

Technology Scholarship Report

Havelock North High School

Brad Donovan
2008

General overview

The issue was the way my client's son behaved in the late afternoons as my client (Kate) tried to prepare dinner. Her son (Tom) would run around the house making a lot of noise and a lot of mess, which resulted in Kate having to stop and attempt to settle him down. It was important for me to choose a suitable client and a realistic issue. I knew this was realistic issue as I had witnessed it before in the past. It was also an interesting issue to look at as it meant there would be a wide range of possible solutions. This issue also offered needs and opportunities which was a positive for me because I felt very enthused and excited straight away, thinking about possible aesthetic designs, functional features and what skills I could develop or use.

My given context was "Most parents of Pre School children like to encourage the mental and physical development of the child by providing challenging and stimulating toys." Although it is a very broad context, it offered me many opportunities and ways I could go about working through the technological process.

The issue I had chosen also meant that as well as developing something that could keep Tom occupied, it also needed to be mentally stimulating and help his mental or physical development. My client was also very enthused by the decision of solving this issue and was keen to see the outcome after we talked about all possible issues.

The reason I chose Kate as my client was the fact I had seen the way her four year old son carried on after school. Kate also has another child to take care of at the same time, as well as trying to preparing dinner while her husband would be at work until later in the evening. I saw the need to help Kate out by attempting to solve this issue by giving Tom something to do, which could also help his development. Tom being four years old also enforced my decision because I believe this would be a really interesting age to develop a toy for. Which means it could be quite detailed or quite complex, rather than developing a toy for a younger child which would mean it would have to be quite basic.

This was a challenge I was excited to face.



The location in which the toy would be used is in the living area of Kate's home. The interior of her home is quite modern as it has many new appliances but at the same time it has quite a traditional feel as it features wooden furniture and a wooden floor. The house would be no more than twenty years old and has had renovations done to it in the last few years. The room had wooden floors and is near the kitchen so Kate can keep an eye on Tom. The toy would be stored on display on top of a wooden toy chest in this living area. Kate and I decided this would be the best place as it can be viewed, so it could be acknowledged by visitors to her home rather than being stored out of sight. Kate quoted "I want to show it off" and having it stored here would also be easily accessible for Tom, and finally it would be up out of the way so it wouldn't get broken or damaged.

I did not have any previous experience in constructing a children's toy but was pretty familiar with toys as I have young cousins who are always getting the newest toys for their birthdays. I also enjoy the odd browse through the old Toy World brochure now and again to see what's available. The thing I thought would be most difficult in

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The complexities of the situation have been discussed.

making a toy is the fact it needs to appeal to the child otherwise it would be pointless. The aesthetics of the toy would be really important. I researched wooden toys on the internet because there is an unlimited source of new and old toys being sold or advertised online. I and came across a range of different kids toys for younger children around Tom's age, but over all, they were quite similar in they way that they were quite plain and simple. The more interesting toys were made from plastic and as I intended to work with wood, I wanted to create something that was as interesting to play with as a plastic toy, but at the same time, have the natural and quality look of wood. This was important to Kate as she wanted it to be something different from all the plastic toys Tom has. I came across a Japanese toy company on the internet. I chose to research on the internet as it is a lot quicker to find what I wanted. Visiting local toy shops would take up a lot of time which I did not have. Using the internet could bring up almost any toy imaginable at the touch of a button. The company I came across was called "Takeji Nakagawa" (a.k.a. Take-G") and they produced the most unique wooden toy I had ever seen. The craftsmanship and detail was amazing. I really wanted to create and base my design on this style that I had come across. I also looked into the development stages of children as well as child safety standards. As Tom was four years old, this meant he was well underway in developing all his physical and mental skills. He could do things like stacking up to ten blocks and could even cut with scissors. Therefore I knew Tom had some physical and mental toys so I could make the toy a bit more interesting.

The Key factors at this initial stage were:

- I must consider the toy safety standards in my design, these included things like small parts and sharp edges.
- The toy must appeal to Tom.
- The toy must be user friendly
- The toy must function.
- The toy must fit in its environment.

