Group #7 - Assessment 2

# Team Profile

### Team Name Personal Information

#### Daniel Blake

I’m Daniel Blake, my student number is s3910924. I’m from an English background, and moved here quite young. I love AFL and the west coast Eagles, and like camping, fishing and the beach. My professional background is in Operational Technology and vehicle automation, working in the resources sector. My interest in IT is to expand my knowledge and career opportunities within mining or possibly other industrial technologies. Go TBD!!!

*I’m Daniel Blake (s3910924) of UMI. I’m from an English background but moved to Australia at a young age. I love AFL and the west coast Eagles. I also spend a lot of time camping, fishing, and at the beach. My professional background is in Operational Technology and Vehicle Automation specific to the resources sector. My interest in IT is to expand my knowledge and career opportunities in mining or other industrial technology fields. Go TBD!!!*

#### Nicholas Drinkwater

Hey! I’m Nick Drinkwater (s3508178) of UMI. I was born in Sydney but grew up in Melbourne. Whilst I don’t have any formal IT experience, I actually previously started this degree back in 2015. After completing half a year, I left to go traveling, spending 2 years living in Edinburgh, Scotland. With Coronavirus and being unable to travel, I decided to use this time to return and finish my degree! I love traveling, film, and baseball. My interests in IT include programming, building IT systems, and hardware. I hope to learn the necessary skills and knowledge to help me enter the IT industry in my career, as well as exposure to inspiring topics and fields of IT that I haven’t seen or encountered before.

Abby Durbridge

I’m Abby Durbridge (s3794613) - a Melbourne resident living in the heart of Southbank, loving every moment. My passions lie in creative arts and languages and use most of my spare time growing my skills in each. Historically, I’ve worked with an Engineering firm before transitioning into a SaaS company within the Childcare Industry. A hefty lockdown saw me trying to develop new skills and interests and evidently picking up another degree. My interest in IT hasn’t been at the forefront of my life but rather a natural necessity, and it wasn’t until I began to think of developing my own software or being able to work remotely for any company that I pursued IT professionally.

*I’m Abby Durbridge (sXXXXXX) of UMI– a Melbourne resident living in the heart of Southbank and loving every moment. [Can we get some hobbies & heritage in here?] Historically, I’ve worked with an Engineering firm before transitioning into a SaaS company within the Childcare Industry. A hefty lockdown saw me trying to develop new skills and interests and evidently picking up another degree. My interest in IT hasn’t been at the forefront of my life but rather a natural necessity, and it wasn’t until I began to think of developing my own software or being able to work remotely for any company that I pursued IT professionally.*

Mathew Dwyer  
My name is Mathew Dwyer, student number S3807459, part of [Team Name]. I am 27 years old living in Newcastle NSW. I have previously studied 3 semesters of a bachelor of communications and done part of a TAFE course regarding video game design. I speak English and am currently trying to learn German. One of my favourite past times is playing with electronics. Currently, that revolves around 3D printers and learning CAD and 3D modelling. It is extremely helpful to me as I like to print miniatures and terrain for my DnD games.

My experience in IT is primarily focused around web development and electronics, having helped develop and maintain a retail website for the retail store I worked for. I also have some video game development experience, having created several small games for different competitions. My main interests lie in software development, specifically automation and cybersecurity.

*My name is Mathew Dwyer (sS3807459) of UMI. I’m 27 years old and based in Newcastle, NSW, Australia. English is my primary language, however I’m in the process of learning German. Previously, I’ve completed 3 semesters of a Bachelor of Communications at [insert university], as well as partially completed a video game course through TAFE. I love playing with electronics and am currently expanding my skills with 3D printing, 3D modelling and CAD to facilitate the printing of miniatures and terrain for my DnD games.*

*My experience in IT is specific to web development and electronics, having played an integral role in the development and ongoing maintenance of the website of a retail store I worked for. Additionally, I’ve had involvement in video game development and have created several small games for various competitions. Software development, automation and cybersecurity are all areas I’d like to explore during the course of my education and career.*

Erin Paton

I’m Erin (s3910930) of UMI. Originally from Sydney, I relocated to Byron Bay for a change of pace and to get closer to nature—most of my weekends are now spent hiking, exploring waterfalls, or at the beach. Currently, I’m fluent in English but I have a passion for French culture and intend to study the language up to C-level (only after I’ve knocked over a few programming languages!).

My experience with IT is specific to marketing technology, and the software used to implement it. Art, Design, Psychology, Health & Wellness, and Sexual Education are all areas that are important to me and while I don’t have plans to further my education in these fields, the possibility of exploring their convergence with emerging technologies is something that excites me. I’d love to play a role in increasing the accessibility and interoperability of these spaces in some way throughout the course of my career.

Harrison Tang

My name is Harrison Tang, s3908223 of Team UMI. Born to migrant Chinese parents, I am a second-generation Australian and denizen of Brisbane Town/Meanjin. Whilst not possessing an extensive background in IT, I grew up in the 1990’s and 2000’s playing video games and exploring the internet. Eventually, technologies would play a crucial part in my life in staying connected with friends and family, discovering art and music, educating and expressing myself, and seeking new employment and career opportunities. Recent work performing administration and data collection for an infrastructure company prompted an exploration into avenues in programming, cloud services, and app and web design leading to pursuing a formal education in IT. Currently, I play guitar as part of the ‘strings’ section in a ten-member pop-punk cover band/orchestra and occasionally travel interstate to perform.

### Team Profile

The test outcomes for each person in the team (all 3 tests), and your understanding of how this information may be helpful to the group. You should do this as soon as your group is formed. You will have a chance to reflect on how well the group has worked later.

#### Daniel Blake

Brigg Meyers Test was and an INTJ-A, an Assertive Architect. This means, for me, that I can use rational thought and ingenuity to bring a project to fruition. I found a learning styles test online at<http://www.educationplanner.org>.The results of the test say that I’m a 50% tactile learner. The third test that I found online was to assess my productivity, it was conducted at<https://hbr.org/2018/08/assessment-how-productive-are-you>. The results show that I am 95% productive.

#### Nicholas Drinkwater

**Myers-Briggs**

My Myers-Briggs test indicated that I am an INFP-T, which is a Turbulent Mediator. This means that I am thoughtful, open-minded and empathetic but can also overly self-critical and idealistic.

**Honey and Mumford**

My Honey and Mumford score indicated that I have a Reflector learning style, which is someone who learns by observing and considering what happened and someone who likes to consider all the possibilities and implications.

