allowed to access the website with permission of OBSID so they can easily share and exchange information regarding homeless individuals via the platform. Social workers will also be notified via email about people who they need to visit after a field worker has captured the individual's information.

Database

A central database will be used to store all data securely. This will form the foundation and basis which the website will be built on. The database is connected and always ready to be accessed at any time.

Application

For when social workers need to quickly and remotely access information about an individual, they can use the phone application which is built specifically to retrieve any updated information which may have been collected by another organization pertaining to a particular individual. The application is preferred over the website for remote users on the streets while working as it will be more responsive and easily accessible compared to a website.

Overall, this solution caters for the problems pertaining to data capture, storage, sharing, and remote access while on the job.

Feasibility:

To determine if this solution is feasible in practice, we have weighed out the strengths and weaknesses pertaining to the solution stated above.

Strengths

- **Tailored to Fit**
  - This solution caters for each problem defined. Due to the nature of it being custom made, it can be designed to fit all criteria outlined.
  - It fits exactly with OBSID’s day to day operational requirements.

- **Adaptability**
  - This solution is able to adapt to changes required by updating the platform as time goes on.
  - As the solution is built specifically for the purpose of OBSID's operations, it is able to adapt once new requirements arise.

- **Scalability**
  - Once the inevitable need to upscale comes, this solution will be able to handle it as it can be adapted and changed to fit in with new requirements.
  - As more organizations collaborate with OBSID, it will allow multiple different users of different organizations to join in and utilize the platform with ease as it has been designed with the need to scale in mind.

Weaknesses

- **Cost**
  - Due to the need for a platform to be designed and developed specifically for OBSID, it will require a lot more overhead to see the outcome of this proposed solution.
  - The cost associated with this solution is far greater than any other solution due to the extent of what it caters for, and how tailored it is for the organization.
  - The estimated price for the development of this solution ranges around R50 000 thus being a large financial risk

- **Time to Build**
  - A custom-made solution requires time to be designed and built.
  - This solution will take time to properly test and deliver a working product.

- **Maintenance**

    - The platform will need to be maintained by someone qualified who knows the platform well.
    - Maintenance and updates may be difficult to follow through with after the development team has delivered the final product.

Solution Two: Recommended Solution

This solution adopts the approach of utilizing an existing platform which caters for similar needs as defined in the section above. The already existing platform performs sufficiently at a level where it can be compared to a custom-built platform.

We have identified several existing platforms which will suffice and have narrowed the selection down to one which we believe is the superior option. Out of those available, we believe Caspio is best suited for tackling OBSID's problem.

Caspio

Caspio provides the functionality which OBSID requires, from data capture to data analysis. It is an already established product which is regularity updated and maintained. Security is guaranteed and strict measures are in place to protect the data. Below is an in-depth look into the full functionality which Caspio provides.

The functionality of Caspio:

- Setting up and changing database tables.
- Easy-to-build applications.
- Data Security.
- An email alert system for new database entries.
- Password protected data entries and applications.
- Multi-user access with role-based data privacy.
- Data analysis.
- 24hr customer support as well as online tutorials to help you develop your system.

The major concerns are covered by what Caspio offers, namely those listed below:

- **Data Storage**- Caspio comes with a built-in database which will safely store captured data from different users
- **Data input** - Input forms are provided which link to the database where the data is stored in tables, a user can enter in captured data via an online form.
- **Role-Based access to private data** - Caspio allows certain users, depending on their role to access certain data. Social workers will be allowed to access sensitive data pertaining to each individual while field workers will not.
- **Accountability** - Once data is entered about an individual, a social worker is notified via email. This allows the social worker to be able to keep track of who has been visited and who has not.
- **Need for Data Analysis** - Caspio provides data analysis for all captured data. The user can produce and view reports via the platform.

Security

The platform ensures the data that is captured and stored is kept safely, where it will not be exposed to anyone who those with the permission to view and access it.

Feasibility:

To determine if this solution is feasible in practice, we have weighed out the strengths and weaknesses pertaining to the solution stated above.

Strengths

- No Development Required
  - This solution utilizes an already established product to solve the problem OBSID is facing.
  - Caspio offers customer service support in case there are any issues.
  - Caspio's database can easily be modified.
  - Forms are easy and intuitive.