I researched two existing technologists who specialise in wooden toys to inform and inspire my own practice and help to generate ideas. I chose John Linck and the Japanese company "Take-G". I chose John because I had seen many of his products on the internet and believe they are a really high standard of toy and of a high quality. Although I did not want to design a toy like his (because they are old school and really plain looking) I really admired his attitude and values towards his work. He works for clients and ensures the quality of his work by guaranteeing them for "a life time". John signs his name to every toy he builds which shows his faith in the quality of his products. The second technologist I studied is where I got the most inspiration from during this project. "Take-G" mainly create one-of crafts and usually only sell them to galleries and companies. The designs of these toys are really amazing in the way that they have so much detail and use a range off wood types to create a contrasting look. His motto is "to bring wooden beauty and quality into life in my own style" which is was I did as I used his toys for inspiration but added my on style to the final design.

From doing this research I was able to see what was needed in the design of my solution. I had clear ideas of possible concepts that I would draw up. I wanted to follow the style of "Take-G" and Kate was also very excited by the idea of having a similar styled toy for Tom to have. But I needed to be aware of the copyright law at

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It would have been helpful if the student had referenced the sources of information in their portfolio of evidence and provided a reference back to these in the report. This would have allowed them to clearly show how their analysis of existing toys informed their future technological practice and design ideas.

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The student has described the factors which will be 'key' for him to consider when designing and making a child's toy that is 'fit for purpose'.

this point because the design needed to be my own and I must respect the intellectual property of this company.



I now knew what was expected in terms of safety standards, as well as design ideas I gained from Kate and Tom after interviewing them. During this interview we discussed things like finishes and colours and it was decided that it would have a natural wood finish, similar to "Take-G". Kate left the rest open for me to design how I thought would be best.

The Key factors were confirmed at this stage before I moved into the conceptual stage. These included:

- Legal- as I was not allowed to copy other designs and replicate other products for my solution.
- Function-The solution needed to function properly in order to properly serve its purpose, as well as with standing wear and tear.
- Fair Trade Act- the toy safety standards are based on children under the age of three but I still needed to consider the size of things and the sharpness of edges.
- Stakeholder- the design needed to appeal to Tom so he would want to use it.
- Materials- the wood I chose needed to be durable enough to be used by a four year old boy.
- Aesthetics- The wood I chose to use needed to have an aesthetically pleasing finish.
- Availability- The materials I chose all needed to be easily available and not too expensive.
- Location- The design needed to fit comfortably in the intended location so it could properly function.



As Kate had left a lot of the designing open for me to do as I wanted, I first looked at the location in which it would be used. Tom enjoys playing on the wooden floor which also has a large rug, so that is where I decided the main part of the toy would be based around. After watching Tom plying with his existing toys, I noticed that the functional aspect of the wheels were poor and struggled to work properly on the rug. This was because the wheels were simply too small and were designed for a smooth, even surface. This toy was one of Tom's trucks and it inspired me to create something that would work on both surfaces. So because of this, I decided the toy needed to have wheels so it could be pushed along the ground. These wheels needed to be durable and big enough to with stand Toms use, as well as function properly over the carpeted rugs. By deciding this, I now had a foundation to start from, something that each concept would have in common. I also wanted to use a similar idea to "Take-G" in the way that their toys feature a main body or vehicle as well as one or two little robot people. I knew from showing Tom the research I did, he liked the small robot figures and he really wanted a big vehicle to play with.

So I turned these ideas into concepts, three vehicle designs, two robot body designs, and three robot head designs. I drew each vehicle on separate pages and showed images of where inspiration came from for each part of the designs. – Such as the Bat mobile. The idea was to have one vehicle design, one robot body design, and two robot head designs that could interchange on the chosen body. I decided the best way to get Toms opinion was to show him the designs straight up and see which he

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Explanation of how understandings gained from researching practicing toy makers and safety standards applicable to childrens toys and copyright law influenced the design ideas and practices used by the student.

