

1.1 Achievement

COMPLETED

872

hours

TARGET

420

hours

Communication
3 of 3

Creativity and Innovation
2 of 2

Initiative and Enterprise
2 of 2

Intercultural Competence
2 of 2

Planning and Organisation
2 of 2

Problem Identification and Solution
2 of 2

Professionalism
2 of 2

Teamwork
2 of 2

Use of Tools and Technology
2 of 2

1.2 Activity Summary

Engineering Work Experience

420 completed hours

Engineering Professional Development

31 completed hours

Engineering Curriculum

108 completed hours

Non-Engineering Work Experience

90 completed hours

Non-Engineering Professional Development

13 completed hours

Non-Engineering Curriculum

0 completed hours

Student Name:

Student ID:

1.3 Reflection Summary

LILO: Time Management and Prioritisation: Be Organised and Efficient -

Hours claimed: 3 hour(s) as Non-Engineering Professional Development

Everyone has the same number of hours in a day - but have you ever wondered how some people manage to fit so many things in and achieve so much? Time management enables people to complete set goals and manage projects, and also helps to create balance in our lives and reduce stress. This module will help you to: 1. Understand what time management is and why it is important; 2. Identify ways to improve your focus and concentration; 3. Recognise distractions and techniques to avoid them; and 4. Evaluate effective methods of prioritisation and delegation. This module forms part of the Leap into Leadership Online (LiLO) suite.

Proudly presented by Career Connect.

Contact:

Position:

Phone:

Email:

SKILLS UTILISED:**Planning and Organisation**

Describe a time when you were able to establish clear project goals and deliverables.

This Leap Into Leadership Online Module introduced me to new ways to approach time management and prioritization, which I was then able to implement into my coursework and group assignments. For an assessment in a third year material engineering unit I was placed in a group of nine students where we were required to complete a report on surface treatments for roller chains and give a group presentation on our findings. The presentation was also to be accompanied by a slide show and report had multiple aspects we had to complete. The assignment and presentation were to be completed within four weeks.

This group presentation required the collaboration and coordination of nine individuals, each working on the same overall task. This required clear delegations of work which could be completed simultaneously whilst prioritizing tasks to increase the efficiency of the team. We also had to complete the report before the due date to give us time to prepare and rehearse the group presentation.

I undertook a leadership role in the group from our first meeting and after a group discussion we agreed upon the best way to approach the assignment. All nine of us would spend the first week doing background research which we would all share using a google drive document. We broke up into smaller groups of two or three to focus on a particular area of the background information. This ensured we all had an understanding of the background information, which we could then elaborate on so that sufficient research would be done so we could provide suitable recommendations at the end of the report. We also prioritized sections of the report between those that were urgent and those that were important and set milestones and due dates so the report writing was not delayed due to information dependencies. It also ensured that we had a schedule so all of our objectives could be completed within the given time frame.

In the end, each smaller group had a particular area of expertise and we were all able to work simultaneously on the report which increased our efficiency as we maximized use of the team's resources. The group then divided again to work simultaneously either on the power point or oral presentation. This was considered to be a smaller task as we had already completed the main report. It also left us time to rehearse our presentation and revise the report or add any extra information. The final outcome of our assignment was

Student Name:

Student ID:

that we received full marks. The online module on time management taught me about the importance of prioritizing work not only for time critical tasks but also important tasks, and then focusing your attention on a single item of work at a time. This is a method we employed in our assignment where we divided into smaller groups and investigated a specific background area which we could then relate to the rest of the team and then go on to prioritize tasks within the report. Having intermediate due dates for tasks also helped the team stay on schedule and helped us complete all the work within the given time frame. This method proved to be an effective way of coordinating a large group of people to complete an assignment with many different aspects over a short amount of time and will be a technique that I will continue to use in the future.

Engineering Work Ready Program - Job Searching & Networking

Hours claimed: 2 hour(s) as Engineering Professional Development

At this session students will gain informative and relevant tips from the Career Connect team about improving their employability and networking skills and identifying and replying to job opportunities. This interactive session is held each semester. Afterwards refreshments will be served and students will be encouraged to practice their new introduction/networking skills.

Contact: (removed)

Position: (removed)

Phone: (removed)

Email: (removed)

SKILLS UTILISED:

Communication

Describe a situation where you were able to interact and build rapport with other in order to achieve a goal.

Attending the Engineering Job Searching and Networking event was very informative and gave me information on how to present myself to a future employer. The session gave information on how to present yourself both written and verbally to an employer and the correct way to convey your skills with appropriate evidence. This is information I later used when I applied for the position of (removed) Ambassador.

To apply for the position of (removed) Ambassador, I had to submit a written application detailing why I was interested and what skills I would be able to bring to the position. Upon learning my written application was successful I was then required to go in for a group interview which would determine which candidates were successful.

Using the information I learned from the Job Searching and Networking event, I did research on the position and structured my written responses in such a way to use examples to demonstrate my skills as I was taught to do during the session. Being part of one of a number of group interviews, the job searching event also emphasized how important it is to positively set yourself apart from other applicants and be remembered by employers. The session taught me how I should present myself as well as other networking techniques I used on the day such as how to introduce yourself to others. I also rehearsed some responses of questions I was likely to be asked, again using examples to demonstrate how I have been involved in university life.

On the day of the interview I felt prepared and was ready to respond to the different questions and situations presented to me. I was able to introduce myself to the ten other applicants at the interview as well as those running it. Due to being ready with situations and examples where I have been involved at Monash, I was able to respond to the questions posed to me with confidence and gain the attention of the interviewers. I was later informed that my interview was successful and I have been selected to be a (removed)

Ambassador. This was my first semi formal interview with multiple interviewers and candidates in the room at the same time. From attending the Engineering Work Ready Program I was able tailor my written responses and prepare for my interview. These are skills and techniques that I will be able to practice, use and expand upon in the future during professional interview or when networking with others.

Group Assignment on Surface Treatments

Hours claimed: 15 hour(s) as Engineering Curriculum

In the unit (removed), we were assigned into groups of nine to complete an analysis of a metal component- which for my group was a bicycle roller chain. We had to use our knowledge of surface treatments to determine an appropriate metal and treatment process to increase the durability of the component.

The assessment was in the form of a group report, covering aspects such as background on the component, wear mechanisms, possible material choices and an analysis of different surface treatments before drawing a final conclusion. This report was also to be accompanied by a Power Point and group presentation before our lecturer and other students. We were given four weeks to complete the assignment and we worked in groups of nine students, as determined by the lecturer. To complete the report and other requirements we had to use organisational and coordination skills as well as work cohesively as a team. It also required us to draw upon our knowledge and experience of Materials Engineering and apply these principles to a new concept to resolve a problem.

Contact: (removed)

Position: (removed)

SKILLS UTILISED:

Teamwork

Describe a time when you worked as part of the team and ensured that every member of the team was able to participate.

As an assignment on Surface Treatments and Wear Modes, my team was given the component of a bicycle roller chain which we had to analyse and identify a suitable metal from which to make the component and then possible methods of surface modification to increase the durability and wear resistance. My team of nine was given four weeks to complete a written report, Power Point and prepare an oral presentation to report our findings and final recommendation to the other students.

In order to complete all the different aspects of the assignment, it was important we work cohesively as a team and ensure each of the members had specific tasks to complete, was aware of the timeline and have the same overall objective. As there were nine in my assignment group, it was important that there were

members such as myself who were willing to undertake a leadership and coordination role to ensure the team had direction, effective methods of communication and clear outlined tasks to be completed according to a schedule. We also had to find a way for nine individuals to work simultaneously on the report to ensure our team was efficient and completed all the of the assignment within the given time frame.

In our first meeting, we established a method of communication using the application 'We Chat' where we could reach each other at any time and set up a Google Drive where we could collaborate on the report, power point, meeting minutes and other important documents.

One of the first issues we overcame as a group was deciding how best to approach the assignment. After a group discussion with all the members it was decided, following my suggestion, that the best way to use our group resources was to divide the report into three sections, the background, surface treatments and final recommendation. As a team, we would focus on one section at a time, however each section was divided into smaller sub sections which we could then split into smaller groups to complete.

