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Scholarship 2013
Technology

Total marks: 24

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	Mark
Synthesis and integration	8
Justification	8
Critical reflection	6
TOTAL	22 /24

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Analysis and Critical Reflection of my Technological Practice

OVERVIEW

First Problem: finding a context that would challenge me, and a client within that.
I knew that I needed a client that posed a real challenge. In the past I had always worked with myself as the client, I identified that I needed to choose a client, other than myself, to allow authentic issue within a context that would allow me to develop an outcome that would be fit for purpose in its broadest sense.

Through exploring those around me, I decided to focus on Dennis, my father. Dennis loves golf and has played it since he was 15. Being the former club captain of Bridge Pa, also known as the Hastings Golf Club, he is well known. Dennis plays golf around twice a week, on Thursdays and Saturdays. Dennis is self-employed and is the director of a number of businesses that he runs from home, these businesses include cosmetics, sunscreen and golf equipment.Because Dennis works from home I knew he would be available to me if I needed to talk to him about any issues or ask for his opinion, this was ideal.

The obvious context when working with Dennis was golf. He had previously complained about the many aspects of his golfwear that made golfing harder, and a reason for this was that he usually wore dress pants and a polo shirt, rather than performance golf pants, specially designed for golfing in. Along with this side of the issue, there was also the aspect of Dennis' businesses. 'Divot Golf' sells golf balls, gloves and other golfing tools. There was the opportunity for me to design a prototype garment within the context of golf, that would later go onto mass production, as Dennis was looking to expanding and diversifying into clothing sales.

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Second Problem: my lack of understanding around the culture of golf.
The context of golf itself presented many things to consider. Golf is an internationally recognised sport with a high profile. The Hastings Golf Club, where Dennis plays the majority of his golf, is a prestigious course that has featured in the Top 10 New Zealand Golf courses. There are expected codes of practice around the game, the standard of dress and overall conduct on the course.

Dennis' complex context presented a genuine issue to be explored, as well as the challenge of designing for sport and my unfamiliarity with the context or the game. For me, it provided a way to help my father with a problem he had, as well as gain knowledge around the game of golf, something he is very passionate about.

CONTEXT CONSIDERATIONS & CONCEPTS

Project Management

Problem Three: I had previous knowledge of what kind of planning worked best for me, but knew my planning would need to be more in-depth for it to allow me to meet all of my deadlines.
Through my past use of planning templates as a way to organize homework and other tasks as well as past technological practice, I

was familiar with the use of different systems in order to maximize the efficiency of the use of my time.

After visiting an up and coming Havelock North robotics engineering firm, Haden & Custance, I realized the importance of planning each step of my practice.

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Haden & Custance specializes in the design, manufacture and automation of materials handling equipment for the Food & Dairy Industries worldwide. It was great to see how a business like this, involving engineers, in a completely different context to what I was working on, planned time and resources for efficiency and how it reflected back to something I could learn from. I likened the robotics that they make to developing my own outcome in technology, in the way that they have to develop different robots to meet the needs of each individual client. I needed to specifically design for Dennis in the context of golf.

From this visit, I confirmed that a yearly plan along with planning pages at intervals is helpful, and a space to allow me to organize any meetings and the resources I need would be helpful.

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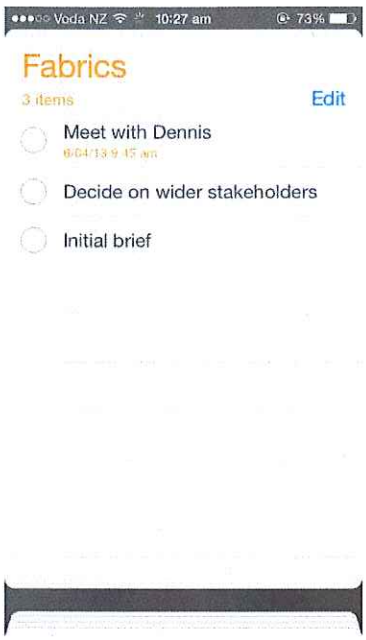
I sectioned the work I needed to do throughout the year into 'milestone stages' to allow me to allocate time for these on a yearly planner. I included any deadlines I knew of, as well as any school commitments I was aware of to allow me to get a bigger picture view of when things needed to be done by. Because I did not think this would be enough to help me to organize my time, I made a 'milestone planner' template that I would use regularly through each milestone. This planner included spaces to allow me to organize my next steps, any resources needed and a visual representation of where I was in terms of where my yearly planner said I should be.