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The key factors were confirmed and explained against understandings gained from an analysis of research findings.

automatically liked the most. Kate then saw the concepts and agreed with what Tom had decided on. As Tom is young, I just asked him two simple questions -which were his likes and dislikes of each concept. This approach was simple so I used the same method with Kate. Doing it this way was quick and I got the feedback I needed as it showed obviously which concepts were the favourite. I recorded their feedback with a concept screening page that displayed their likes and dislikes of the concepts. This clearly showed their favourite concepts so I was able to move on and develop them.

I decided to make a mock up model of the chosen vehicle to find out the easiest order of making it. (Which part should be cut first and why etc) I also made a model of the robot to experiment with sizes. I used MDF wood to create the model of the vehicle. I used this wood because it is simple to work with and the school has a large supply of it. By making this model I was able to see the design from any angle and experiment with the size. I made it to the size I thought would be best for the issue but as it shows in the photos I took, parts of the vehicle were too thin and flimsy. I also decided to make the real solution a bit larger to make it bigger and more durable and so the robot driver could fit in it better. I made the robot body and the two heads using clay. I did this because the design of these had a very unique shape. Using clay was the quickest and most effective method as I could mould the shapes easily and it was simple to make adjustments to the design while the clay was still wet. This method proved to be effective because I managed to make the body and the two heads in less than half the time it would have taken if I used wood. Kate was happy with the models I made and agreed with the changes I intended to make for the same reasons.

After making the models I started developing the chosen concepts by applying the key factors and the specifications that relate back to the chosen issue. I kept this in the back of my mind during the whole process to keep me on track.

As the toy needed to be mentally stimulating, I looked at my chosen concept and came up with a way that would make it more challenging, so Tom would have to think about what he is doing. The concept was quite basic as all it would do at this stage is roll back and forwards. It and would not have required much thought at all. So my idea was to add things like guns and other features to the vehicle that could all detach and interchange. (I immediately thought of guns because this would make it a military type toy as Tom loves army trucks.) Kate was happy with the decision of adding guns and had no problem with this as long as they were not a hazard to any one. I came up with two gun designs that could be mounted on the sides of the vehicle as well as two spotlight designs that would do the same. I also gave the vehicle a powerful and more appealing "boy" look by adding a supercharger to the front bonnet. This would also be detachable. The way these would interchange, was an important part of the design as they had to be durable and secure- as well as detachable. The answer to this was adding small lengths of dowel to each gun etc. These would simply plug into holes I would drill into the body of the vehicle. I got the idea from a previous project I had done that required lengths of wood to be dowel jointed together. I knew this idea would hold up and would last for a long time. These features needed to also be in proportion with the vehicle. If they were too small they would not look as realistic and if they were too large, they would out weigh the vehicle and would look over the top. I had an idea of the correct sizing from looking at the toys Tom already had. By adding these features to the toy, it made it more challenging for Tom as he had to explore the positioning of each feature and all the

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Commentary on Evidence
The student has explained the practice undertaken to develop and test his design concepts using drawings of potential toys.


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Explanation as to how the student used a model to gain an understanding of what the toy would physically look like and the construction process that could be used to manufacture it. The model also enabled the student to refine design features of the toy to ensure they met client expectations and safety requirements.


options of where it could go. This would get his mind thinking and would be more effective of keeping him occupied.

The next step in the development process was figuring out how I would combine the wood types together to give a really unique and interesting look. (Similar to "Take-G" designs.) I did this by drawing the design and rendered it using three natural wood tone colours. –A light tone, a darker tone, and a rally dark brown tone. This created the look I was after because the colour variations made the design look very "fast" as the darker tones created speed stripes that ran down the middle of the vehicle.

Kate decided the design needed one last touch to complete it, as the back of the design was still quite plain. Using drawings, we came up with the idea of a dual exhaust pipe that would be glued on to the rear of the vehicle. This would simply add to the "fast" look.



Both Kate and Tom were pleased with the development I had done to their chosen concept. So with the time frame in mind, I decided to take no further action in any more research or changing any of the developed ideas. Both my client and I were happy with the developed concept and were ready to move into the construction. 