**Big 5 Personality Test**

My third test was the Big 5 Personality test that indicated that I am primarily good natured, courteous and supportive but I can also be shy and tend to worry about things.

**Discussion**I believe that these test results put me in a really good position for working within a team! My strengths will mesh really well within a team as I'm always respectful and open to any ideas that my teammates may have! My results show I’m passionate, generous and dedicated which I will use to ensure that I fit in and work well within the team.

Abby Durbridge

**Myers Briggs (ENFP-A)**

As an ENFP-A (Extraverted, Intuitive, Feeling, Perceiving), I bring a warm and inviting energy to any team through my charisma and abundance of people skills. I have the ability to adapt seamlessly to change-making me a superb choice for roles within dynamic, stimulating environments.

**DISC (Cd/I Style)**

What I find interesting about the DISC test is that it is that you can set your focus thus the report was geared towards my working style within a workplace environment, while also providing insight into your natural style and comparing the two. The test states my adapted behavioural style is a mixture of the Conscientious and Dominance style while my natural behavioural style is very skewed towards the Influence style.

The test deemed my behavioral style as the Networker often meaning I have great verbal skills, well-networked, and high-levels of energy in social settings. In organisations, I have the ability to find the right person for the job through my wide net of connections and ease into group collaborative work effortlessly.

**5 Voices (Pioneer, Connector)**

As a Pioneer - Connector, I love to dream big and share those ideas with people. I find myself to be multi-talented, very resourceful and love challenges. I do challenge the status quo which can be confronting to some people and may be intimidating. I believe I can be a great addition to an organisation who gives me autonomy and believes in me, my capabilities and my vision.

Mathew Dwyer

Myers Briggs Test Result - ISTP (Introversion, Sensing, Thinking, Perceiving)

Learning Styles Test Result - Visual Learner

OSPP 4 Temperament Test - Phlegmatic

Together, these results seem to indicate I am someone who stops to think before making decisions. I am also quite introverted and not particularly social. It also indicates that I am someone who learns more through seeing something be done rather than being instructed.

They help to point that in a group, I am better at being a decision maker because I will carefully consider all options before coming to a conclusion. But it also says that I will not likely speak up very much due to my introverted nature.

This should be taken into account when forming a team by considering what the other members advantages and disadvantages within their personality are, and using them to decide what roles within the group suit each member the best.  
  
Erin Paton

**Myers Briggs (INFP)**

My results indicate introversion, an intuitive information-gathering style, emotion-based decision making, and a preference for structure and organisation in my environment. Dubbed “The Advocate”, 16 Personalities describes individuals of this combination as creative problem-solvers with the ability to accurately read people’s true feelings through compassion and keen intuition. Advocates are inspiring communicators who speak and write with a conviction that can be quite persuasive. They prefer to succeed to the benefit of those around them, never to the detriment of others. Some weaknesses of the Advocate profile are a sensitivity to criticism, difficulty opening up and asking for help, and a sometimes debilitating perfectionism.

**VARK (AK Type Two)**

My results show a multimodal inclination towards auditory and kinesthetic learning styles. Auditory learners digest information that is heard or spoken with a preference for group discussions, lectures, talking things over, as well as some informal writing methods that are formatted colloquially. Kinesthetic learners value implementation that is connected to reality, favouring demonstrations and simulations. VARK Type Two individuals work best when they’ve gathered information from both of their preferred learning modalities and often take more time exploring subject matter which can appear as procrastination or inefficiency but generally leads to a more in-depth comprehension of the material.

**DISC (Type S)**

My results indicate a strong egalitarian inclination and a desire to cultivate a supportive, inclusive environment for teammates to flourish in. Type S individuals are dependable, reliable, strong communicators who utilise compassion and diplomacy in adversity and prefer to diffuse conflict with patience and understanding. They’re natural collaborators and strive for the overall success of the team rather than advancing their individual endeavours. These types can be indecisive and over-accommodating, often to their own and the team’s detriment, which can ultimately have the opposite effect of their intentions if not kept in check. Being extremely empathetic people, they often gloss over problems and avoid calling out the inadequacies of their colleagues in an attempt to keep the peace, leading to setbacks down the line.

Harrison Tang

**Myer-Briggs Personality Test - INFJ**

My scores on this test returned an INFJ result. Referred to as ‘The Advocate’, ‘16Personalities.com’ describe this personality type as principled in nature, empathetically sensitive and altruistically driven with a strong sense of egalitarianism. However, this idealism can evoke perfectionist and reserved tendencies in Advocates, exacerbated by a lack of self-care and often leading to burnout.

**Learning Styles Test - Auditory, Kinaesthetic, Interpersonal**

Results from this test suggested an aptitude for physical, aural, and social learning. These types of learners typically benefit most from hands-on group activities and discussion through problems. Physical and aural learners absorb information through sensory experiences, such as touch and rhythm, while social learners excel through interaction and feedback.

**Big Five Personality Test**

The Big Five Personality Test measures five major dimensions of personality: Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism (OCEAN). According to results, I possess an accent towards Openness and Agreeableness while Neuroticism scored lowest. Many aspects of this summation mirror certain characteristics of the Advocate personality type, such as a tendency towards helping others, collaboration, emotional intuition, and an aversion towards following traditional paths.

**Discussion**

The depths of these varying results indicates that people of various personality types share certain characteristics that express themselves in a variety of ways. For example, the concept of ‘leadership’ does not necessarily require an extraverted personality, but rather an observance of a particular leadership style that is comfortable and productive for a team as a whole. These test results suggest I am strongly capable of collaboration and productive in environments aimed towards helping others, benefiting greatly through physical and social experiences. I aim to always be respectful, positive, committed and inclusive, as I typically learn more through active discussion and debate about ideas and solutions.

# Ideal Job

Job title + 5 or so core skills required. Compare and contrast the ideal jobs for each person in the group. What common elements are there, if any? What differentiates each position from the others, if anything? How similar or different are your career plans across the group? A concise coverage/analysis/conclusion covering all would be good. Strongly recommend a table presentation of comparison data.