Along with these physical planning sheets, because I would not always be near my folder to check these, I also used the reminders and calendar on my phone as a more mobile solution. I used it to take notes throughout the year while I was talking to the public, or if I had any ideas I wanted to refer to later.

At the end of each milestone, I reflected on my practice through that milestone, called a 'critical review point'. These pages helped me to consider a bigger picture view of what I had accomplished to date, and how I had accomplished it. It was an opportunity for me to address any problems that were taking away from the quality of my work and kept me on track. I did not set specific dates for these, as my milestone planners reflected where I was in terms of time; I did not need the pressure of finishing a particular piece of work by a specific date.

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Research

Problem Four: my lack of knowledge of the culture and etiquette surrounding golf.
As I had no previous knowledge of the game of golf, I researched golf at Bridge Pa and its history and its dress code as well as the climate.

I gave Dennis a range of questions to answer, about different aspects of golf and his current golfwear, so that I could better understand the kinds of clothes he wears while golfing as well as physical, natural, social and personal aspects of what he wears. Dennis' answers led me to consider the large range of movement involved in a golf swing, and prompted me to come with him to the golf course and photograph him in various golfing

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positions – swinging with a driver, putting, chipping, picking up his ball etc. so that I could better understand the way his clothing was required to move with him through these actions.

Having researched the context of golf, I compiled a list of context considerations including physical considerations such as aesthetics, function and location and social considerations such as standards on a golf course. This would allow me to refer to these considerations when I was making decisions in the future and inform my initial brief.

The next part of my research involved looking at existing solutions, existing golfwear in the market. I looked at a range of big name golf brands such as Nike and Oakley because of the range of high performance, high quality clothing available from these brands. It was important that I understood the standard of golfwear in terms of styles and extra features. This research provided useful in exposing me to a variety of different options for the golfwear I was going to be developing.

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Problem Five: If Dennis intended to put my prototype into mass production I needed to gain an understanding of wider stakeholder needs. I wanted to make sure that his preferences were reflective of other golfer's needs so that the outcome would reflect golfer's needs in general. To do this, I conducted a survey on golfers at Dennis' golf club, Bridge Pa. With Dennis' help, I compiled a list of five multi-choice questions for the golfers to answer. I structured these questions around any concerns they had about their current golfwear and any problems they had. This research helped me to get a clearer idea about what modern golfers expect from their golfwear. I noticed from this that many golfers were still wearing dress pants rather than pants specially designed for golf. I was curious about this, and to gain a better understanding I decided to look into the history of golfwear. This would also help me to understand the future of golfwear.

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From my research of golfwear historically I found that golfers first wore kilts while golfing, which evolved to pants which they tucked into their socks (plus-fours). I found this very interesting, as to me, it seemed like there never was really any clothing made specifically for golfers to wear while golfing – many men wore morning dress including a jacket and even hats, because at the time, golf was a more social sport and the men playing were of high social standing. The main idea I took from my research was the change in the attitude around the game of golf that came from the introduction of television coverage of the game. Golf went from being a very social game for gentlemen, but as golf became more televised, it became a much more competitive sport, with many well-known names such as Tiger Woods and Danny Lee playing in tournaments like the PGA Tour. Big name brands like Nike and Puma begun to produce specialised golfwear for these golf professionals. This shift to a more competitive game saw golfers moving from smart casual dress to clothing intended for golf with extra features like divot tool pockets. Golfwear has continued to evolve, with a greater availability of high-tech, performance golfwear, leading it to be set as the new standard of dress on the golf course.