- **Maintenance**
  - Due to the product being offered by another business, it will be maintained and updated by them, so OBSID will not need to worry about potential updates and fixes when problems arise.

- **Cost**

  - This solution is far cheaper than having a custom-built platform provided.
  - Cost is estimated at R300 per month for One user. OBSID will need 3-4 accounts initially which means a yearly cost of approximately R12000.
  - The financial risk in adopting this solution is minimal due to it requiring a monthly subscription rather than a lump sum initial payment.
  - OBSID can test the waters with this solution to see if it will match their requirements rather than spending a large amount on a product which, in the end, does not match their requirements.

Weaknesses

- **Adaptability**
  - Due to the product already being established and functioning, it may not be able to adapt to OBSID's future requirements and needs.
  - OBSID may find limitations when utilizing the platform, such as not offering functionality as required.

Solution Three: Open Source Platform

This solution adopts the approach of utilizing an already existing platform. The key difference with this solution is that it will rely on open source, free and accessible tools. This solution has been drawn up to compare to the others in order to determine if having a free solution with the tools available will suffice for OBSID's needs.

Google Drive & Forms:

Google Drive as well as the built in Form functionality will be used. This will allow field workers to input data via online forms and store the data into spreadsheet documents. This is a lightweight and easy to use platform, which is completely free as well.

Feasibility:

The biggest issue with this solution is the lack of excess functionality and value it adds to OBSID's current day to day operations. It doesn't enhance the process of capturing, storing and analyzing by much compared to their current approach. It does however provide a simple and easy platform to keep track and organization of the information they collect.

Strengths

- **Free**
  - This solution is completely free and doesn't require any initial funding to utilize.

- **Easy and Intuitive**
  - Due to the barebones approach adopted by this solution, it is easier and more intuitive to operate than the others provided.

Weaknesses

- **Lack of Functionality**
  - Due to the nature of this solution being quite lightweight, it lacks important functionality which would be useful to OBSID.

  - Thing such as data analysis and reporting are unable to be done with this approach.

- **Unscalable**
  - This solution is unable to scale with the demands coming from more users needing to the system.
  - Other affiliated organizations are unable to also utilize this platform as it is directly to only a handful of users within one organization.

Recommended Solution

After consideration and weighing out feasibility, it can be concluded that Solution Two – the option of utilizing an already existing platform – is the recommended solution. This solution is well suited for OBSID when considering how the solution deals with functional requirements as well as how it fits around the constraints spoken about above.

Solution Two was deemed the most viable due to several factors; the lack of financial risk involved in adopting the approach, as well as how easy it is to get started. Compared to Solution One, where the implications of having to design, build and test a system is tedious and poses a large risk, and the fact it requires a large sum of money to get it started is also unsettling.

The functionality of Caspio fits in with what OBSID demands. Allowing safe data storage, easy input of data, reports and analysis, permission-based access to certain information as well as scalability which accommodates other partnered organizations utilizing the platform simultaneously. More insight into why Caspio is justified to work well as a solution is detailed in Solution Two above.

The only constraint highlighted with this solution is adaptability. There is a risk that it may not always fit with OBSID's needs as time moves on. OBSID may have changing requirements from a

system,which Caspio may not provide. Caspio cannot change to the demands of OBSID whereas a Custom-Made solution such as one outlined in Solution One can. However, based on the requirements we identified, Caspio will be sufficient and meets the project objectives.

Part 2: Project Planning and Implementation

Project Objectives

After gaining an understanding of the problem and establishing business objectives, there was a need to establish project objectives. The purpose of this is to give the project team an understanding as to what OBSID wants to get after the completion of this project.

- Develop / Purchase a new database system with levels of access for security purposes.
- Increase the integrity of data within OBSID.
- Design and develop a new input format that can be uploaded straight into the database from a handheld device.
- Ensure that all cases are followed through to completion (Each time a new homeless person is entered into the system, OBSID must be able to know for certain that at some point soon, a social worker will approach them to offer them aid).
- Develop / Purchase database that can perform analysis of the data it contains.
- Enable OBSID to share their data with other organizations in the area that perform similar functions.
- Enable the transfer of the current database to the new one.
- Enable the exportation of data in the database.
- Purchase an online server that can be used to host the database

Stakeholder Analysis

In order to ensure the team had a good understanding of how the relevant stakeholders would impact the project vision, and how influential each of these stakeholders was an internal stakeholder analysis was conducted. This analysis contained the stakeholder's role, the organization for whom they operate, contact details, level of influence and level of interest. All these bits of information helped to ensure that all the relevant stakeholders were interacted with in an appropriate manner.