At this stage I knew what I was going to build but I had no plans to work from. So I decided to use the skills and apply the knowledge I had gained from taking graphics classes and I drew up the finalised vehicle on Google Sketch up to give me a 360 degree view of the design. As I take graphics, I was able to accurately draw up these designs the correct way which helped me during the construction process so I knew what was to go where, just by looking at the picture. This is a common method of showing ideas in the technology industry as it is easier for the client and the tradesmen to understand the idea. I got this idea from using it in my graphics project where I needed to show my clients an architectural design in an easier way to understand than technological drawings.



I also completed a working drawing of the vehicle and the robot designs. This gave me a scaled plan to work from so I knew how big things needed to be. Having these plans made the construction a lot simpler and straight forward. I basically had made my own wordless instructions to follow. These drawings are the kind that a builder would get as it shows measurements and dimensions. 

To move into the major step of construction, I had to know what materials I was going to be using. I asked myself what kinds of woods would be best. To be "the best" I decided the wood need to be strong, durable, clean to work with and must also vary in tonal colours to give the contrasting look I was wanting. I basically knew from my experience with wood, the kinds of wood that can offer these properties. I researched the woods that I though would be best and recorded the details.

The woods I initially though would be best were: White Pine, Beech, Red Cedar, Jarrah and Kwila. White Pine and Beech are two lighter woods that have similar characteristics but I chose to use Beech as it is used less than pine for making toys. Pine is often used as it is fairly cheap and easy to purchase, but I wanted something a bit different. This would be the really light coloured wood I would use. I had Red Cedar in my mind from the start. It is quite a soft wood but is really good to work

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Commentary on Evidence
The student has explained how he developed his design concept to include features that would stimulate a child to play with it and how he could include design ideas used by other toy-makers. he also explains how he interacted with the child's parent to confirm and refine his design concept into a final design.

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The student explains why the use of graphics to formally record and communicate the design features of his final design as a working drawing was important to his next stage of his practice – manufacturing the toy.

with and can finish really nicely. This is the middle of the tones wood I would use. And finally the dark wood I decided between was Jarrah and Kwila. I chose Kwila as I knew it was easier to access because I knew where to source it from. Also, Jarrah has quite a red tone in it and I wanted a darker brown colour to create the optimum contrast.


I was lucky enough to have these woods donated to me by people I knew so I did not have to spend any money or waste any time ordering it. Also the fact that I did not need a lot of it would have made any order quite difficult because most companies prefer to order in bulk. As Kate had left this part of the project in my hands, I moved on, confident in my choices of wood.

The final material I needed was the four bearings. I purchased these from a local shop that specializes in bearings. These were easy to access and I did not waste any time purchasing them. These were my first expense in this project.


Once I had these steps completed, I was able to identify my final brief and specifications. These basically told me what I was going to construct. They helped me relate to the originally issue that I had. The solution needed to fit the finalized specifications.

I recorded the steps of the construction in a construction flow chart that basically outlines the steps in which I took.

I gave the completed toy to Kate to present to Tom during the time it was intended to be used. Kate assessed Tom's reaction and the success of the toy in serving its purpose of keeping Tom occupied. Photos were taken of Tom playing with the toy in the intended location as well as the toy in the place it would be stored.

I recorded the feedback in quite simple and open way, where there were no questions. All I asked was for Kate, Tom, Shayne and Grace (who are the wider stakeholders) to write down their immediate thoughts of the toy. I believe this was the best way of doing it as it meant they could be honest and give their truthful opinions. 

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Explanation of how the student evaluated his final outcome (the toy) in situ by having the child play with the toy and his mother and student observe his interactions with the toy.

Key Milestones.

Selection of client and issue

- Selecting the client with an authentic issue was important for the success of my project. I needed to decide on and explore the most realistic and achievable issue for me to solve. The issue needed to be suitable for me to base my project around and it was identified once I had selected a client. A successful issue meant I would be able to solve it properly and at the same time, it needed to provide sufficient evidence and information to make it a worth while project. If I chose the wrong issue, my project may not have been a success, or not as successful as it was. This was a key in not only at the beginning of the project, but it was key through out the whole process as it lead on to the initial brief which outlined what I was going to do and it gave the project a purpose. The quality of the issue was dependant on the quality of the client I chose. This person needed to have realistic issues that were solvable. Lastly, the client needed to be reliable as we would need to have regular contact with each other. This would include phone calls, emails and meetings.