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Contrary to this though, the majority of the golfers I surveyed at Bridge Pa did not own these types of clothing. This could be might be because of the high price of this type of golfwear, which could discourage golfers, especially casual golfers, from purchasing them. Instead, the majority of golfers wore dress pants not specifically designed for golf.

Problem Six: my unfamiliarity with the process of mass production.
I needed to address my lack of knowledge of how to produce garments for a wider range of people, not just a client. My research introduced me to the new era of high-technology golfwear and the slow uptake of it in New Zealand, and made me think about my opportunity to solve this problem. The obvious issue here was that high tech golfwear is too expensive for there to be any real demand for it. I took from this that I would really need to consider costs for the outcome to be viable.

I also wanted to consider the effects of mass production on the design and also environmental impact and how I could minimize this. Through research I found a concept called Trash to Trend, which presented four main merits of sustainable mass production; upcycled, repeatable, high design quality, transparent. I was really taken by these ideas and decided to incorporate them into my specifications in some way – if not taking the direct meaning but interpreting it for my own practice.

The aspect of mass production needed to be researched further, so I made an appointment with Harold Trigg from Soma President, a local textiles manufacturer. Harold had some real insights into producing garments in a small country like New Zealand. Soma has been in business for over 80 years, and it really showed how small manufacturers struggle with competition from China manufacturing plants, and the way New Zealand firms cannot match the low cost margins that these large firms have with low wage rates and the economies of scale allowing them cheaper materials and equipment because of bulk buying. It was great to talk to Harold as he was very enthusiastic about the project, talked me through the process of mass peoduction, and told me to keep in touch with him so once the prototype was produced we could look to producing a range of clothes with them.

From my research, I was able to add considerations around the knowledge I had gained about mass production. At this point, I decided to refine my previous context considerations, because I had gained so much more of an understanding of what the garment had to do and the standards it would need to meet, and I wanted these considerations to reflect this.

Concepts

I created four concepts, all including two items of clothing, pants/shorts and a top/vest. These concepts came about through the consideration of my initial brief and specifications, as well as the knowledge I have gained from research. I compiled a variety of basic shapes of outfits, allowing my client and wider stakeholders to evaluate them and give feedback so I could choose which concept to develop. This feedback was crucial and very valuable, as my stakeholders are all people who know Dennis' style well and know golfwear well

Bridge Pa Dress Code

Dress Code Men:

Dress shorts - Trousers - Socks - Sports Shirt

Prohibited:

Bare Feet - Workboots - Jandals - Rugby style shorts - Singlets - Dirty or unkempt clothing. Jandals, non-dress jeans, beachwear etc, are not regarded as respectable dress.

I considered what I had learnt through researching the context, in terms of the range of movement and flexibility required from any golfwear due to the basis of the game being centred on movement in the golfer's swing. The style I was developing needed to allow Dennis to move easily. As well as this, I also considered Bridge Pa's dress code in each concept as this is a major consideration in terms of fitness for purpose.

After presenting my concepts to my stakeholders, we decided to develop concept one further. I took a range of key features from this, so I would be sure to include them in the final design:

- Stand-out, fun material
- Coordination of colour throughout the outfit
- Breathable panels under arms
- Slit in ankle seam for movement

I included variations of the many features I could add to the polo shirt and pants and then decided on the combination my stakeholders and I thought worked the best.

The main features of the final concept were:

Physical

– Complementary coloured shirt cuffs

This means that the shirt is tied into the material of the pants in a subtle way.

– Complementary coloured front pocket inner and back pocket facings and belt loops

Very similar to the coloured cuffs, these features will tie the pants to the shirt. Another advantage of this is that for example, with the back pocket, if plaid or stripes were used they would have needed to be matched but with a block colour, it does not need to be.

Functional

– Slit at hem

This makes for ease of movement around the golfer's shoe and means Dennis' swing will not be hindered by this.

– Waterproof back pockets

The back two pockets will be lined with waterproof material so Dennis can put wet equipment or gloves in here when it rains.