Role	Name	Organization	Level of Influence	Level of Interest	Contact Information
Project Manager	Noaman Zahid	Cape Analytica	High	High	capeanalytica@gmail.com
Project Team	Sabir Buxsoo Sheldon Reay Thomas Baissac Tumi Moeng	Cape Analytica	High	High	capeanalytica@gmail.com
Project Mentor	Seneme Mthembu	UCT Information Systems Department	Medium	Medium	MTHSEN005@myuct.ac.za
Course convenor	Gwamaka Mwalemba	UCT Information Systems Department	Medium	Low	gt.mwalemba@uct.ac.za

Work Plan

The Workplan section breaks down the project into smaller parts. The product breakdown section shows the various components and their sub components. In the Work breakdown section the different activities that need to be performed are grouped and numbered in the order which they will be performed. A gantt chart and network diagram is also used to schedule the project.

Risk management

Following an analysis of the work plan, there was a need to discuss possible risks that could adversely affect the project. Therefore, a full risk analysis was conducted by the project team in order to uncover possible risks, how these risks could be solved and the consequences of the risks going unchecked.

Risk Identification
1. Inadequate time allocation for deliverables
2. Project exceeds deadline
3. Project costs exceed the allocated budget
4. Scope Creep
5. Documentation not written and formatted professionally
6. Project team member not qualified
7. Communication breakdown between team members
8. Project deliverables do not integrate
9. Risks not identified properly
10. Communication between team and sponsor is too infrequent

Table 1: Summary of core risks identified

The team then categorized these risks according to the probability of the risk occurring, and the consequence of the risk occurring. This categorization is laid out below in the Risk assessment matrix.

		Consequences		
		Minor - 1	Moderate - 2	Major – 3
Likelihood	Probable - A		1, 5, 10	2
	Possible – B		4, 6, 7	3, 9
	Improbable - C			8

Table 2: Risk Assessment Matrix

Key	Green: Low Risk	Yellow: Medium Risk	Red: High Risk

Table 3: Key for Risk Assessment Matrix

Finally, a risk response plan was developed by the project team to be used in case one of the risks became a reality. The purpose of this is so that the team has a clearly laid out plan to mitigate the risk, and if that fails the team can rely on the contingency plan. This table can be found on the following page.

Number	Rank	Description	Probability	Impact	Category	Cause	Triggers	Owner	Mitigation	Contingency	Status
R2	1	Project exceeds deadline	High	High	Time	Team members not working efficiently	Project delay exceeds 15% of the total allocated time	Project Manager	Implement PERT	Ask for a project extension from the project sponsor	Green
R1	2	Inadequate time allocation for deliverables	High	Medium	Time	WBS does not allocate enough time	Deliverables take 10% more time to complete	Project Manager	Add 10% extra buffer time to estimates	Revise the WBS and the Gantt Chart	Yellow
R5	3	Documentation not written and formatted professionally	High	Medium	Quality	Team members lack professional writing and formatting skills	20% of the documentation is not formatted	Project Manager	Delegate the writing to a team member with proficient writing and formatting skills	Ask another team member to format the documents	Yellow
R10	4	Communication between team and sponsor is too infrequent	High	Medium	Communication	The team does not see the benefits of engaging the sponsor	Communication only occurs once a fortnight	Project Manager	Set meetings with the sponsor in advance	E-mail sponsor with queries	Yellow
R3	5	Project costs exceed the	Medium	High	Cost	Budget estimation is incorrect	The project falls 20% over the	Project Manager	Estimate costs more accurately	Ask sponsor for extra funding	Green