Daniel Blake  
**Strategic Technology Lead, Operations Transformation at Woodside Energy** 1. 10+ Years of Leadership experience  
2. Experience with design and deliver of complex platforms  
3. Knowledge of systems architecture and cloud computing  
4. Ability to communicate.   
5. Analytical and strategic thinking

Nicholas Drinkwater  
**Software Engineer at SpaceX**  
1. 2+ years of software engineering experience.  
2. Experience with Python and other software/scripting languages.  
3. Interacting with end users and interfacing with cross-functional teams.  
4. Experience in operations and/or support.   
5. Analysing test results and troubleshooting systems.

Abby Durbridge

**Chief Technology Officer at Xplor Technologies**

1. Business and stakeholder management;
2. Well-honed leadership skills;
3. Emotionally Intelligent;
4. Hands-on;
5. Logical and Sharp communication skills.

Mathew Dwyer

**Automation Software Engineer**

1. Programming language skills (several languages like Java, C++, C#, and possibly PHP, SQL, and Javascript)
2. Cybersecurity expertise
3. Electrical Hardware Knowledge would be extremely helpful
4. Creative Problem Solving Skills
5. Agile Development skills

Erin Paton  
[**Project Manager at Minty Art**](https://cryptojobslist.com/jobs/project-manager-web3-marketplace-at-minty-art-remote)

1. Communication
2. Leadership
3. Critical Thinking
4. Crypto knowledge & understanding
5. Project planning & management skills

Harrison Tang

App Developer at Nightlife Music

1. Programming language knowledge (Java, C++)
2. Communication and Documentation Skills
3. Product/Applications Design
4. Industry Knowledge/Experience
5. Research Skills

* Communication in one form or another is the one defining trait across all six of our ideal jobs

# Tools

The link to your group’s website

The link to your group’s Git repository (GitHub)  
[github.com/blakey83/Intro-to-IT---assignment-2](https://github.com/blakey83/Intro-to-IT---assignment-2)

Links to each individual website on the group website.

s3910930.github.io/erinpaton/home.html  
[aabbayy.github.io/space-junk/](https://aabbayy.github.io/space-junk/)  
[harrisontang.github.io/Assignment1MyProfile/](https://harrisontang.github.io/Assignment1MyProfile/)  
[drinkwatern.github.io/IIT/index.html](https://drinkwatern.github.io/IIT/index.html)  
[matdwyer94.github.io/COSC2196-Assignment-1/](https://matdwyer94.github.io/COSC2196-Assignment-1/)  
blakey83.github.io/

Include a brief description of what you have done.

From the outset of our assignment, we wanted to ensure that we were able to track and maintain all of our objectives and the output that was produced. We therefore set up a group GitHub to house all artifacts created, such as our report and website. For the report, so that that team could collaboratively work on their own parts of the assignment, such as the Personal Profile and IT Technologies, we decided to use Google Docs which enabled us to see changes made in real time and easily enable us to work on this assignment. This solution instead of having a word file that we would need to download and then upload to GitHub each time. To track the changes in this Google Doc, we have uploaded a word file of this to GitHub every couple of days.

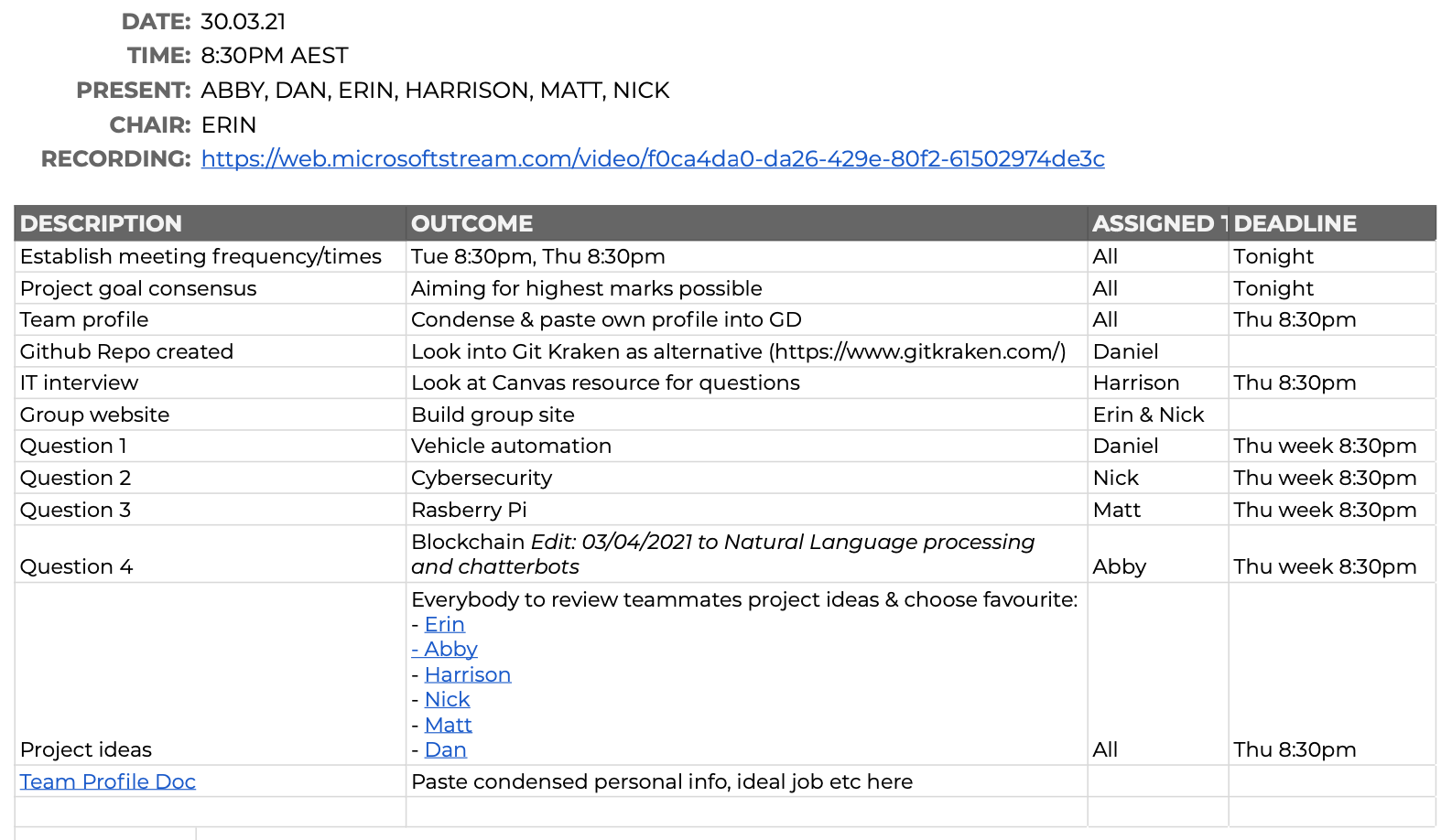
We have also extensively used Microsoft Teams for all of our group communication and meetings and have decided to use Trello to track each individual's work. Trello is a collaboration tool that manages project tasks into a board; in our case, a kanban board. This meant that we were able to set appropriate deadlines for each task to be completed and then as a group know when an individual was happy with the work that they have produced, so that it can be committed to the website. Additionally, TEAM NAME utilises Miro, an online collaborative whiteboard, to facilitate brainstorming for our project idea.