– Divot tool pocket

This will take some consideration as to how big and where it should be placed, and if it is valuable, but a special pocket for a divot tool to be kept could be useful.

Having decided on my final design I was able to refine my brief. It was important that I had a brief that I could add to, because it would allow me to evaluate the outcome using this, as criteria for fitness for purpose of the outcome.

TECHNOLOGICAL MODELLING

Functional Modeling

Functional modeling was a big stage of development, and it is very important for testing and trialing the functionality of the design that I had developed. To manage the risk of the garments not fitting Dennis I made mock ups of each to test for fit and feel of the garments and to practice the advanced techniques that I would be using in the prototype. This process enabled Dennis to try on the garments and for me to make quick alterations that would then be transferred to the pattern pieces for the prototype. Haden and Custance tested and trialed throughout their development process as did Soma textiles. For these firms this managed the risk of having a specific production fail and them not being able to meet the client brief.

Problem Seven: Style and Fit

I had three main problems at this stage concerning the fit:

1. The pants were slightly too large around the leg. I solved this by getting Dennis to put the pants on inside out and pinning them so that they fit, starting with the outer of both legs. I then sewed the alterations and found they were still too big, so took in the inner of the legs also, bringing the perfect fit.
2. The sleeves of the shirt sat too low on Dennis' shoulders by about 5cm. I decided to address this problem while prototyping, rather than waste time mocking it up, as all I needed to do was take the armholes of the shirt in.
3. The shirt was too loose at Dennis' sides, so I took the shirt in gradually, 3cm at the biggest point on both sides.

The finished toile fit Dennis well, and through some "practice swings" – Dennis imitating the movement of a golf swing, we found that his movement was not impaired by the clothing, and it would only improve in the prototype because of 'Calico' the trial material did not have any stretch to it. I noted that my material choices would have to be carefully made.

I also tested pattern piece layouts for efficient use of material and lower cost, meaning I had a better idea of how much material to buy when I was at that stage and the implications for mass production

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Materials Research

A big part of the project was making something that would last a long time and would be sustainable. This was important to me, because from previously researching sustainability I learnt a lot about the implications of the use of different types of materials on the life cycle of a garment. Maintenance was also a very important consideration because the garments needed to be easily machine washable to be viable for mass production, as is the standard set by the current garments in the market.

Research of golfwear historically helped me to understand how the needs of golfers have changed significantly over time and a better understanding of what modern golfers expect from their clothing with the very competitive yet social nature of the sport at current day. By looking at existing big-name brands in golf allowed me to gain a wide range of knowledge around the materials used in golfwear. Each brand has its own unique material brand like Oakley's O-Hydrolix or Nike's Dri-fit breathable material. This has allowed me to see the growing demand for high performance materials in the market and helped me to realise that I needed to include some of these in my garments, making material selection a very important aspect.

Problem Eight: finding suitable material with a limited selection.
It is always hard to find high performance fabrics, especially in Hawke's bay with only one fabric shops which does not really provide the type of high quality materials I was looking for. I started by looking at the types of materials my patterns had suggested to use, then went on to research different types of materials commonly used for pants and polo shirts, and finally compiling a list of considerations/specifications for my chosen materials. I took this list with me when looking for materials so that I could check things off and find the perfect materials. I already had a vague idea of what Dennis and I wanted, so I browsed fabric shops in Hawke's Bay, Wellington and Levin until we found the materials that best suited the needs of both garments, throughout this process I took photos of various materials so that I could go back to them if I did not find another. The fabric we chose for the pants was from Arthur Toye Fabrics in Wellington. It is a Viscose (60%) Polyester (40%) blend in a dark green, dark blue and black plaid pattern. This blend met all of the specifications I had set for the pant material, and through Dennis' approval of the pattern we chose it. The next step was to find the polo shirt material; I did this second because my desire for the pants to be made in a bold material meant that the polo shirt material would need to match well with this material. I chose a black merino polo blend from Levana. This is a 100% sustainable material and this was important to me. Merino is a naturally high performance material with many attractive performance properties such as great breathability and odor resistance.