		allocated budget					initial budget				
R9	6	Risks not identified properly	Medium	High	Risk	Not enough time spent identifying risks	Project quality drops by 25%	Project Manager	Meet with the team and revise risks	Emergency meeting to solve problems	Green
R4	7	Scope creep	Medium	Medium	Scope	Scope not clearly identified	Team members argue about the requirement for 20% of all meetings	Project Manager	Consult the sponsor about the scope and clarify any misunderstandings	Limit the scope and drill down on important features	Green
R6	8	Project team member not qualified	Medium	Medium	Human Resources	The project manager did not conduct proper team select	Team members delivering late 20% of time and work is of poor quality	Project Manager	Set deadlines early and give reminders of upcoming deadlines	Delegate the task to other team members	Green
R7	9	Communication breakdown between team members	Medium	Medium	Communication	Team members lack communication skills	Team members only participate in meetings 50% of the time	Project Manager	Encourage communication from the beginning, and attempt to make team members comfortable in a team environment	Have a bonding session to improve team morale	Green

R8	10	Project deliverables do not integrate	Low	High	Integration	Deliverable outcomes not defined clearly	50% of deliverables have a lack of cohesion	Project Manager	Define the goals for deliverables early and monitor progress consistently	Revise the deliverables	Green

Table 4: Risk Response Plan

Color	Rag Status Definition	Action
Green:	Project performing to plan	No action needed
Yellow	The problem has a negative effect on project performance	The sponsor should be notified in progress report / scheduled briefing
Red:	Significant issues with the project.	The matter should be escalated to project sponsor and project board

Table 5: Key for Risk response table

Prototyping and Testing

The teams preferred solution based on Sponsor feedback was to use the Caspio software solution to buid a database for OBSID to use in place of their current system. Using a free Caspio account, the team constructed a table for data storage with table headings based on the current input form being used by OBSID. Additionally, a digital data input form was created to be used by field workers. This form allows the data to be entered directly into the database as they enter it into the form.

Based on testing of the input form, it also performed as expected and served its purpose successfully, however it was not as user friendly as was possible and as such needed to be developed further. With regards to changes made, when dealing with fields requiring a date, such as Date of Birth (DOB) and Date of First Contact, it was discovered that manualy entering a date was difficult, slow, and there are too many different formats and ordering which could cause problems in the database if manual typing was allowed. Therefore this was changed to a date picker.

Additionally, for options where there is a drop down box initially there was an option to select “all” which does not make sense in this context, and as such this option was removed. Following these changes, the data input form was efficient and more usable.