We took this approach as it was important we each had an understanding of the background as the following sections were dependent on this information and meant all members were actively contributing to the report from the beginning of the assignment. This also assisted in completion of the presentation as we each had an overall understanding of the topic and could contribute to all areas of the report.

In my role as a coordinator and organiser I ensured the team held regular meetings and that everyone was aware of the team's progress, had specific tasks to complete and that we were adhering to the timeline so we could adequately prepare for the oral presentation and had time to overcome any issues that appeared throughout the assignment.

The outcome of our joint efforts and maximising use of the team's resources is that we were able to complete the report before the due date leaving time to prepare the Power Point and oral presentations to the best of our ability. We worked well as a larger team and everyone was actively involved throughout the entire process.

As a result of having the whole team focus on the three main sections of the report, there were five of our team members who made the final 10-minute group presentation which was the largest number of speakers out of all the groups to present.

We were also able to answer the questions posed to us and demonstrated an in depth understanding of our component, wear mechanisms and surface treatments. Our report and presentation received full marks indicating we were able to cohesively work together and had successfully coordinated our group of nine people to achieve our objectives.

This was my first experience coordinating such a large team of nine individuals over a long period of time. This experience has informed me of the various approaches people take to group work and helped me learn about compromising as a team, resolving disagreements and encouraging the best results out of the other members. I have since worked on smaller group assessments with the people in my team which has been enjoyable as we have proven to worked well together. The skills I have developed during this assignment are ones that I will continue put to use as I work in groups of different sizes in the future.

Shop Assistant at (removed)

Hours claimed: 90 hour(s) as Non-Engineering Work Experience

Over the summer holidays I worked as a shop assistant in a cookware and gift shop- (removed). The store has been located for 22 years in a suburban shopping strip and has an established customer base and large clientele. The shop sells a range of items from cookware, gift ware, crockery and cutlery as well as candles and home decorations-especially over the Christmas period. There are many positions the staff undertake in the shop from working at the counter and wrapping items as well as walking the floor to assist customers and pricing and replacing the stock on the floor.

My position was as a shop assistant over the Christmas period and into the New Year. This position required I that work cooperatively within the long-established team of staff as well as with the store manager and the owner.

As a shop assistant I had to work cohesively with the other team members, take direction from the senior staff and interact with the public by understanding what people require then using my initiative to assist them to the best of my ability.

Contact: (removed)

Position: (removed)

Phone:

Email:

SKILLS UTILISED:

Teamwork

Describe a situation in which you able to contribute fully to the team effort and play an important role in the success of the team, without necessarily taking the lead.

During the Christmas period of and into the New Year I worked as a shop assistant in a suburban gift and cookware shop. In my position as a shop assistant, I was required to work with the other staff members to meet the needs of our customers. There were always at least three other staff working in the shop at the same time. My main role was to walk the floor and greet and assist the customers through learning what they require, directing them and fetching items from storage and checking each item for damages. In order to be able to serve all of our customers quickly and effectively all the staff had to work cohesively and cooperate with each other, often stepping in and helping with each other's roles.

Over Christmas, to meet the demands of the customers, the four other staff members and myself had to cooperate together, perform our specific tasks as well as take initiative to assist with other roles during busy periods. In my capacity as a shop assistant, I had to use initiative to answer each customer's question whilst taking direction from the other staff and running errands. I was also required to multitask between many customers and fill in other roles at the front counter. However, beyond this role I also had to perform extra tasks set to me by the manager and more senior staff such as checking stock, pricing and unpacking deliveries.

I was able to integrate myself into the established team of staff- who have previously worked together for a number of years. This enabled us all to cooperate and perform as a dynamic team as we were each occupying different positions. As a worker who was positioned on the store floor, I greeted and interacted with the customers and assisted with their shopping. I also had to constantly check at the front counter with the other workers for new stock to bring down to the counter for the other staff could check the items, gift

wrap and put the sale through.

During busy periods, often I had to collect items for multiple customers whilst running upstairs to fetch items for the other staff – as the only staff member walking the floor or take over roles at the front counter. It was through having our own defined roles and tasks as well as being willing to step in and cover each other's positions we were able to serve the customers in a timely fashion.

This method of cooperation made us most effective as a team, as the more senior members operated the registers and take phone calls, I was able to go quickly upstairs to fetch items so the others did not have to leave their positions. I was also capable of assisting many customers with their shopping which ensured the customers were served as quickly as possible.

The outcome of the cooperation between the store workers is that we were able to cope with the large influx of customers over the busy Christmas and New Year period. We were able to share the workload and ensure the counter was constantly staffed during this busy time and customers were not left waiting to be served. After New Year's, I was kept on working a few days a week, particularly to cover the busy midday period until university began for the year.

I really enjoyed working amongst the team of other staff members and also interacting with members of the public. This experience has made me learn more about team dynamics and the importance team members holding different positions yet being open to accommodate and assist one another in working towards a mutual goal when under pressure. I will be able to draw upon what I have learned from operating in this environment as I work in teams and groups in the future.

Group Assignment to design and create a mobile application

Hours claimed: 15 hour(s) as Engineering Curriculum

We were given an assignment where we had to work in a group of four to develop a mobile application where we created a fitness app using JavaScript. We used global positioning technology on a Samsung phone to establish the location of the user and record their speed, position and track their route on a map of Monash. We were also required to add extra features of fitness information and visual modes. The application was then presented through an oral presentation in a professional format also requiring an accompanying power point. The group assessment also required use of various programs such as Brackets, Github and Asana to organize our team and collaborate on the project.

Contact: (removed)

Position:

Phone:

SKILLS UTILISED

Use of Tools and Technology

Describe a situation in which you utilised a range of tools or technologies to achieve a positive outcome.

In a group of four we were required to design and code a fitness mobile application where exercise routes would be plotted, timed and stored in a directory. The application could also calculate the users speed and therefore calorie loss during the period of exercise. The technology we used for this application is JavaScript through use of the browser design program 'Brackets' which allowed coding of the JavaScript and CSS files. The assignment was given six weeks to complete and at the end of this period we were required to give a formal presentation to our 'clients' who had commissioned the application. The oral presentation was accompanied by a PowerPoint and the entire presentation was filmed.

Our team was required to use our knowledge of application design to come up with a number of different pages for the application. We had to draw templates of the final design as well as come up with a logical path between the pages. To create the application we also had to become familiar with programs such as 'Brackets' and 'Github' as well as team management programs such as 'Asana' and 'Google Drive'. The final application had to be operational and enough time be left to prepare an oral presentation and PowerPoint of all of the features of the app to show to the customer.

In order to manage all the tasks required for the completion of the app, 'Asana' which is a project organization site, was used to keep account of each member's progress and task completion. 'Github' was also used alongside 'Brackets' as a platform for the application design which was specifically for use on a Samsung mobile phone. This enabled each of our team members to simultaneously collaborate on the coding of the index, JavaScript and the CSS pages then combined each of our contributions. Our group held regular meetings and also utilized 'Google Drive' to store all of the accompanying documentation of our assignment. We were able to create the app through use of the phone's global positioning technology which enabled us to collect information for use in the app. From this we were then able to develop other features such as changing the CSS page to alter the application design and use of user input data to perform fitness calculations. Nearing the completion of the application we also had to put our app through multiple cycles of designer testing, practice runs and also introduced the app to new users to ensure we had designed a compatible user interface.

The outcome of our mobile application assignment was that our group received a very high mark as we were able to meet all the requirements of the application. We utilized all the required programs such as Brackets, Github, Google Drive and Asana to design and develop the app as well as manage and organize our team. We were also left with enough time to prepare and rehearse our oral presentation and present it in a professional manner. Our application was operational on a Samsung mobile phone and we were able to demonstrate all of the features of our app to the customer.