Environment

- In order for me to successfully solve the given issue, I had to explore the location in which the solution would be used and stored. I looked at the environment of the location, including the style and the amount of space the room had to offer. The style of the room was quite modern but also had some older furniture so the style of the toy could be modern or traditional. But as the intended location did have some modern and expensive appliances, the size of the toy was important as it could not be too large in case it damaged the property around it. The location also restricted the size of the toy because if it was too big the toy would not be able to function properly.

Product Development

- I managed the product by drawing up a time plan that I could work by and to help me stay on track as I would have certain parts of the project due at certain times. Research was done through out the majority of the project. It started with the research of the client as I needed someone suitable, then the issue which would give me something to base my project on, next was the location which would determine the size and style of the product, and finally the materials I used, which needed to fit the specifications. I was able to get all the wood I needed for free from people who I knew, which was lucky as I only needed a small amount so ordering it may have been difficult. The bulk of the research it was done before I moved into concepts. The research gave inspiration for the designing of the concepts. Looking at other toys helped by giving ideas and exploring the possible options of how I would solve the issue. The research proved to be important because I came across the "Take-G" company that inspired the idea behind my design. By doing research I was also able to show my findings to my client and stakeholder to get their opinions on certain things, such as a design feature or a functional aspect of a toy.
- The key factors were presented through out the folder as initial, revised, and confirmed. These were important as they identified all the key decisions that

had been made and showed the considerations I had to make during the design process. These were added to and became prioritised as I move through my project.

- The development of my chosen concept was vital during the project. This is the stage where the original idea is made into a real solution that is ready to be manufactured. The development also included the models I made which allowed me to test the size, shape and aesthetics of the chosen concept and ensure the quality of its function. The model also helped to give the correct proportions to my design which meant I could also add features to it. This is when I applied all the specifications and key factors to the concept to make it suit the original issue. Through developing the concepts that were chosen, I was able to personalise them to better suit Kate and Tom's needs and requirements.


Manufacture

- The actual making of the toy was obviously the most important part of the process as it is when all the specifications, requirements and factors were applied to the project. I needed build the product based on the specifications and ensure along the way that the toy met them. I was not just making any old toy; I was manufacturing a toy that had specific specifications to meet, as well as a standard of aesthetics and it needed to be fully functional. I needed to ensure the quality of the project was a high standard and it needed to be finished in the time specified. This meant I could not rush this process but it needed to be done quickly and efficiently. As I manufactured the toy, I needed to be aware of the copyright law as I could not make the product the same as someone else's. I also needed to be aware of the part of the consumer guarantees act that outlines the child safety standards of toys. As this act mainly applies to under three year olds, this was not a huge concern.

Implementation

- Applying the solution to the original issue was important as this was the test to see whether or not it was successful. If the toy met the brief and specifications it would therefore meet the needs of the client and wider stakeholders. The success of the toy also depended on how well it functioned in the intended location. The models I made helped to ensure the success of this as I was able to work out the sizes and feature of the toy.

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Commentary on Evidence

Reflective comments on each key stage of the practice the student undertook to develop a toy that was fit for purpose. These comments provide an explanation that justifies why the practice undertaken was used by the student and what factors influenced the design of his final toy.

Initial Concept and Development.

The idea with the development of my solution was based on the research of the current toys that are available. From examining the toys that Tom already owned, I decided to keep with the type of toys that were popular with Tom. These included toy cars and trucks, superheroes, robots, figurines, and military vehicles, which were all made of plastics. I also explored the toys that were available on the internet. These ranged from complex robot models to basic wooden vehicles. But as this was a one-off project, I wanted to create something completely unique. –Something that could not be purchased from the local toy store.