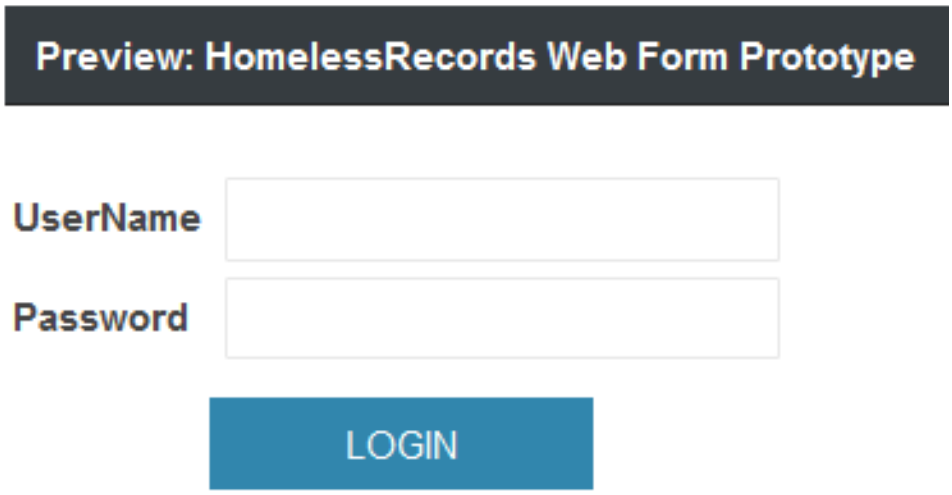

Figure 6: Prototype Login Screen in Caspio

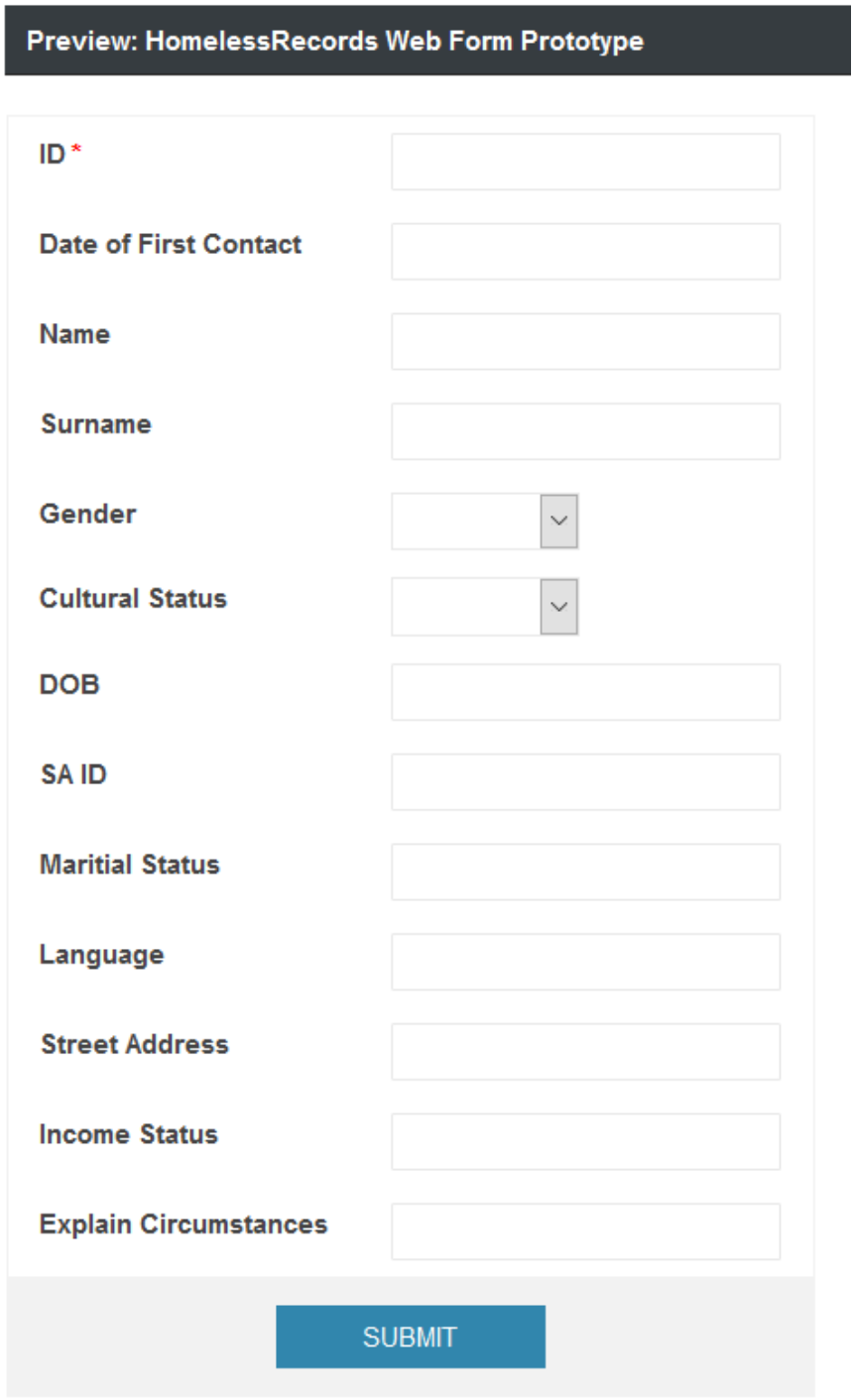

Figure 7: Prototype Data Input Form in Caspio

Output and Exhibits

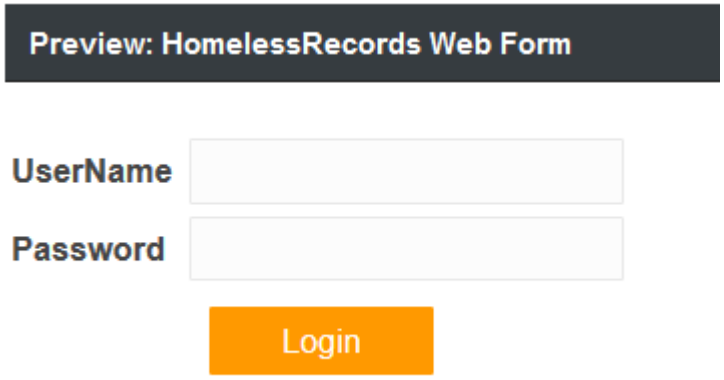

Figure 8: FInal Login Form in Caspio