This assignment was one of the largest assignments I had been a part of since starting Engineering at the beginning of that year, as it lasted for half of the semester. It was a great way to begin working on larger projects as a team and introduced me to many new programs and technologies which not only assisted with project management but also with the development of the mobile application. These are tools I have continued to use in later years and in other units where I have been required to use coding or to coordinate a group of people in an assignment.

(Club Name Removed):

Hours claimed: 20 hour(s) as Engineering Professional Development

The (Name) club holds many events throughout the year, including academic events such as site tours of engineering companies, and FYP and vacation work information sessions. We also hold revision sessions near exams in our very own common room, which is open to all members all year. It is located in Building 36, near Materials Engineering reception. Our social events include BBQs (with cider!) and end of term dinners. Join us to meet new mates, and form bonds stronger than 316L stainless steel!

Contact:

Position:

Phone:

Email:

SKILLS UTILISED:**Communication**

Describe a situation when you had to use written communication skills in order to convey an important point.

In my position as club secretary it is my job to act as a means of communication between the club executive and the rest of the committee as well as to the rest of the club members. This is to insure important information about meetings and events is clearly distributed to all the members, so the events are well attended, and everyone is aware of the activities and work of the club and committee. It is also my role to create events in the club portal and obtain the attendance list, to work with the club treasurer to ensure that the club is able to obtain funding and have well organised and successful events.

For example, a club event such as the OGM requires planning and organisation in many committee meetings leading up to the event. As the secretary, one of my tasks is to ensure the club documents are up to date, including minutes which can be accessed by all committee members and are distributed to the club members for the OGM. Each event that is held is organized committee meetings and documented in the club minutes, the topics decided and included in the meeting agenda which is emailed to the committee. Then for each event and a portal event made and an email with the details sent to all the members.

For example, the club OGM required me to create a club portal event so we can take attendance. It also required to liaise with the club executive to obtain the agenda for the meeting. I then had send an email to all committee and club members with information of the event details, the agenda and the OGM minutes from the previous year. This ensures everyone is aware of the event location, time and day as well as is aware of what is going to be discussed and is able to review the minutes from the previous year's OGM. At the event, I also took minutes to record the topics of discussion and news so that the committee could later review the meeting and invoke any suggestions that have been made. The minutes are also required to be legible for the next years membership to read at the next OGM to be aware of the activities of the current years committee.

The outcome of this is we were able to hold a successful and well organised event. There was a good attendance, and everyone received notice of the event and had access to the last year OGM minutes and the current years agenda which they could follow in the meeting. Any ideas and suggestions that were made were well documented so at subsequent committee meetings the committee has been able to review the suggestions and comments made during the meeting in detail and put them into action to improve the MatES club experience for the members.

Design and Build a Motorised Skateboard

Hours claimed: 20 hour(s) as Engineering Curriculum

As part of a (removed) unit we were put in groups to design and build a motorized skateboard that could be used as a means of transport around the Clayton campus. We had to use design thinking to come up with a product that met the design requirements, was functional and could be designed, prototyped and produced within 12 weeks. The entire component and features were left to the group to decide and we had to create the skateboard, order and construct the parts and use CAD to design and 3D print components.

Contact: (removed)

Position:

Phone: .

SKILLS UTILISED:

Initiative and Enterprise

Describe a situation where you were able to contribute to innovative outcomes.

As part of the assessment in the Materials Engineering fourth year design unit, we were required to work in teams to design and build a functioning electric skateboard which is to transport the user across campus. This project had a 12 week time frame, at the end of which we would present our project to the other students and judges.

Days before our skateboard was meant to be assessed and presented, we discovered that the skateboard was no longer moving when the engine was started and could not carry the weight of a person. This required a fast and innovating method to fix the board and work within a restricted time frame without having to completely deconstruct the engine.

An innovative solution was required to repair the board as there were a number of limitations which the group had to work within. This included not being able to deconstruct the motor system so there was highly limited access to the damaged site, we had only one day to fix the board and consequently there was not time to order replacement parts, so we also had to work with the materials and resources we had at the student work shop.

All of these considerations meant that we could not use a traditional method to fix the board and any decisions that were made were important as they may affect the group's ability to present the board. Therefore, I took the initiative to lead the team towards investigating the problem and developing an appropriate solution which could fix the problem, without negatively impacting on the skateboard's performance.

We began by closely observing the motor system and it appeared the problem was caused by the drive belt axel. Our first approach was to remove the wheel to better access the drive belt whilst leaving the motor system intact. We noticed the screws that hold the bushing to the axel were coming out, and this was causing the bushing to move which allowed the drive belt to slip.

Because of the working conditions, we could not undertake a traditional approach to fix the problem by deconstructing the area to access the screws and either replace them or add glue to keep them in place.

The group ultimately fixed the slippage problem by filing away one side of the screw thread in situ to create a flat edge. The side ridges were predicted to make the screw more difficult to move once in place and therefore hold the bushing to the axel. This solution did not require extra materials, deconstruction of the motor system and was carried quickly therefore was an effective and innovative solution to our problem.

The approach taken to fix the board was successful and the skateboard was again operational and able to transport a person effectively. The group made a very good presentation which was well received by the audience and we received a very high mark for our efforts. Even with the fix, the skateboard was able to carry a person from one side of the campus to the other. Our group is also involved in some follow up work with the skateboard design and presentation teams.

Use of Tools and Technology

Describe a situation when your ability to learn and work with current technology contributed to a productive outcome.

As part of a Materials unit I was placed in a group of six members and together over the semester we had to design and build a motorised skateboard that could be used as a means of transport around the Clayton campus. We had to use 3D printing to create components to use in the skateboard. This required learning and utilising CAD software to design the components which could then be additively manufactured.

To be able to print components using the 3D printers, I had to become familiar with CAD design software such as AutoCAD and SolidWorks. This also allowed the group to quickly come up with potential skateboard designs. The CAD images were then able to be transferred to STL files which could be used to perform the 3D printing.

After becoming familiar with the software I was able to design a light holder which could be attached to the deck of the electric skateboard to allow enhanced visibility in low light environments. This required designing the component on Solidworks as a CAD file and then using other software to prepare the file for printing by selecting the printer settings and adding support structures to the component.

The CAD drawings also allowed a method of rapid prototyping of designs which enabled the group to progress quickly to the final model. We were able to rapidly produce a light holder then refine the design by amending the CAD file and re printing.

With the same technology, I was also able to design a 3D logo for the group as we were able to assess many possible designs before choosing the final company logo. The CAD drawing on Solidworks could then be compiled together to create a final graphic of the skateboard so the group could see the design before we completed building. This software enabled easy design, scaling and compiling of individual components to produce a model of the electric skateboard.

Through learning how to use CAD and 3D printing my design group was able to prototype components for our skateboard quickly to determine the final design. Our final skateboard contained two additively manufactured components which were designed by the group through creation of CAD files. I was responsible for creating the logo for the group which we used for both 3D printing on the skateboard and as a T-shirt design. The light holder was also able to be prototyped and printed to be used to mount the light under the deck. The group demonstrated the use of CAD throughout the building process and received high marks for our electric skateboard. This also allowed me to become familiar with different CAD software as well as 3D printing of plastics which I will be able to apply in my future work.

Creativity and Innovation

Describe a time when you were able to develop or design a novel product, processes or strategies.

As part of a Materials unit I was placed in a group of six members and together over the semester we had to design and build a motorised skateboard that could be used as a means of transport around the Clayton campus. We had to use design thinking to come up with a new product containing original features and as a group we could decide how to power the skateboard, what it should look like and who the target consumers would be.

The task was to design a motorised skateboard that could be used to reach opposite ends of the Clayton campus. This required the team to design, prototype and build the skateboard using the student workshop. We were also required to use 3D printing to create plastic components which the group had to design and incorporate into the skateboard using CAD Solidworks modelling software. The group was given a budget of \$500 and a 12 weeks to complete the project.