Your comments on how well the audit trail on the Git repository reflects your group’s work. You will presumably only be able to do this close to the time of submission.

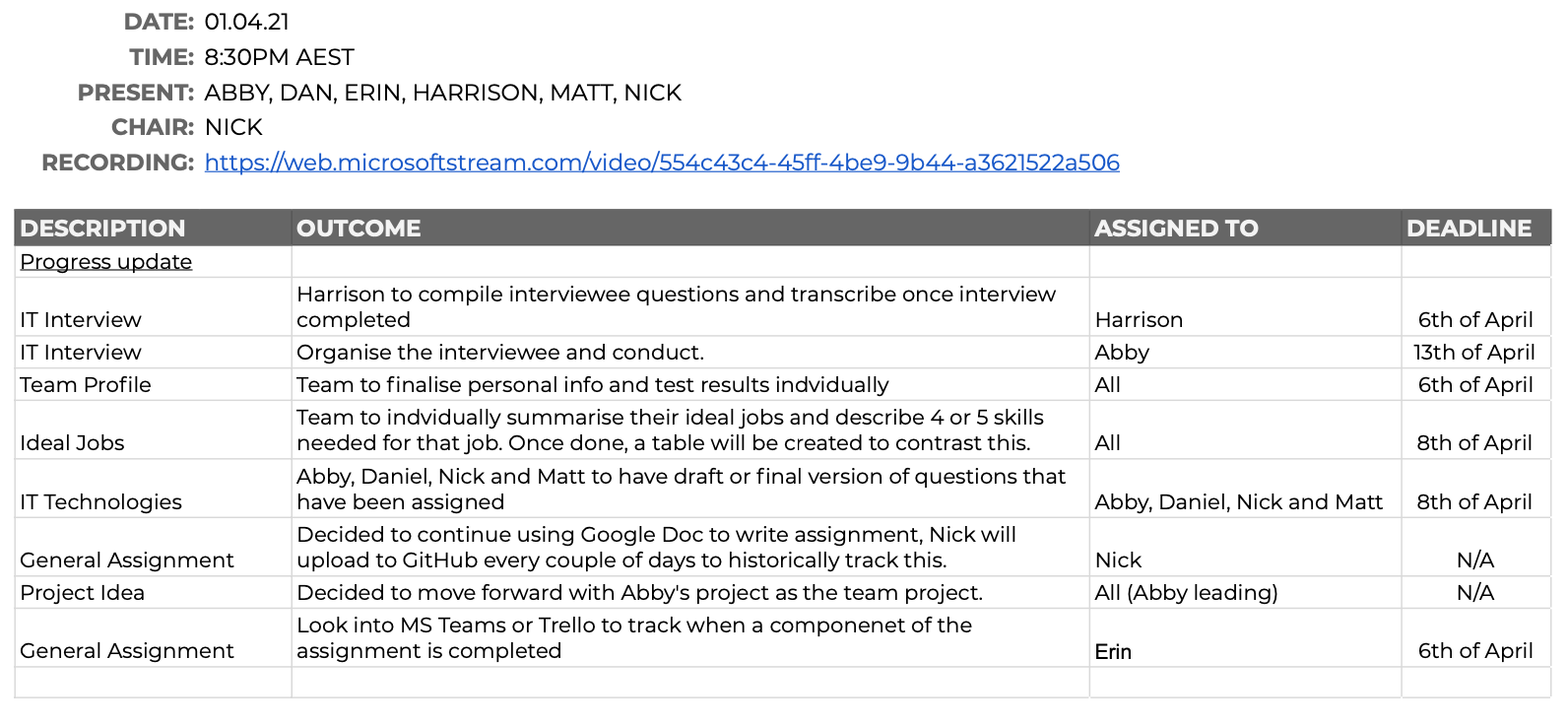
MS Teams information, meetings, notes, and links (etc.) should be included in this section too