Prototyping

Problem Nine: Constructing a high quality prototype.
A time consuming aspect of using plaid material is matching up the stripes. When cutting the fabric I had to cut each piece separately so that they sat straight along the grain and would line up with any piece that would be attached. A method I used to reduce the time consuming nature of this was using green contrasting material for the front pocket linings, belt loops and back pocket facings, so to avoid needing to line up the plaid in these places, which would have been especially tricky. Through my research, I found that waterproof material had been used in some aspects of golf pants, and I wanted to incorporate this somewhere. After

speaking to Dennis, we decided that the best place for this would be the back pockets. He often has trouble with the pocket linings for his back pockets coming up as he removes things from them, and waterproof material's slippery nature meant that it would remove this problem. It also had the benefit of being waterproof, meaning Dennis could put things that he did not want to get wet in the pockets, if it rained. I chose a dark blue waterproof nylon material for this.

When finishing the pants and attaching the waistband, I had to consider if I wanted the plaid to match up here. Although Dennis wears belts with his golf pants, it was important to me that the overall finish was of a high quality. I decided I would make sure that the plaid lined up on the front of the pants – the back and front would have been too hard to do because the lines of the plaid were not vertical on the back of the pants.

When constructing the polo shirt, I realized that the placket instructions I had followed for the mock up were for a female's polo shirt, as fastening right over left. The placket was an interesting experience for me, as I had never done one before. I used the same green material for the under arm inserts I had experimented with in the mockup, and they turned out well. I chose to use green thread for the buttons on the placket, because of the subtle link it created throughout the outfit. I needed to take the shirt in at the armholes, because I found in the mock-up that it sat too low on Dennis' shoulders. I got Dennis to try the shirt on and I marked where I needed to cut (5cm in). I took the shirt in 5cm around the armholes but made the mistake of not graduating my cutting. This meant that the sleeve did not fit to the shirt. Through not wanting to waste time in mocking up, I did not manage the risk that I would cut too much off. After weighing up my options, I decided to add the material that I was going to use for the coloured cuffs of the shirt to insert a piece of graduated material where I had cut too much. This meant the sleeve pieces fit to the shirt, as they needed to and solved the problem. However, this slight alteration would add significant cost to manufacturing if mass produced.

IMPLEMENTATION

Implementation allowed me to see Dennis' garments in the environment they were intended for use in. It was great to hear all of the positive feedback Dennis received, and how well they worked for his golfing.

I implemented the garments at Bridge Pa, Dennis' local golf club. I did this by following him through a day on the golf course and photographing the way the pants and shirt responded to his movement, the things he put in his pockets, as well as how comfortable they were in terms of fit, feel and temperature.

I found that the garments responded well to all of Dennis' needs throughout the day, especially when he was playing golf. From the start of the day they performed well, as he stepped out of the car the garments were not creased from Dennis sitting down. Dennis was able to put his car keys and wallet in his pockets with plenty of room. He proceeded to pick up his scorecard from the pro shop, which due to testing in the prototyping stage, fit perfectly in his back pocket. Dennis then tested some of the pro shop's putters on the putting green. After this, he got out an iron and his golf glove and proceeded to practice some chips onto the green. I was able to see how flexible the garments were while he was swinging the club, and they responded well to the movement. Dennis commented that it was very easy to swing and that the pockets were roomy enough that they didn't feel too full. He especially liked the waterproof back pockets due to the smoothness of putting things in them and taking them out provided by the material used. Overall, the pants and polo performed well and Dennis gave feedback that through an 18-hole game of golf the clothes kept him at an optimum temperature throughout.