Our team decided that our board would be designed specifically to appeal to a younger demographic and have additional features such as a night time skating mode and a handle incorporated in the deck for ease of carrying. The final board, called "(removed)" was prototyped and built. The group created a board with powered by a single brushless motor which was controlled using a remote and transmitter mounted on a hand made wooden deck. The board included a 3D printed light holder and light mounted to the underneath of the board to allow enhanced night vision. The team also designed and 3D printed a company logo to put on the skateboard deck which was covered in grip and light reflecting tape.

The result was the team was able to use design thinking to create an electric skateboard which was built over the course of the semester. The finished product was a remote controlled electric skateboard with additional light features for low light environments and an in built deck handle. The group was able to produce an operational motorised skateboard within the time frame and in budget that contained additional light features and 3D printed components through undertaking the creative process of design thinking, prototyping, testing and building.

(Removed) Mentor (program)

Hours claimed: 10 hour(s) as Non-Engineering Professional Development

I was a mentor as part of (Mentor program) during the first semester of (year). This program assigns mentors a mentee who is a new student to Monash Engineering and the mentor helps them settle into university life through answering any questions and sharing your knowledge and experience of starting at Monash.

Contact: (removed)

Position:

Phone: .

SKILLS UTILISED:

Intercultural Competence

Describe a situation where you demonstrated your ability to recognise and respect diverse values, beliefs and behaviours.

During the first semester I volunteered to be a Mentor as part of the (Mentor program) run by the Monash Engineering Department. This is where the mentors are assigned a mentee, who is a new student to the faculty and the mentor works with the student to help them settle into engineering and university life. I was partnered with an international student that was in second year materials engineering and this was also her first time in Australia.

Throughout the first weeks of the semester my mentee informed me she was having some difficulties adjusting to the cultural differences compared to what she was used to. One particular challenge for her was to voice her opinion during group meetings in her team of local and international students as she also was concerned about her language skills. As her mentor I had to be sensitive to the cultural differences and understand her perspective, so I could offer the right assistance and help her settle into Monash life.

My mentee and I had some long discussions about some of the differences between university and everyday life between her home country and Australia, so I could pin point some specific areas to address. Through doing this I could identify the right channels at Monash which could assist her. I helped put her in touch with groups at Monash for international students that holds activities designed to assist international students, such as language sessions where students are invited to turn up and hold conversations with one another in English to improve language skills. We also talked of some ways to be involved in group discussions and spoke to some group members individually about having a time in meetings where each person was asked about their views and opinions until she was comfortable doing this on her own.

Through helping my mentee settle into university life and becoming more comfortable in group situations, after a month she was much more settled into her course and comfortable contributing to group discussions. She formed a network of friends and has become more independent, even being able to offer her international friends assistance and answer their questions about university. She and I remain friends as we continue Materials Engineering together however I have taken from this experience a new awareness of the challenges and differences faced by international students when settling into a new environment and culture.

(Company) Research Project

Hours claimed: 420 hour(s) as Engineering Work Experience

Over the Summer I was part of the (Scholarship) program in Engineering. My project was based at the (Company) and I was investigating the effect of grain refinement on cracking susceptibility in Selective Laser Melted Aluminium 6061. This required preparing metallographic samples, taking images, analysing images then creating a poster to present at the end of the program.

Contact: (removed)

Position:

Phone: .

SKILLS UTILISED:

Professionalism

Describe a situation in which it was important for you to recognise, understand and work within the rules, rights and culture a workplace or organisation.

Over the Summer I undertook a research project at the (Company). This is based just outside of the Monash Clayton campus and works with both the university and industry partners. My project focused on investigating the effect of grain refinement on Selective Laser Melted Aluminium 6061.

In order to work effectively in this professional environment, I had to be respectful and mindful of the workplace rules and regulations as well as the other backgrounds and cultures within the organisation. This required being aware of the additional rules and expectations that exist in a professional working environment in addition to those in place at university.

As a research student at (COMPANY), it was important I operate within the rules and regulations to meet the safety requirements, so I could carry out my research. Due to the equipment and work being carried out at (COMPANY) there is a strong safety-oriented work culture and it was important that I adopted this safety-oriented mindset and met the rules and regulations.

For example, working with the Selective Laser Melting machines required safety and lab inductions, booking and working within a specific time frame, wearing correct protective equipment, ensuring I was constantly supervised around the machines and sought advice from those in charge.

During my time at (COMPANY) I also had to go through the correct administration channels and follow protocol to order metal powder for use in the project. This required getting a quote from an overseas supplier, obtaining the safety data sheet information then adapting these documents to adhere to Australian, (COMPANY) and Monash University Standards. Once the documentation was in order I could then proceed to have the powder ordered and delivered to the university.

The other aspect to working in a professional environment is not only being aware of safety and administration procedures but also being mindful of the work culture by adapting to workplace hours, participating in workplace events and being present and prepared for group meetings and presentations.

The outcome of demonstrating professionalism and awareness in the work place is I was able to cooperate with everyone at (COMPANY) to work safely and effectively. I followed the safety and administration procedures and was able to fulfil the project tasks whilst meeting the (COMPANY) rules and regulations. I was also able to observe and participate in workplace culture as I sat in meetings and made presentations. This provided a valuable experience of operating in a professional environment which I will build upon in the future as I continue to work in (COMPANY) as I undertake my Final Year Project.

Intercultural Competence

Describe a situation in which you were able to work effectively with people of different ages, gender, races, religion or political persuasion.

During the Summer I undertook a Research Project at Monash University which was based at the (COMPANY) (COMPANY). This centre is located just outside of the Monash Clayton Campus and specialises in 3D printing of metals, both in research and for industry. Not only was I working on my own research project overseen by supervisors at (COMPANY), but I was also working with other research students and professionals at (COMPANY) who all come from different cultural backgrounds.

As a summer student who was undertaking a research project, supervised by (COMPANY), I had to operate in a professional working environment among people with a different backgrounds and beliefs to my own. To work effectively, I had to interact with people outside of my immediate supervisors and with the other research students, so we could all reach our goals and progress in our respective research projects.

In order to operate effectively in a working environment with professionals, researchers and students I had to be aware and mindful of the different cultures and backgrounds of the other workers. My supervisors and I worked well together and throughout the project we had conversations about our respective cultures which allowed each of us to have a better understanding of each other's background. This helped us build a better working relationship and interact more effectively as a team. This is also true of the other research students, as we were able to bond over our different cultures and were mindful and respectful of any differences. I was happy to answer questions about my background and in turn showed interest in my co-workers. Through establishing friendships with the other students, we were able to work together and help each other with our individual projects. I also became more familiar with my supervisors and other people at (COMPANY) by talking about our cultures to each other to develop a better understanding of each other's backgrounds.

I was able to work effectively at (COMPANY) and enjoyed operating in a team of individuals from many different backgrounds. We were able to interact and communicate effectively to achieve our work and undertake the research. This has allowed me to experience working in a professional environment with people from many cultures. Following my summer position, I have since continued to work at (COMPANY) on the same research as part of my Final Year Project with the same supervisors and students.

Problem Identification and Solution

Describe a time when you came up with a new approach to a problem.

Over the Summer I was part of the (Scholarship) Program where selected students undertake a research project. My project was to investigate the effect of grain refinement on cracking in Selective Laser Melted (SLM) Aluminium. My project required me to analyse the microstructure of SLM samples and determine the effect of grain refinement on cracking in Aluminium 6061.

One of my first tasks was to perform a quantitative analysis of previously taken Optical and Scanning Electron Microscope images to determine the effect of processing parameters on cracking in SLM Al6061. I was advised to use ImageJ analysis software and left to determine my own method of performing the analysis. Therefore, it was up to me to obtain meaningful quantitative data that can be readily interpreted to identify the best processing parameters to use when SLM Al6061.

After discussing with my supervisor, I was advised that the output data should report the crack length or area. From this, my first approach to analyse the data was by using the ImageJ software to colour the images to highlight the cracks then use a ratio of crack area to original area to determine the crack density. However, as I progressed through the analysis I discovered this method would not be suitable to apply to low magnification images with small cracks and high amounts of grain refiner particles. Therefore, I had to determine an alternative analysis method which could consistently be applied to images of all the samples and provide accurate and meaningful data. I then took a different approach using ImageJ software to trace the

individual crack lengths which could then be summed to produce a total crack length over a given area. This avoided any impurities being identified as cracks and allowed me to analyse all of the images and all of the samples.