**Meeting 1**

web.microsoftstream.com/video/f0ca4da0-da26-429e-80f2-61502974de3c

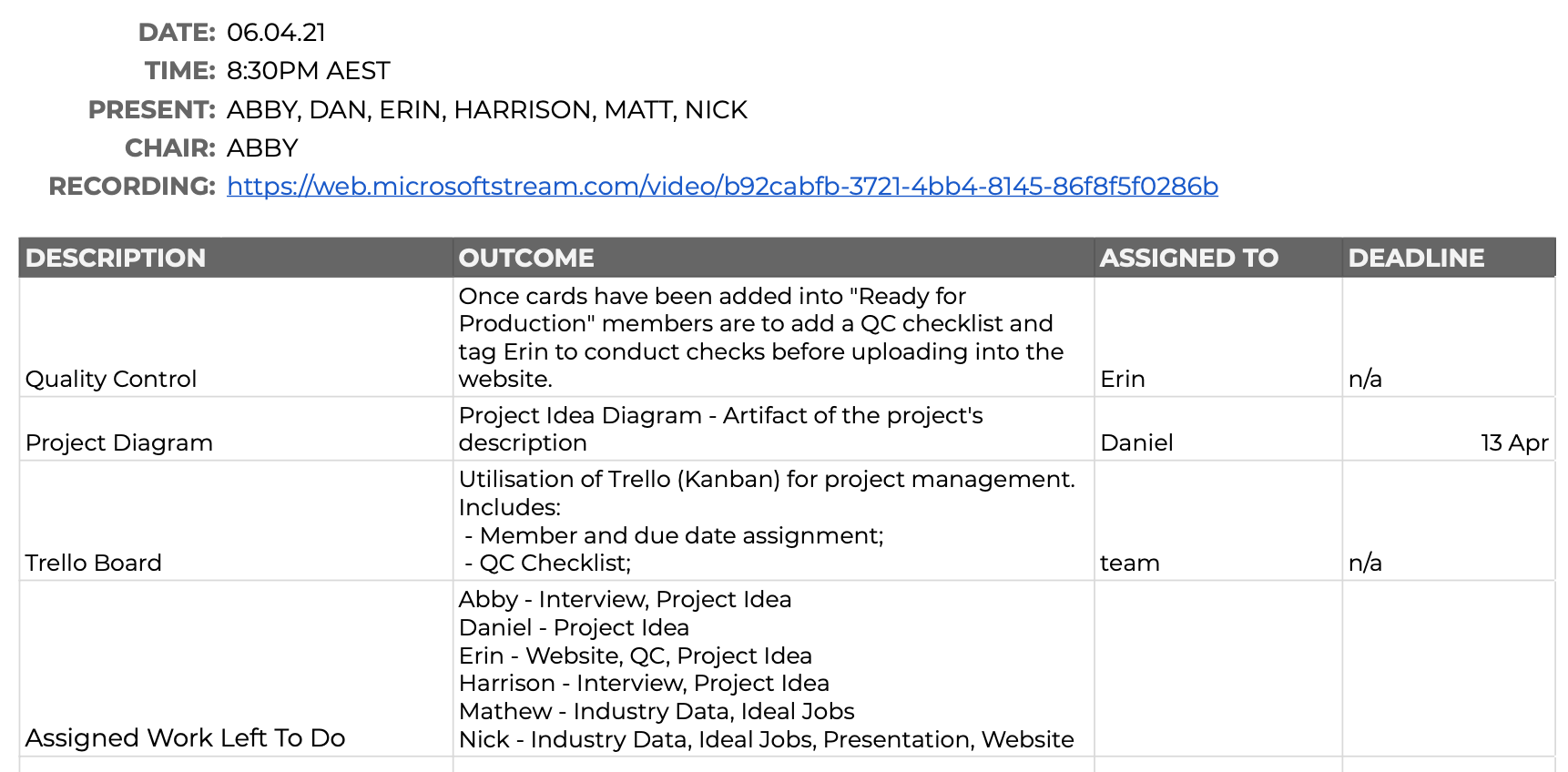


**Meeting 2**

web.microsoftstream.com/video/554c43c4-45ff-4be9-9b44-a3621522a506

**Meeting 3**

web.microsoftstream.com/video/b92cabfb-3721-4bb4-8145-86f8f5f0286b



# Industry Data

In Canvas on the Assignment 2 page, you will find a link to some industry data supplied by Burning Glass. You should use this (as well as any other data you may be able to find) to answer the following questions. If you’re to be looking outside of the IT field, find similar data for your specific Industry.

What are the Job Titles for your group's ideal jobs? How do each of these rank in terms of demand from employers?

Our six job titles cover a wide range of different occupations within the IT field, each requiring a unique set of skills and experience. Our six job titles are:

* Strategic Technology Lead
* Software Engineer
* Chief Technology Officer
* Automation Software Engineer
* Project Manager
* App Developer

Using the data provided of the top occupations, software engineers and developers are the most highly in demand, with this demand more than double the second highest in demand occupation. This means that three of our ideal jobs, which represents half of our jobs are within the highest in demand occupations.

* Software Engineer
* Automation Software Engineer
* App Developer
* Strategic Technology Lead
* Project Manager
* Chief Technology Officer

From your group's ideal jobs, identify a set of skills required for these jobs (we will refer to this as your group's

required skill set). These can be divided into general skills (communication, problem solving, writing etc) and IT-specific skills (Javascript, SQL, etc).

Due to half our ideal jobs being software engineers/app developers, our required skill set ranks highly in demand

How do the IT-specific skills in your required skill set rank in terms of demand from employers? o How do the general skills in your required skill set rank in terms of demand from employers?

What are the three highest ranked IT-specific skills which are not in your required skill set?

What are the three highest ranked general skills which are not in your required skill set?

Having looked at the Burning Glass data, has your opinion of your ideal job changed? Why or why not?

# IT Work Include raw transcripts / recordings in appendix to support your written component. You should answer the following questions. - What kind of work is done by the IT professional? - What kinds of people does the IT professional interact with? Are they other IT professionals? Clients? Investors? The general public? - Where does the IT professional spend most of their time? - What aspect of their position is most challenging?

Interviewee name:

Company/Organisation:

Position:

Rubric in red

* Tell us about the company you work for?
* What is your position in the company?
* How long have you been in the industry?
* Tell us about the industry you work in?

(You have clearly described the kind of work done.)

* Tell us about your IT work. What exactly do you do?
  + Who/What are you responsible for?
  + What knowledge is required for your role?
  + What resources/technologies (if any) do you use to carry out your work?
  + How does your work contribute to the greater whole of the company/organisation?
  + What are the biggest challenges? (You have succinctly included the challenging aspects of this work.)
  + Do you perform other roles within your organisation?

(You have described how most time is spent with a high standard of narrative flow)

* Describe a typical day in your role.
  + Overall, rank your major tasks from most difficult to most manageable
  + Why is it most difficult?
  + What takes highest priority?
  + What aspect of your work do you spend the most time on? Why?
  + Are there busier periods than others throughout the year? (You have succinctly included the challenging aspects of this work.)

(You have described and explored all of the interactions with other people.)

* Who do you meet/interact with during your day-to-day duties?
  + Describe interactions with other IT professionals?
  + Describe interactions with clients/investors?
  + How do you interact with co-workers/clients? (technologies/email?)
  + Challenges? (You have succinctly included the challenging aspects of this work.)

(Developing a section substantially beyond the question set.)

* How did you arrive at this role?
  + What prior knowledge did you have before being in this role?
  + Did you study for qualifications/tertiary education?
  + Why did you pursue a role in your industry? (IT/Engineering)
  + What is exciting about your work/industry? (Short/medium/long term)
  + How do you describe work life balance?

# IT Technologies **Autonomous Vehicles What does it do?**

Autonomous vehicles, as the name suggests, is about getting vehicles that can drive without the need for human operators. Although we are yet to see these on the roads of our cities, Autonomous vehicles are a reality in the resources industry (Frangoul 2020). Rio Tinto alone operate over 130 autonomous trucks around there operations in Western Australia’s Pilbara region alone (Frangoul 2020). At the moment simple haulage of mining dirt can be transported by level 5 (Truecar Adviser 2018) autonomous vehicles to either crushers or dumps. These vehicles are currently able to operate in the mining environment alongside other manned vehicles, such as Diggers, and light vehicles, however only in the highly controlled mining environment.