EVALUATION/CRITICAL REFLECTION

For me, the biggest difference in developing this outcome for Dennis, compared to other years, is that I was developing for a man. Prior to this, I had made garments for myself. As I know what kinds of clothes I like, and what flatters my figure this made these previous garments easy and required little feedback from stakeholders in order to make decisions. This year was very different, as I could not make many decisions without consulting Dennis or other stakeholders about it. Overall, I think that this meant that there was less of my input into the process and a wider range of opinions that were taken into consideration.. Fitting the garment required planning, as Dennis needed to be there to try it on so I could alter it.

For the garment to be fit for purpose in its broadest sense, I needed to consider implications for future practice and mass production possibilities. This meant considering the outcome's social and technical acceptability. Throughout the development, I consulted with stakeholders and referred back to the golf club's dress code to make sure that it was going to be considered socially acceptable at the golf course. When considering materials I realized that certain materials might have cultural implications, and the materials that were chosen needed to be inoffensive. I considered the codes of practice and made sure that I was producing a high quality product that met standards.

A major consideration for me was the sustainability of my practice, especially when it came to considering the implications of environmentally sound mass production. Material selection is an area where it is easy to incorporate a degree of sustainability to any garment. I chose 100% Merino as it is a very sustainable material and is naturally biodegradable. Viscose and polyester, while being man made, do not use the amount of pesticides and water for their production that materials like cotton do.
I needed to consider the ethical nature of my testing practices. I tested the fit of the garments on Dennis, and gained feedback and survey results from willing members of thegolf community and ensured that my testing practices were appropriate.

In consideration of the lifecycle of my garments, I used high quality materials and was careful when manufacturing, making them durable. Both garments are easy to care for, as they wash easily in the washing machine and do not require any extra care. When it comes to disposal, the garments are made from large pieces of material so there is always the option for them to be used for something else, especially the merino polo shirt. The pants could be adapted into shorts. Ultimately, the merino polo will dispose naturally and the viscose and polyester will take longer.By developing my own design with strips of breathable material under the arm, which I have never seen before on a polo shirt, brought from the idea of existing sportswear means I was not infringing on copyright or patents. Ethically the clothes are appropriate as they meet the rules and regulations set by the golf course where Dennis will be wearing them. As reflected from the positive feedback Dennis has received, they are appropriate for Dennis' age, size and social standing at the golf club.

Time management was an area that was vital for the success of the outcome, especially as I was developing for someone other than myself. Time needs to be managed and carefully considered at each stage to ensure it is fully utilised and not wasted. This has many implications for future practice, including those for mass production, where the misuse of time can have a large economic impact on business, and profit margins.

When comparing the finished prototype to garments in the current market, such as the pair of Oakley pants Dennis recently purchased, and the way the back seam came undone with one wash, I know my garments compare well and are of a manufacturing quality. I think I have future proofed the garments by using NZ produced merino, a fibre that is evolving in its application. By researching the current golfwear market in both New Zealand and the USA, I believe that it allowed me to interpret future trends in materials and added features to golf wear.

Meeting with Harold Trigg from Soma and getting a tour of Haden & Custance allowed me an insight into industry and other technological practice. The way Harold continues to operate Soma, even with growing competition from China, and the way he has adapted his services to what is in demand showed me that perseverance is valuable, and Haden & Custance taught me the importance of planning thoroughly to achieve a result within a set timeframe. I used this knowledge as a guide throughout my own practice.

Working with Dennis in the context of golf allowed me an insight into his status at the golf course, as former club captain. He was very cooperative in terms of devoting time to the project throughout; he suggested many helpful things, such as testing the length of the pockets to make sure they would fit everything they needed to, as well as providing honest feedback to me. I have a close relationship with my father and this made me strive to produce a garment that was of high manufacture quality, as well as something that he would be proud to wear. Designing for a man meant I was able to learn a range of new techniques I had not touched on before (e.g. back pant pockets and polo shirt placket). The aspect of mass production allowed me to learn more about designing for industry and the implications decisions made throughout the project had on this.

I would have liked to have taken my final design in to a manufacturing plan but time constraints and the fact that Soma Textiles was in the process of restructuring prevented this. I am confident I produced a viable prototype for 'Divot' golf wear and this was supported by key and wider stakeholder feedback.