The outcome of this analysis is that the SEM and OM images were able to be successfully analysed to determine the optimum processing parameters to be used for subsequent Selective Laser Melting. Although the crack length data is more effective, the crack area analysis, when it could be successfully applied, provided a good method of comparing and confirming the crack density measurements. From this data we were able to compare the cracking produced under the different processing parameters and also compare the crack susceptibility in future SLM samples. Following my summer position, I have been able to keep using this image analysis method as I continue this research for my Final Year Project.

Final Year Project

Hours claimed: 58 hour(s) as Engineering Curriculum

During this semester I began my Final Year Project in Materials Engineering. This is where students undertake a research project with a supervisor and work towards completing a poster and interview for the semester. My project, which is a continuation of Summer research I was involved in, is investigating the effect of grain refinement on cracking in Selective Laser Melted Aluminium 6061. This involves analysing metallographic samples using microscopes and software then comparing the microstructure and cracking between samples of different processing parameters.

Contact: (removed)

Position:

Phone:

SKILLS UTILISED:

Creativity and Innovation

Describe a situation where you had to challenge or extend perceptions of how things are, and how they might be.

For my Final Year Project I am undertaking research based at the (Company) where I am investigating the effect of grain refinement on cracking in Selective Laser Melted (SLM) Aluminium 6061.

As part of the assessments for the first semester I was required to create a poster of my research and findings, which I then presented in a 30-minute interview to my supervisors and examiner. During this assessment, I was required to convey the results of the project in a new research area of additively manufacturing Al6061 to experts in the field of additive manufacturing and metallurgy.

During my interview with four supervisors and examiners, I was required to demonstrate my understanding of my research topic and convey the purpose, results, underlying theories and future investigation to those in the room who each undertake research in different areas. It was important they understand the relevance of my research project, as Al6061 is an alloy which does not perform well when Selective Laser Melted due to extensive cracking. This information had to be understandable and relatable to those not currently working in the field of additive manufacturing and convey the issues associated with SLM Al6061 and why it is important to overcome these problems.

This meant I had to share my research on Additively Manufactured Aluminium to those who were more

familiar with other metal processing techniques, therefore challenging their perception of how this material performs differently to both cast Al6061 and other SLM metals. I had to challenge any preconceived ideas on how Al6061 behaves during SLM compared to other SLM aluminium alloys and present theories as to why and how SLM Al6061 forms a different microstructure to that of cast Aluminium using my current results.

In the interview I also responded to questions about how different processing techniques influence the microstructure of Al6061 and describe the importance of SLM Al6061 compared to other processing techniques and SLM Aluminium alloys. During this experience I conveyed the significance of my current results, to show why it is important to continue pursuing this particular project on SLM Al6061 throughout the year.

As a result of my interview and presentation my project research was well received. My supervisors and examiners found my research project to be interesting and relevant. They also had a few ideas as to what I could further investigate throughout the next semester. From going through this assessment, I have gained experience in conveying important information to stakeholders and having to challenge ideas on a topic using my results and information which I will build upon as I continue my Final Year Project.

Professionalism

Describe a situation that demonstrates your ability to work honestly, transparently and openly within a role and organisation.

During the first semester of 2018, I began my Final Year Project which is based at the (COMPANY). This project is investigating the effect of grain refinement on cracking in Selective Laser Melted Aluminium 6061.

As a student working on a research project at (COMPANY), I have to be honest and open about the progress and the tasks I am undertaking. Even as my project generated some unexpected results and faced challenges and delays, I had to report these events to my supervisors to ensure we were all up to date with project progress.

Being open and honest about progress and results meant those involved in the project were aware of any challenges and were able to offer assistance. When I experienced delays because of machine failures and availability I made this known to my supervisors and we were able to determine alternative tasks to ensure the project could continue to progress. Being honest about project progress also allowed me to receive help and use analysis methods I was not be able to perform on my own such as extensive SEM and EBSD imaging.

Through working transparently, I was honest about unexpected test results which meant that my supervisors and I could determine alternative analysis methods to obtain the information. For example, observing the microstructure of my printed samples was challenging and caused delays as we performed several analysis methods. In the end, the mechanism of grain refinement is not yet clear and requires further investigation. Working honestly and transparently, I reported this in my assessment poster as it provides a new area of investigation for the rest of the project.

Working openly and honestly was also important when using and obtaining resources and materials for the project. Those in charge at (COMPANY) were aware if I had to replace supplies such as polishing solution and metallic powder, as I got my supervisor and (COMPANY) approval. This meant that not only were people aware of the direction of the project, but safety procedures were also followed.

As a result of working honestly and transparently in the work place, my supervisors were aware of my progress and any challenges such as equipment delays and unexpected results. This meant I was able to receive assistance with different analysis methods to get results for my final assessment. Any supplies that I needed were obtained with the approval of those in charge and fully authorised and followed the safety regulations. As I continue my final year project during the next semester at (COMPANY), I will keep working openly and being honest my research, progress and results to my supervisors.

Planning and Organisation

Describe a situation when you had to attend to several competing demands at the same time, and outline the steps you took to achieve this.

For my final year project, I am involved in research based at the (Company) which focuses on the effect of grain refinement on cracking in Selective Laser Melted Aluminium 6061. The project spans both the first and second semesters, therefore it is important to have a clear outline of the project objectives, timeline and to determine the project aims. As problems and delays arose, it was important to keep to the schedule whilst managing the tasks and deliverables to ensure the project progressed and was able to produce results.

In order to complete the project, it was important to be organised and have a planned timeline to meet the project aims and objectives within the given time frame. Therefore, the project team had to decide upon a scope of the project and a set of tasks which we aimed to complete for my project assessment. This required a set of objectives and the ability to adapt the project plan in response to any issues that arose during the course of the semester whilst carrying out the project tasks.

As the project spans the course of the year, it was important to have meetings to discuss the main project objectives and identify the direction the project is going to take. This involved outlining the important objectives which were Scanning Electron Microscope imaging, mechanical testing and microstructure investigation which were important tasks to be carried out during the ongoing project work of image analysis of samples under different processing parameters.

Whilst there were clear tasks outlined to achieve during the semester, the project plan also had to change and adapt to new results, delays due to equipment faults and contingency plans in response to the results obtained as some needed further investigation. For example, there were several delays as a result of the hardness testing machine undergoing repairs, so in that time I performed specimen preparation and image analysis to ensure the project still progressed.

Having a clear outline of the project priorities and timeline also allowed the supervising team to change throughout the course of the semester without disrupting the running of the project. The planning and organisation of the project became very important, especially near the end of the semester, as extra investigation was needed to observe microstructures which eventually required undertaking several analysis techniques before successfully obtaining the results. This meant there were constant amendments to the project schedule to prioritise this task to prepare samples, perform analysis, interpret data and include the results in my poster whilst allocating time to draft and proof read the assessment piece before submission.

Careful project planning and organisation allowed the project to run to a schedule to meet deadlines at the end of the semester. As there was a clear outline of the main objectives and tasks, planning allowed the project to adapt to any problems which arose, especially near the end of the semester so extra tasks could be carried out whilst still meeting the project timeline. As a result, the aims of the first semester were met and I was able to include the results and information in my final assessment. This also means there is also an ongoing set of project aims and objectives which I will be able to continue with during the next semester as I proceed with my final year project.

Communication

Describe a time when your communication skills made a difference to a situation and/or contributed to a productive or harmonious outcome.

During my Final Year Project, I undertook research based at the (Company) ((COMPANY)) which focused on the effect of grain refinement on cracking susceptibility in Selective Laser Melted Al6061. Throughout the first semester there were some changes to the project supervisors who oversee my project therefore it was important we were able to communicate effectively to ensure the smooth continuation of the research to meet important deadlines.