The current technology, while quite amazing, is quite simple in terms of artificial intelligence. The path taken from a digger or loader to a dump area or crusher, is usually mapped out by a manned vehicle, and the truck will just follow the path. The future of Automation in mining is going to be the ability for command and control systems to make up their own paths. One example of this is the Automation Solutions Inc. built mobius command and control (ASI n.d.). This solution is currently being implemented in the Western Australia’s Pilbara for Roy Hill holdings (Canadian Mining Journal Staff 2020).

This is a massive leap forward for the Automation of not only mining vehicles, but for the future of all autonomous vehicle advancement. Mining has certainly led the way in terms of the technology, as they usually have large capital expenditure budgets and the return on investment is easy to measure, and can be enormous in terms of iron ore mining (Peters 2019). However the technology that has already been bought and paid for by mining could well be the technology on the roads (Peters 2019). The key to this is for a leap in artificial intelligence, so that many split second decisions can be made by the vehicle to ensure the safety of those around. I predict that the artificial intelligence being developed by companies such as ASI robotics will drive the Autonomous Vehicle advancements for the next decade (ASI n.d.).

The technology that allows for Autonomous Vehicles in the mining sector today, is a convergence of both Information technology, and electronic/electrical engineering. For a truck to run autonomously, a lot of computations need to be made very quickly, which is done inside a control unit, with a processor, memory and I/O cards. This also acts as a go between, with a series of microcontrollers ensuring drive by wire operations and a wireless network router, usually either Wi-Fi or 4G LTE.

The ability to control the automated vehicle is from a long line of advancements within telecommunications. On an elementary level, AHS trucks need to have three basic pieces of information to operate safely.

1. Their current location

2. The route to their destination

3. The location of other equipment

To answer all the questions above and have a control and communication network, Wi-Fi or Long-Term Evolution (LTE) coverage must be established throughout the truck's operating environment (Ayres 2017). Developments in Wireless data transfer in the 1990s allowed for the first Wi-Fi standard, 802.11 protocol, to come into existence in 1997 (cablefree 2017).

The release of the 802.11g protocol in 2003 allowed the average throughput of 22Mb/s at the 2.4 GHz band. This is what allowed the adoption of Automated Haulage inside a mine site. In recent years there has been a push towards LTE technology. This is not only for greater data throughput, to allow for things such as camera feed, but the algorithms used for handover between cells make Automotive transport more productive (Bonilla & Navarez 2018)

# **What is the likely impact?**

The likely impact of having autonomous vehicles on mine sites are really two fold. The first big potential change will be to productivity. The problem with a “manned” workforce operating trucks is that people are by their nature, vulnerable. A large mining Organisation may use as many as 70 trucks during a shift. This requires 70 drivers, who may have health, family, and other pressing concerns that could mean they are not able to work. You multiply that by the 24 hour nature of mining (i.e. 2 x 12 hour shifts per day) and the Fly in fly out rosters that means that the mine will require as many as 280 drivers on staff.

The improvement in productivity on investment for Automated Haulage is quite huge. One example is that of Rio Tinto, Australia’s largest iron ore producer. Prior to 2017, they spent over $2 billion on automation projects. From between 2014 and 2017 they saw an enormous 37% increase in per person productivity (Francis 2018). There are also other cost benefits to automation, such as improved fuel efficiency, less wear on engines and tires and other benefits (Miller 2019).

Automation also offers great improvement in the area of safety. Back in 2018, a 28 year old Haul truck driver at Rio Tinto’s Chennar mine died during a night shift (Newell 2018). This is only one of many stories of people who have been injured, or killed, driving haul trucks. By eliminating the driver in those situations, lives could be saved.

It is no secret that Automation across the mining industry will be at the expense of employment of low skilled workers. It is estimated that by 2030 that as many as 77,000 frontline jobs will be lost to automation within the mining industry (Nera & Mets ignited). However this will be offset initially by an additional 44,000 new roles will have been created to support automation (Nera & Mets ignited 2018). This will be accompanied by around 63,000 new jobs in the supply chain, as mining will need additional things like advanced equipment, software and other capital goods to support mining automation (Nera & Mets Ingited 2018).

# **How will this affect you?**

In my daily life, this has affected me greatly. Currently I work in the mining industry, as an automation project specialist. The project I am working on at the moment is to upgrade the Roy Hill mine from a manned fleet of 77 trucks, to a fully autonomous fleet. This means that I am currently employed delivering this technology.

Without these kinds of projects, I would probably not be able to find work in the mining industry, as I have no truck driving or civil engineering experience. The size of Australia’s mining industry also means we are world leaders in this type of technology. Which for me, means I am working on state of the art automation and artificial intelligence.

For my friends and family, the advent of Automation has been a mixed blessing. My brother lost his job in the mines during the recent downturn, and came back to work in Perth. As an experienced Haul Truck operator, he would have easily found work when the industry picked up, however, due to AHS it took him a fair bit longer to find work than expected.

However for most of the people I know the advent of Automation has been a positive one. I was in the Navy for a number of years, and know a lot of technicians that have been able to transition back into civilian jobs a lot easier. Automation gives opportunities to a lot of people within our community. A lot of old drivers are now involved as pit controllers in the city, and can go home every night, instead of spending half their lives away from family and friends. I do believe that on balance, automation will continue to be a positive part of our lives.

# **References**

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# **Blockchain and Cryptocurrencies** What does it do? (600 words) What is the state of the art of this new technology? What can be done now? What is likely to be able to do be done soon (say in the next 3 years)? What technological or other developments make this possible?

Blockchain and cryptocurrency are some of the newest and most exciting developments that we’ve seen in the IT world. These technologies have the ability to, and have already started to transform how data is stored, how currency is traded and how transactions are made online. The first and still most prominent cryptocurrency is Bitcoin, which has taken off in the last couple of years as the first true digital only currency. Most cryptocurrencies, including Bitcoin are completely decentralised meaning that they’re not backed or secured by any financial institution or government. Due to cryptocurrency not being secured against any physical item, it has experienced a juxtaposition of being seen both as a fad and also as the future of money (Hatzis 2019). As a result of this dual view of cryptocurrency, it and specifically Bitcoin have suffered continuous volatility and continues to ride waves, surging in both popularity and value, for it then to suddenly come crashing down; often referred to as the ‘bubble bursting’. Bitcoin then tends to simply rise sharply to new heights months later, seemingly for no clear reason, besides purely on speculation with ‘Bitcoin’s value almost entirely defined by perceptions’ (Partington 2021, para. 11).