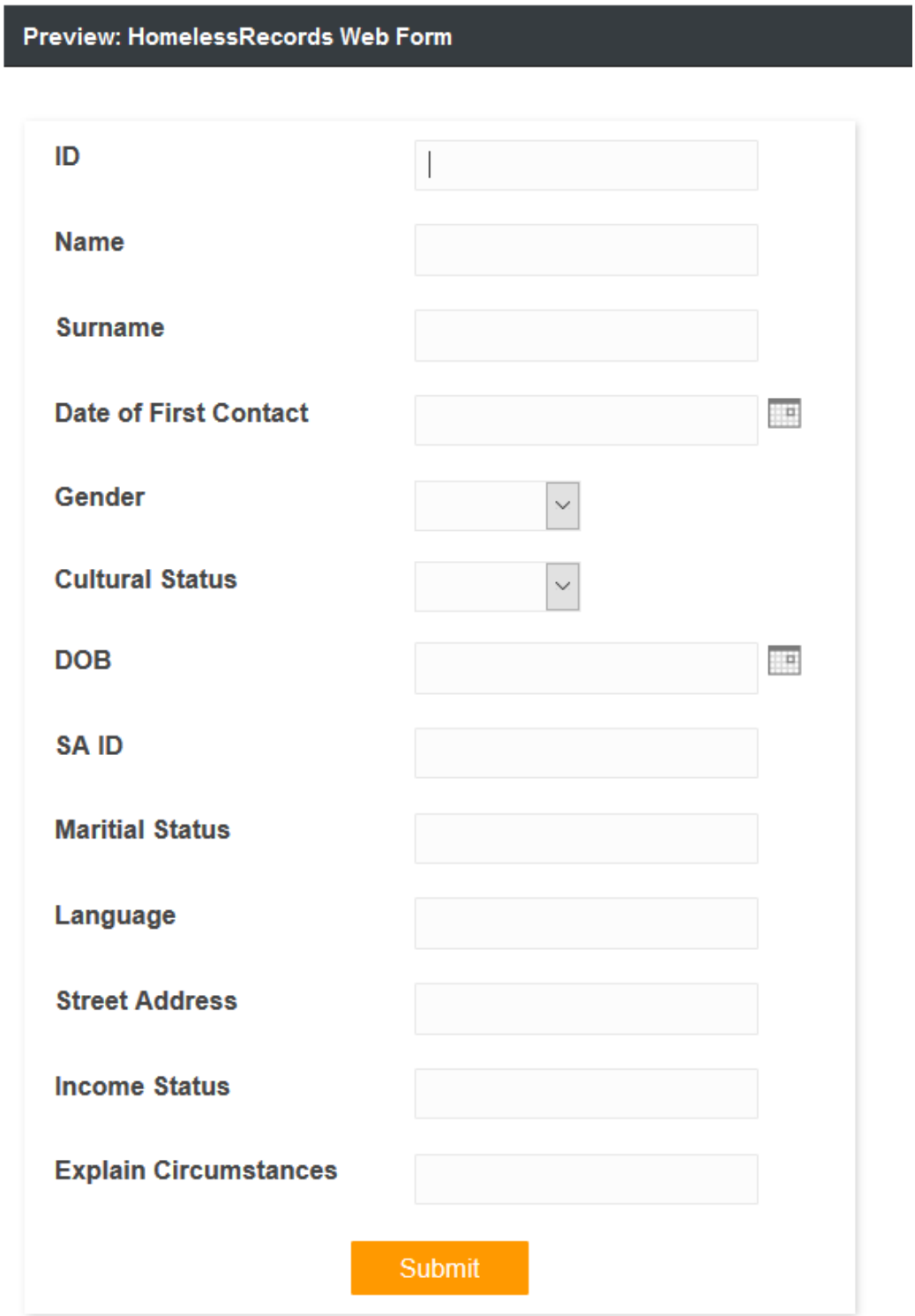

Figure 9: Final Data Input Form in Caspio

Datasheet | Table Design | Triggered Actions

New | Refresh | Download | Find | Replace | Filter | Reset Autonumber | Delete | Delete All | Record 1 of 15