To be able to continue with my research project with a new supervisor we had to be able to communicate effectively, so everyone on the project team was aware of the current results, tasks and future objectives. Therefore, the ability to communicate effectively with different people was important as new supervisors were overseeing the project throughout the semester as we all had to be up to date with events and developments. It was important for me to establish an effective channel of communication and understanding with all team members involved so the project could continue as it had before.

To ensure the project was able to continue with my new supervisor, it was important I sought clarification about aspects of the project and we often had long discussions about the results, interpreting information and future work to be completed. We also each had to clearly outline our thoughts and expectations for the project and our roles. Through doing this we were able to remain up to date on any developments and address new issues as they arose which made us more effective as a research team.

Through having a strong channel of communication, I was able to get fast feedback about my work and we could change the approach quickly in order to meet the time constraints for the first semester. An example of this when we had difficulty observing the microstructure of the samples. Through communicating the results quickly, we were able to attempt three different methods of analysis on the same samples within two weeks and obtain the information I needed for my poster.

We dealt with challenges that arose during the project by understanding, reasoning and communicating effectively to outline any issues, potential problems and future aims of the project.

Through communicating effectively with my supervisors for my project, I was able to successfully continue the project throughout the semester as the supervising team changed. Any setbacks relating to the project were able to be resolved easily through our ability to communicate as we had discussions to outline the issues and objectives for the project. Because of this, we had time to try many different techniques as we were effective in identifying tasks then communicating and discussing the results. The outcome of this was that I was able to finish the first assessment of my Final Year Project within the scheduled time frame and my poster was well received by my examiners.

Problem Identification and Solution

Describe a situation in which you faced a significant obstacle to succeeding with an important work project or activity.

Whilst undertaking my Final Year Project, I encountered difficulties in observing the microstructure of the Selective Laser Melted samples which is an important part of the research project. To overcome this issue, a number of different approaches had to be identified, attempted and discussed in order to obtain the required information on the microstructure.

One important part of the project was to analyse the microstructure of the SLM components. This was difficult to do using the regular imaging techniques and required undertaking a number of different methods to obtain an understanding of the microstructure. Throughout the semester, myself and my supervisors had to think of and execute a number of different analysis methods before successfully obtaining the information we needed.

My first attempt to view the microstructure was done using the most basic imaging method which had been used routinely throughout the project. This involved preparing and polishing the samples that I could then image under an optical microscope, but with the extent of cracking and grain refiner in the samples this did not expose the grain boundaries.

Given the limited power of an optical microscope, the next attempt was made using a more powerful Scanning Electron Microscope (SEM) to get higher magnification and resolution images of the samples. However, even with the more powerful microscope the microstructure could not be clearly seen.

Another approach was to expose the microstructure through etching and eroding the grain boundaries that I could then view under an optical microscope. It was found this only worked effectively on samples without grain refiner and gave more information of the SLM scanning strategy than the grains.

A final attempt was made to view the microstructure through using my prepared samples, polished and cold mounted, then slicing a thin section and using this to perform Electron Backscatter Diffraction in the SEM. This resulted in the best imaging of the microstructure and provided the information we needed, although we were limited to a very high magnification.

Through identifying and attempting a number of different investigation methods, my project team was eventually able overcome the problem of microstructure analysis and observe the samples to obtain important information. During this project I have also been exposed to a range of imaging methods and analysis techniques which can be used to study metals.

From having to overcoming this challenge, I have gained practical experience of the process of developing a methodical solution to address a problem, assessing the information analysis methods provide and then determining a course of action which will be useful in the future as I undertake further research.

Open Day Ambassadors

Hours claimed: 9 hour(s) as Engineering Professional Development

Do you want to be part of the biggest University recruitment event of the year? Share your experience of being a Monash student? Represent your Monash campus and provide assistance to visitors on Open Day? If yes, then consider being a Campus Student Ambassador on Open Day. Open Day provides prospective students of all ages and their key influencers (parents, peers and career advisers) with key information about studying at Monash.

Contact: (removed)

Position:

Phone:

SKILLS UTILISED:

Initiative and Enterprise

Describe a situation when you showed initiative and took the lead.

During Open Day I acted as an open day ambassador. This required the teams of ambassadors to be stationed around the university to direct and assist visitors. We were able to help members of the public by answering their questions and directing them around the university to different events and faculties.

Throughout the Open Day it is the role of the ambassadors to answer questions of the visitors and assist them with directions to faculties and locations throughout the university. However, from early on many visitors had trouble finding locations that were far away from our present position and were also unable to find the information tents. Therefore, as an ambassador I had to come up with a way to make helping people

more effective.

Our ambassador group was paired off and given different positions along one of the main entry ways into Monash. As the morning progressed, I noticed a consistent trend of people asking to be directed to a particular location on the other side of the university or asking for clarification of directions that were previously given by other ambassadors. This was a problem, especially given the inclement weather which meant people were less inclined to explore the campus to find the correct buildings.

To help them, I started directing the visitors to the main information site near the campus centre where there were maps available, however often they returned unable to find the location as this was a very busy part of the campus. I took it upon myself to suggest to my team leader that we should get some of the maps from the information centre and distribute them ourselves to visitors, so we could show them on the maps where they are and where they are wanting to go. She then went to get the maps and gave them to me and my partner, and we passed them amongst our other members. Soon people were approaching us to get a map and were being directed to us to show people around. We also told some of the other ambassador groups what we were doing who then also obtained maps to hand out, after experiencing the same problem.

By mid-day, the organisers had learned what we were doing and systematically came around to deliver maps to the ambassador groups. This meant that now all visitors were able to easily obtain a map, and the open day ambassadors could more easily direct people through talking them through the campus map. This resulted in less confusion about locations and a more effective way of instructing visitors.

As a result of taking the initiative to obtain and distribute maps to the public, the ambassador teams could operate more effectively and give clearer instructions to any visitors. Given the heavy rain and wind on the Open Day, it was very important that we could direct people as quickly and efficiently as possible. The Open Day was successful and we were still able to help many people and gave a very positive representation of Monash University as the ambassadors were all prepared to hand out maps and clearly direct people to the different faculties.

Student Futures is a digital platform designed to enable students to find opportunities to develop employability skills and reflect on them.

The platform enables students to capture the key skills they develop in real time and focus on the skills they may wish to further develop. The platform is underpinned by nine employability skills which include: Communication, Teamwork, Professionalism, Tools and Technologies, Problem Identification and Solution, Creativity and Innovation, Initiative and Enterprise, Planning and Organisation and Intercultural Competence. This PDF is a record of the reflections and self-assessment that students have completed in the platform. Whilst participation in some programs and activities is verified by Monash University, the University does not verify or represent that the student has the skills that they have reflected upon and recorded in this PDF. The Student Futures platform enables self-reflection much like a resume or key selection criteria might do.

Should you have any questions about Student Futures or this PDF please contact Career Connect at Monash studentfutures@monash.edu or +613 9905 3151

CPD Question 1: *Ethics and Professional Accountability*

Drawing upon your CPD experiences, provide an example for two of the following situations.

Part 1:

1. A situation where you had to consider your actions in terms of **ethical conduct**, specifically relating to the Engineers Australia Code of Ethics. **(250 words)** [Download the code here](#)

Over the Summer I was part of the (Removed) Scholarship Program. I undertook a research project on the effects of grain refinement on cracking in Selective Laser Melted Aluminium 6061 based at (COMPANY). When undertaking my research project, I had to work ethically and professionally as an engineering research student. This required me to constantly develop a range of new skills, such as metallographic specimen preparation, image analysis, and utilise new data analysis software such as OriginPro to complete my work. This meant I was constantly trained to use new lab equipment as my project progressed and developed new skills to improve and continue my work.

Throughout my research I also had to display integrity and professionalism as I interacted with my supervisors and other academics, as well as those in charge at (COMPANY) and communicated regularly with my supervisors about the progress of my project and any issues I was having. It was also very important that I acknowledge all of the sources I used for information and credited my supervisors and other members of (COMPANY) in my assessment piece for their contributions.