Whilst many critics lament this volatility and lack of inherent value (Boukhalfa 2019) many proponents continue to herald cryptocurrency as the future of money, pointing to the strength of cryptocurrency being that it is completely decentralised. This makes it easier to be able to transfer funds between two parties or make purchases without having to go through a third party, such as a bank. This also helps avoid bank fees, provides users with autonomy, discretion with payments and much faster processing times when making transfers (Reiff 2019).

To enable cryptocurrency to become the first digital only currency, it has been built on and made possible thanks to blockchain. Blockchain is at a most basic level a way to store data, in a series of blocks linked together. In the case of Bitcoin, each block would hold the account that the bitcoins are being transferred from, the account it’s being transferred too and the amount of bitcoins.

Once data is recorded in a blockchain, it's extremely difficult to change it thanks to the use of cryptographic hashes, which can be compared to a fingerprint in that a hash is always unique and is used to identify a block. When you have blocks in a chain, each block stores it's own hash as well as the hash of the previous block. This means that if anything is changed in the first block, the hash changes. As the second block was holding the original hash of the first block, which has now changed, the rest of the blocks would now be invalid.

This security is furthered increased by blockchains being shared over peer to peer networks and copies of each blockchain being sent to each user on that network to verify and authenticate, so that if a hash is changed in block 1 and block 2, it will still be invalid as it won’t match the blocks that other users have. This makes it almost impossible to be able to tamper with a block successfully.

With the security provided by blockchain, and due to the basic principle of blockchain being the holding of any type of data securely, it has led to the application and possibilities of blockchain to go far beyond just cryptocurrency, finding uses in many different industries.

An example of one of these applications and an indicator for what we may see become more common in the future is IBM’s Food Trust blockchain. Developed to help track food products on every step of their journey, from their origin until their final destination, Food Trust takes advantage of blockchain and harnesses the technology to ensure that food products have not been tampered with in anyway; or in the case that a food product is found to be contaminated, blockchain enables companies to be able trace this contamination to its exact location in the ever growing complexity of the food supply chain (IBM n.d).

Due to the relative newness of these two technologies, it’s an exciting time to be able to speculate and watch how these both continue to emerge and find new uses and implementation in many different industries. With the continued growth of cryptocurrency and blockchain, it will affect many different people and have far reaching implications, as discussed below.

What is the likely impact? (300 words) What is the potential impact of this development? What is likely to change? Which people will be most affected and how? Will this create, replace or make redundant any current jobs or technologies?

As blockchain and cryptocurrency both have such far reaching applications, it’s not hard to envision a future where we will all be impacted in some way, shape or form by both of these technologies. From the possibility that cryptocurrency could become the premier way to make payments and transfers funds in the future, to the application of blockchain as a way to securely and uniquely hold all sorts of data, from medial records to being a unique digital identifier for people online, these technologies have the possibility of making profound changes in our everyday lives. The positive aspects related to blockchain and cryptocurrency becoming increasingly popular are that this will help to drive new jobs being created and existing job growth within the IT field, with the number of jobs relating to blockchain rising by 300 percent between 2018 and 2019 (Zhao 2018).

Whilst the use of cryptocurrency and blockchain continues to grow and expand, both of these technologies do come with significant downsides. The most pressing of these is the computational power and resources required to mine new cryptocurrency . As the mining of bitcoin requires the solving of exceptionally difficult math problems, only intensely powerful computers, mainly utilising multiple top of the line graphics card are sufficient enough to be successful at mining bitcoin. As the number of bitcoins is finite, the more that are mined, the harder that these math equations are to solve, meaning that more and more resources are required to be able to mine bitcoin, leading to a higher consumption of energy. Recently, the amount of energy used by users trying to mine bitcoin has exceed the amount of total energy used by entire countries, such as Argentina, Serbia and Ireland (Aratani 2021). Whilst the energy to mine bitcoin can come from renewable sources, this is in no way regulated or mandated. This has led to mining operations to move to where energy is the cheapest, such as in China where four out of the five of the worlds largest bitcoin mining farms are found here due to the lower price of energy (Williams 2018).

This amount of energy being used, which is only going to increase, poses many threats to the environment at a time where many scientist fear that the point of no return with man made climate change is approaching, or has even been passed (Climate Council 2018).

Whilst there are many positives and things to gain through these technologies, the negatives continue to weigh heavily. With no solution yet to be devised for the energy use and no regulation in sight for the use of renewable energy, these technologies will continue to churn through resources at an unstatibale rate, which has the potential to contribute to and affect everyone through climate change.

How will this affect you? (300 words) In your daily life, how will this affect you? What will be different for you? How might this affect members of your family or your friends?  
  
Due to the ubiquitous of these technologies, I stand to personally be affected by these in very much the same way that others will be impacted. On the positive side, cryptocurrency has the potential to be the premier way that I use money and make transactions in the future. Whilst I don’t currently use any form of cryptocurrency, the enticement of a decentralised digital only currency does continually grow and as more and more entities start to deal in cryptocurrency, it does seem to be an inevitability that I will be using cryptocurrency in the near future. It also seems to be an inevitability that my entire identity could one day live in blockchain, an all in one solution as a way to uniquely and securely identify myself digitally. Blockchain will also affect me indirectly as seen with IBM Food Trust. Although I most likely won’t ever see this blockchain working or fully feel it’s effects, I will still be affected as there is the very real potential for a food item that I’ve had or will have in the future to have passed through the Food Trust.

These technologies also present a very good opportunity for myself to enter the IT field and find a career, with job growth in this sector growing exponentially in the last couple of years. Due to the high demand of engineers, careers in this field also tend to be very lucrative and whilst money is not the be all and end all, it is definitely something to consider when finding a career path after university.

However on the negative side, due to the impact to the environment that mining for Bitcoins has, one indirect but also extremely serious way that this technology will affect me and my friends and family is by contributing towards climate change. With humanity on the precipice of passing the point of no return, the threat of climate change is the most serious issues in our lifetimes, with studies finding that ‘Generation Z fear climate change more than anything else’ (Barbiroglio 2019, para 1).