ID	Date_of_First_Contact	Name	Surname	Gender	Cultural_Status	DOB	SA_ID	Maritial_Status	Language	Street_Address	Income_
6435	04/18/2019	Jermaine	Cole	Male					Xhosa, English		
4849	05/19/2018	Alice	Mkulema	Female	Venda	05/11/1979	7982758392843	Married			
1212	05/26/2018	Xolisa	Nongxa	Female	Xhosa	05/10/1980			Xhosa		
6743	05/15/2019	Herbert	McDuffie	Male	Asian	05/16/1987	8702258095085				
7462	11/05/2018	Andrew		Male	Asian	05/02/1991		Divorced	English		
4892	05/01/2019	Fatimah		Female	Brown	05/08/1991	9008057365907	Single	Afrikaans, English		
8664	11/14/2018	Aya	Nonsgile	Male	Zulu	05/09/1991	9111299372097	Single	Zulu, English		None
3490	04/16/2019	Tyelovuyo	Jali	Male	Xhosa	01/23/1992					
3895	02/14/2019	Larry	Luby	Male	Xhosa	05/14/1992	9208097959085		Xhosa, English, Se		
2020	02/05/2019	Henry	Harris	Male		08/05/1992					
1337	04/11/2019	Paul	Smith	Male		10/08/1992					
1234	05/04/2019	Sheldon	Reay	Male	White	03/10/1994					
8593	04/09/2019	Randy T.	Harlan	Male	White	05/12/1994	3311215828086	Single	English	Crown St	Part Time
8594	12/14/2018	Nancy	Michalski	Female	White	06/01/1994	4401189910082	Single	English		Monthly gra
9039	05/07/2019	Sibabalwe	Mkutukana	Male	Xhosa	05/26/2000	0094857382918		Xhosa, English, Se	Link Road	

Figure 10: Screenshot of the prototype database in Caspio

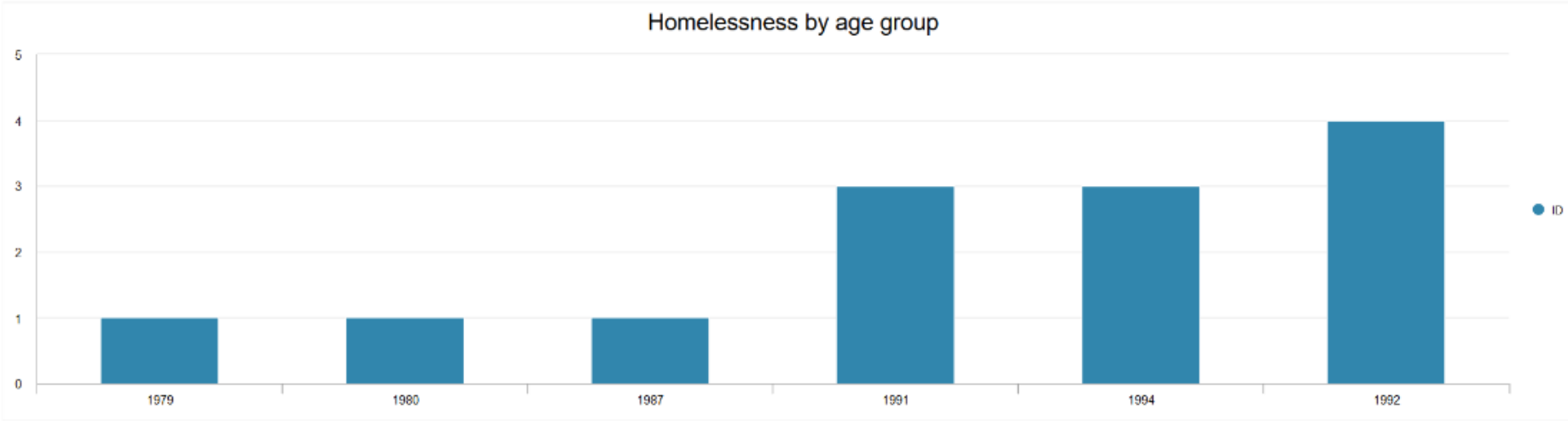

Figure 11: Sample data analysis using data in table. Made in Caspio