Safety and sustainability was also practiced as I used the SLM machine and metallic powders in a responsible and safe manner, adhering to the rules and regulation at (COMPANY) and Monash University. This meant that powders were handled in a well-ventilated lab, away from the office space and any materials were disposed of and stored in the appropriate way so all members working at (COMPANY) and the university labs could use the facilities safely.

Maximum Words = 250

Part 2

(choose only 1 of the following situations):

- A. A situation where you had to consider whether **due diligence** had been applied in relation to risk management compliance.
- B. A situation where you had to consider the **safety of other people**.
- C. A situation where you had to consider **environmental protection concerns**.
- D. A situation where you had to recognise and address **intellectual property** requirements.

(250 words)

Scenario B **Safety of other people**

Beginning in the Summer of (year) and continuing throughout (year), I am undertaking a research project at the (COMPANY). My project is investigating the effect of grain refinement on cracking in Selective Laser Melted Al6061. My research project requires working in a lab environment and the handling of metallic powders and grain refiner with particles from 3-30 microns in size. Using the powder and the EOSM290 SLM machine requires undertaking and observing safety measures and adhering to rules and regulations. Often there were other people working with the SLM and cutting machines at the same time and the location of the machines is near an office space, therefore consideration of the safety of other people is important.

When handling the Aluminium powders I had to be supervised by a trained member of (COMPANY) staff and wear personal protective equipment, including a respirator when handling the powders. To ensure the safety of others in the building, a sign was put up to notify that metal powder was being used and doors were kept closed between the lab environment and office space. Anyone who had to enter the room was required to also wear correct protective clothing and a respirator and metal powder handling was stopped and the SLM chamber door closed when anyone entered the lab who was not working with powders. The powders were also poured and sieved slowly to prevent dust cloud formation for personal safety and to reduce any risks associated with using Aluminium powders and to ensure those nearby were not at risk from any activities in the lab.

Maximum Words = 250

CPD Question 2: *Effective Communication*

Drawing upon your CPD experiences:

Part 1

Reflect on a time when you gave an **oral presentation**. Describe the audience and how you tailored your oral and visual communication to suit the audience. How effective was this method and what would you change in the future? **(250 words)**

As a part of a fourth-year design unit, in a group of 6 we were tasked with creating and building an electric skateboard over the course of the semester. Our finished products would then be presented to the other groups and a judging panel in the final week of the semester and were to be accompanied by an oral presentation. During this presentation, my role was to explain the prototyping process of the skateboard and how we developed the final product. I also gave a description of the final skate board and the different features my design group incorporated.

The oral presentation was complimented by a PowerPoint which contained visual aids of images and graphs of the product and the design process. As the audience consisted of other students and professionals in materials engineering and design, it was important the presentation contained our CAD images and showed the progress of the product. This emphasised the design process we undertook and demonstrated our ability to create a product from a project brief. To further enhance the oral presentation, a short video was made by the group which provided a visual demonstration to our audience of our operational skateboard.

The speakers in the group and myself, could then elaborate on what was seen in the video and in the presentation images, thereby giving the audience a greater understanding of our work over the semester. The audience responded well to our presentation and showed great interest in our skateboard. From witnessing their positive response to the video, in the future I would incorporate more dynamic features such as videos into my presentations as it gains the audiences interest and differentiates my team from others.

Maximum Words = 250

Part 2

Describe and **contrast two different formal engineering written reports** that you have produced, in terms of their objectives, target audiences, writing style and structure. Comment on how each of these reports was appropriate for the intended purpose. **(250 words)**

During a fourth year unit I was required to complete a report that was focused on determining the material selection withing a laptop computer. This project required me to undertake materials testing and analysis of the different laptop components to determine the materials selected for use in the different parts. This included the the analysis results which support the material identification, the purpose for selecting the material and how it facilitates the function of the component. The report also investegated processing methods and alternative materials to use in lap top and electrical applications. Therefore the project was designed as an engineering consultation to identify the materials used in an electrical device and to produce a technical report of the data collected for the client which may be other engineers or industry professionals.

Another type of report I completed was to accompany a design project of creating and building an electric skateboard. The purpose of this report was to outline the scope of the project and design process used to create the final product. It also included a financial forcast for the design company and budget for the project, including a break even anlysis. Another section included materials design and selection including CAD for 3D printing components. The target audience was therefore potential investors, people from industry with a business background as well as other engineers who are interested in the operation and materials used in the product. Thereofore the report gave a comprehensive overview of all aspects of the project and showed how the group met the project requirements and made a convincing business case for the production of our skateboard.

Maximum Words = 250

CPD Question 3: *Self-Management and Professional Conduct*

Drawing upon your CPD experiences, provide an example of **one** of the following:

Part 1

(choose only 1 of the following situations):

- A. A time where you had to **critically assess your professional performance** as an engineer (e.g. ability to analyse, judge and make decisions). What criteria did you use to self-review your engineering performance? How did this help to improve yourself as an engineer?
- B. A situation where you needed to **apply time management and prioritisation skills** to a project. What steps or decisions were needed to achieve the project requirements? To what extent did your project goals conflict with your personal goals/expectations? **(250 words)**

During my Final Year Project, I had to apply time management and prioritisation throughout the year as I was restricted to a time limit to meet assessments during the first and second semesters. My project is focused on investigating the effect of grain refinement on cracking susceptibility on Selecting Laser Melted Aluminium 6061 and was based at the (COMPANY). Throughout the year I had to organise and prioritise my time between lab work to perform testing and time in the office to analyse and write up my results. I also experienced delays due to equipment failure, therefore often was required to change my schedule to complete other tasks whilst I was waiting for equipment to ensure I was able to continuously progress with my project.

There were also times during the start of the year, that I had to amend my personal expectations of what I would be able to achieve within the given time frame as some tasks, such as microstructural analysis which is an important project requirement, need many different analysis techniques and supervisor assistance. Therefore, during this period I had to prioritise this analysis to obtain important results over other supplementary testing which was postponed. Through using time management, I was able to address challenges, such as having to use several analysis methods to obtain microstructural information, whilst meeting the project aims and requirements through re-scheduling and prioritising tasks during the semester. This means I sometimes have to alter my personal expectations and extend the time frame to achieve the project goals as I continue my research throughout the year.

Maximum Words = 250

Part 2

Give **two examples of professional engineering societies** and reflect on the impact the professional bodies have on the engineering profession and the general society. How has this helped you to improve yourself as an engineer? **(250 words)**

(SOCIETY) is one professional society I have been a member of over the past two years and have attended their events. This organisation holds monthly meetings such as the (NAME) and produce a magazine with the latest information on materials engineering developments throughout Australia. They also organise Materials Science and Engineering tours of facilities and promote events such as the Manufacturing Expo. Attending events and being a member of this society allows materials engineers and students to become aware of the developments made in this field and the active areas of research. Through promotion of events such as the Manufacturing Expo, students, such as myself and professionals are allowed the opportunity to gain insight as to how materials related scientific research and developments meet with industrial processing. (SOCIETY NAME) has allowed me to develop a better understanding of how an engineering qualification can lead to opportunities in both research and in industry.

I have also been a member of (COMPANY) over the past two years. Being a part of this group has allowed me to become aware of advancements and information relevant to my chosen field of materials engineering and also provides specific information and opportunities directed at students. (COMPANY) impacts the engineering profession by monitoring the teachings of the engineering faculties at universities. This combined with the CPD program at Monash ensures their students meet with Engineers Australia's competencies to produce qualified engineers with a range of skills and experiences to join to the work force, thereby raising the standard of practicing engineers in Australia.