Whilst blockchain and cryptocurrency are not wholly responsible for climate change, it demonstrates humanities potential disregard for the wealth of evidence demonstrating the threat of climate change in exchange for new and exciting technology, with the impact to the environment seemingly an afterthought. This paints a worrying picture for the future of these technologies and their inevitabile growth. For blockchain and cryptocurrency to continue to grow and become a part of our lives, it will require more and more resources to sustain itself, which will only make the situation worse if a solution is not found (Rogers 2017).

While there are both positives and negatives associated with cryptocurrency and blockchain, both of these technologies have an aura of the future attached to them. As with all new technology there are going to be challenges to overcome, but it’s going to be exciting to see the potential for these technologies to usher in a new way of life going forward.

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**Natural Language Processing and Chatterbots - Abby [WIP]**

**Natural Language Processing** (NLP) facilitates human-to-machine communication without the user requiring knowledge of programming languages. NLP allows machines to obtain and process information from written or verbal user inputs and convert it into meaningful structured data machines can understand (Barbora Jassova 2020). **Chatbots** are conversational simulations that can understand human language through algorithms and interact back with humans while performing specific tasks (Great Learning Team 2020). Developed in 1966, ELIZA was the ﬁrst chatbot created after Alan Turing’s 1950 game “imitation” sort to determine whether a computer could imitate human behaviour (Ebtesam Almansor & Farookh Khadeer Hussain 2020). Since then, there are many types of chatbots available, a few of them can be majorly classified as follows:

* Text-based chatbot: In a text-based chatbot, a bot answers the user’s questions via a text interface.
* Voice-based chatbot: In a voice/speech-based chatbot, a bot answers the user’s questions via a human voice interface (Great Learning Team 2020).

Human language is unstructured in nature compared to that of the programming languages machine’s use to process data. As such, Chatbots use NLP to convert the human language input into structured language computers can interpret. Through the use of algorithms, the machine can get meaning and context from every sentence to collate useful data. This process is called **natural language understanding** (NLU), and it’s a subset of natural language processing (Aarushi Ramesh 2019).

There are two main approaches used in the design of chatbots. The **rule-based approach** where a bot answers questions based on some rules on which has been trained and programmed. The rules defined range from very simple to very complex, but where these bots can handle simple queries, will fail to manage complex ones. This is where self-learningbotsfill the demand; they use **machine learning-based approaches** and are definitely more efficient than rule-based bots. User experience with chatbots is further enhanced with the development of the chatbot persona and constant reference to the history of dialogue while also retaining the chat experience to a knowledge bank (Medium 2019).

**Raspberry Pi’s - Mathew**

# Project Idea

There is no set length for this section, but it is difficult to see how a description of less than 1500 words would be adequate.

Expand the Overview, Motivation, Description, Tools + Tech, Skills, Outcome items from Assignment 1.

Adapt it using the feedback received and the developments/suggestions from your group members. Put weight behind innovative components and ensure the project is feasible [no sci-fi / pie-in-the-sky] to make steps beyond a simple proposal/plan. Perhaps look towards identifying niche/markets/needs, and the more detailed mechanics of the project.

[original project idea below]

Language barriers have been a focus of mine since studying Korean and Japanese at Monash University. There are many language learning and translation applications on the market that are making learning a language or getting by in a foreign country earlier for the end-user. However, I see a gap in the ease of learning a language for the unmotivated end-user, those who do not have access to learning resources or those who believe it is just “too hard”. There are many scenarios where better human connections can be made and perspectives gained however are hindered by a language barrier.

My project aim is to alleviate the stress and hassle of language differences between the specific above demographic through the medium of NFC technology to facilitate ease of communication.

NFC technology allows you to encode preferred personal data that can be received by an array of other clientele. Using an app on the sender’s phone, they would encode in their native language what they wanted to say and choose the language they want to communicate in. The app using advanced translation software like Mirai Translate that leverages deep learning technology would be used to translate the input. The medium of NFC technology coming from the user’s device or external hardware can be tapped on the receiver’s mobile device or corresponding NFC hardware. Proceeding this, a link to the output will be available to the receiver to listen to or read the sender’s message.

I envision the obstacles in producing the project would be the following:

* Conveying cultural nuances and context to each speaking party;
* The communication at this stage is mostly one-way;
* Using NFC hardware would have a negative environmental impact if not produce sustainably;
* This may deter user’s from being motivated to learn about other cultures through language due to the lack of need.

To create my project I would need to:

* Develop an App using MIT App Inventor;
* Embed specific translating software into the app;
* Build the corresponding website the receiver would access;
* The hardware option for those who cannot use their mobile device.

Not having the experience in any of the above is challenging however, I can outsource most of the more technologically difficult aspects with funding. The NFC hardware can be sourced from Tappy Tech and use of existing translation software such as Google Translate and Mirai Translate can be used in the preliminary and beta-releases.

As my targeted market audience are those who do not have the access to language learning resources or do not have the motivation for language learning however, have the need to communicate in another language; I believe there is a use case for my project to be created. The barrier created by language differences can be broken through this method and despite the user’s intentions, creates the opportunity for future desire to learn and deepen the brief connection made through dialogue.

My final food for thought as a part of my project pitch is a study I came across regarding the impact of a language barrier in the delivery of high-quality medical care. In this study, patients who spoke a language not as common or the translation resources weren’t available were less satisfied with their health care treatment. (Al Shamsi, Almutairi, Al Mashrafi & Al Kalbani 2021) Additionally, the effect of less satisfied patients correlated to workplace stress for health professionals (Al Shamsi, et. all 2021).

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# Feedback

You **do not** need to include any information about the feedback you receive, the markers will however, check that **each** person in the group has contributed via SparkPLUS, and the marks for this section will only be awarded if **all** group members have contributed in an appropriate manner by the assignment deadline.

# Group Reflection

You should reflect as a group on how well you think you have performed in this assignment. You should include whatever evidence you may have about the groups processes (such as commit trails from GitHub, or project meeting minutes). Each member of the group should contribute up to 200 words about their own perception of the group, and the group as a whole should contribute around 400 words. This should include the following attributes.

• What went well

• What could be improved

• At least one thing that was surprising

• At least one thing that you have learned about groups

• Remember to include in your section on Tools how well you think your Github log of activity reflects your group’s work on

this assignment.

Daniel Blake

Nicholas Drinkwater

Abby Durbridge

Mathew Dwyer

Erin Paton

Harrison Tang

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