Maximum Words = 250

CPD Question 4: *Innovation and Creativity*

Drawing upon your CPD experiences, provide an example of **one** of the following:

Part 1

(choose only 1 of the following situations):

- A. A time when you used **creative or innovative approaches** in either a technical or non-technical context;
- B. A time when you **assessed or systematically evaluated** a new development within the field of engineering;
- C. A time when you **engaged with professionals** from outside your field of study to increase your awareness of broader issues relating to STEM and/or the business environment. **(400 words)**

As part of a fourth-year unit we were required to design and build an electric skateboard that was capable of transporting a person across campus. Our group of 6 was given a budget of \$500 and 12 weeks to design, build, prototype and test the skateboard before presenting the finished product at the end of the semester. We were given no design constraints on the type of board and motor system, therefore it was up to the discretion of our design group to take a creative approach to produce a product that met the project requirements.

My group created a skateboard called the '(NAME)' containing a single brushless motor and 36V battery powered by an external charging system. The skateboard is controlled using a wireless remote and transmitter attached to the deck. The board also contained a light at the front of the deck attached using a 3D printed holder created using CAD imaging software. There was also a handle incorporated in the deck and a 3D printed logo. To reach the final result, we took a creative approach of prototyping and testing to produce a final product which was innovative yet functional in design.

There were also design and technical challenges such as motor belt slipping just before the final presentation. A traditional method of fixing the issue was not suitable for our skateboard as the team was faced with limited time, budget, resources and had restricted access to the damaged area as we did not want to deconstruct the motor system. This required an innovative solution to work within these restrictions and repair the board in time for our assessment. To address this issue, we filed the edge of one of the grub screws which attached the bushing to the axle in the drive system. This meant that the edge would not slip and therefore hold the drive system in place.

As a result, our skateboard was well received by the judging panel, as they were impressed with the creative design, lighting features and 3D printed components. My team and I gained experience in finding innovative solutions to complex problems with a number of time and resource restrictions. We were also able to complete the assessment and meet the scope of our project whilst taking a creative approach to produce a functional product.

Maximum Words = 400

Part 2

Reflect on how and why the example you have selected is evidence of your creative, innovative and pro-active demeanour. **(100 words)**

For my design project, my group was tasked with designing, testing and building our own electric skateboard with only a budget of \$500 and the requirement of transporting a person. All of the creative decisions such as motor type, deck design, materials selection and additional features were left to the discretion of my group to meet the project requirement. Throughout the design, building and testing process to produce our final product I was heavily involved in finding innovative solutions to address technical and design problems with the skateboard and motor system. This meant we had to resolve problems whilst working with constraints on time, money and accessibility. Therefore, I had to be proactive to coordinate my group to fix any problems in an efficient way to meet the project timeline.

Maximum Words = 100

CPD Question 5: *Management of Information*

Drawing upon your CPD experiences, provide an example of **one** of the following:

Part 1

(choose only 1 of the following situations):

- A. A time when you located the information you required via a systematic search of multiple sources (both online and physical).
- B. A time when you critically assessed the accuracy, reliability or authenticity of an information source and found it inadequate.
- C. A time when you utilised document identification, tracking, naming conventions and/or version control procedures. **(400 words)**

During my fourth year at Monash, I undertook my Final Year Project investigating the effect of grain refinement on cracking in Selective Laser Melted Aluminium 6061. The project was based at (COMPANY) and was a continuation of Summer research I undertook in 2017. To begin my project, I had to spend time reading literature articles and gathering information on Additive Manufacturing of Aluminium. This required extensive research on the topic of Additive Manufacturing of Al6061 and other Aluminium alloys as well as Selective Laser Melting. I initially sourced information from a number of academic journals and research papers to establish the effect of SLM processing parameters on microstructure. However, I had to be mindful of the scope of my project, the aims, equipment and conditions selected in my research to ensure the information I was obtaining is applicable to the conditions used in my project. All of the journal articles had different processing conditions and powders, therefore it was difficult to find information that replicated the conditions of the current research project and my chosen Aluminium alloy. I followed this research by extensive discussions with my project supervisors about our hypothesis and how our results can be interpreted given the changes in the processing parameters, powders and conditions compared to other works. This information was developed upon further by attending talks and lectures on Additive Manufacturing and metallic powders as well as developing an understanding the microstructure of different processing techniques.

Often the reliability of the information obtained from other sources had to be critically analysed as to how applicable and accurate it was to my research project due to differences in equipment and processing conditions. Therefore, this often required more extensive research from several sources either find conditions which directly replicate those in my project, or to gain a consensus of general information which develops my understanding of the subject. After developing a general understanding of the field of Additive Manufacturing, I then sourced information which could be specifically related to my given Alloy and project aims. This was then followed by seeking out academics who specialise in this area to discuss the reasons and mechanisms behind our results. I also followed up by searching books and attending lectures talks on metallic powders and additive Manufacturing to further obtain information and develop my understanding of the SLM Al6061 and the mechanisms of grain refinement. Through undertaking a systematic approach to research, I was able to report information accurately as I had used many reputable sources to learn and obtain information both generally and directly relating to my research project.

Maximum Words = 400

Part 2

Reflect on how and why the example you have selected is evidence of your professional use and management of information. **(100 words)**

As my research project in SLM Al6061 contains specific experimental condition, obtaining information which directly relates to my project must be done systematically and carefully as each source and journal article uses different processing parameters. Therefore, not all results on SLM aluminium were applicable for my to use in my research project and were often only useful to obtain a general understanding. It was important to not only use professional channels to obtain information, but to also confirm this across several sources before using it with appropriate references and academic integrity. To obtain my information I first used journal articles and books, before having discussions with my supervisors to ensure how this background information specifically my current research project. I then broadened this understanding by searching out other physical sources and lectures. This shows a professionalism of obtaining, evaluating and handling information as I ensured the data is correct, relevant and in agreement across a range of credible sources.

Maximum Words = 100

CPD Question 6: *Being an effective part of a Team*

Drawing upon your CPD experiences, provide an example of **one** of the following:

Part 1

Describe a time when you were part of a project where there was conflict within the team and reflect on:

- Your role within the project team.
- How did you accommodate varying personality types and gain the trust of your peers & team members.
- What did the team do to resolve the situation.
- What you would do differently in the future and why.

(500 words)

As part of a Materials (removed) unit, I was placed in a group of 9 individuals to complete an assignment on the tribology of roller chains. As a chair of the group meetings it was important to allow all of the group members to voice their opinions and hold group discussions. This meant that each member was able to voice their opinions whilst the other members acknowledge their contributions. Through holding a group conversation and hearing the opinions of the other members it was easier to see the direction of the project the team.

A couple of members of the group suggested dividing the 9 members into teams of 3, then have one team work on the introduction and background of the report before the second team present information on the tribology and metals before the final team gave a material and surface treatment recommendation. This meant that over the 4 weeks we had to complete the assignment, not all members would be active throughout the process as each section depended upon the information obtained by the previous group, and the team could not make an informed recommendation to meet the assignment requirements.

This decision was openly opposed by other members of the group and almost resulted in an argument. This was because their approach meant there would be weeks where some members had no tasks to perform, there was an uneven distribution of the work load and could not all evenly contribute to the oral presentation.

It was important that those who had the idea felt that their opinion had been acknowledged and discussed by the other group members and that their contribution was valued. Acting as the chair and mediator during this meeting, I asked those that opposed the idea to give reasons as to why this was not believed to be effective and to suggest an alternative.

Finally, to resolve the situation a compromise was reached where the team would indeed split into smaller groups of 3 to work on smaller sections. However, these sections were divided so all the members of the group were working progressively through the introduction, background and tribology, common materials and treatments before the final recommendation. Though using this approach, each group member would gain an understanding of the assignment information and then the group could have reasoned discussion to come up with a final recommendation.

As a result, the 9 group members were able to actively contribute to the project over the 4 weeks and all of the groups personal resources were utilised. Each member had a good understanding of the different aspects of the project and as a result, all of us made the final presentation together, which none of the other groups did.

In the future, if I were to be in a similar situation again I would discuss early on an approach that maximises the groups resources and makes everyone involved. I would also continue to have open group discussions and strong communication between members, such as by ensuring that anyone who disagrees with an idea gives a reason and an alternative to make their stance better known to the group, as this can avoid arguments and lead to a faster resolution.

Maximum Words = 500