As I was researching existing toy technologists, I came across Takeji Nakagawa. (a.k.a. “Take-G”) This company designs and creates one-off toys that are not available in New Zealand or practically any toy store world wide. This is because these toys are really unique as each one takes hours and hours to manufacture to a high standard that “Take-G” works by. The toys are mainly kept in a show room as they are more like works of art, or models as they are designed more for their aesthetic appeal, rather than their functional aspect. This company uses the method of “Yosegi-Mokuzougan” which basically is the construction of joined wooden blocks, where combinations of original and unique colours and textures of different kinds of woods are utilized to express artistic patterns.

This company gave me the inspiration for creating something that was as functional as any of Tom's other toys, but also would have huge aesthetic appeal. I wanted to combine both function (such as wheels that could turn) and aesthetics (such as the combining of contrasting wood) together to create a wooden toy that Tom would have never seen.

As I wanted to produce a toy that would appeal to Tom, I asked him questions that gave me a basic idea of the kind of toy he wanted, which was a moveable vehicle that would have guns. I took these ideas to paper and designed three basic concepts that could all move. After researching the intended location and speaking with Tom, I decided that the most effective way of making this toy moveable is by giving it wheels. I based these designs on modern/real life things that Tom could relate to. These included things like the Bat Mobile, motorbikes and snow mobiles. These vehicles inspired the concepts as they contain design features such as wheel positioning etc. The concept that was chosen was based on a modern Bat Mobile design that had four wheels. –Two large rear ones and two smaller front ones. Rather than having the design really detailed (as this would make it fragile) I kept the design quite simple and clean. –Like the “Take-G” toys.

The next step was to design a robot figure that would “drive” the vehicle. I looked at the way “Take-G” create their figurines, and came up with some concepts. To help relate the solution to the given issue, I decided to make the head on the robot detachable. And to make the design even more interesting, I designed three possible head ideas that could interchange with the body. After screening the concepts, Tom and Kate decided on the two best head designs and best body design for me to make.

Once I had the robot designed, I asked Kate how she would like the chosen vehicle to better suit the original issue and help it to be solved. After discussing possible ideas,

Kate decided she wanted to take Tom's interest in army machines, and add guns to the vehicle that could interchange like the robot heads. I drew up some possible gun designs that she was happy with. As this toy will only be used in the home, Kate was happy with it having guns as it will not be used by other kids. If it was intended for a play group or kindergarten, I would reconsider the addition of guns as it could offend the beliefs and values of some parents. To make the design have more of an aesthetic appeal, I split the design into sections that would be made of woods to give a contrasting appearance in the tones of the wood. - Just like "Take-G".

Developing this concept into a realistic solution made it relate back to the issue of Tom not having anything to have him occupy him at home in the afternoons. By having interchangeable parts on the toy, it makes it more interesting as it requires Tom to think about all the possible solutions and focus on what he is doing. It also allows me to develop my skill level by manufacturing more intricate parts than I usually wood. The developing of the concept also makes the design more unique by having interchangeable features that are wooden.



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Commentary on Evidence
Reflective comments on what influenced his initial concepts for a toy and his later development of these into a final technological outcome – a toy for a four-year-old boy. These explanations also justified the technological practice he used for the initial idea generation phase and development phase of his practice.

Skill and knowledge development.

During this project I was able to increase my skills and expand my knowledge of the technological process and working one on one with a client to produce a successful outcome.

I have made models for my last year 11 and 12 projects to test the functional and aesthetic appeal of the designs. From this experience I knew that creating a model is important as sometimes it is only when you see the design in real life, you can then spot any design flaws.

The model I made of the vehicle was done using MDF as it is in huge supply in the school. I was able to save time using MDF than having to go out and find or buy another wood which I could build a model with. The purpose of this model was to not only test the size of the design, but also work out the best process of building the vehicle for when it came to the real thing. The body of the vehicle needed to be made up of three main parts glue side by side. The middle piece needed to be cut differently to allow for the placement of the robot driver. I thought of this idea straight away and decided to trial it with MDF and it proved to be a success because the model turned out as I had designed it. From making this model, I realised the actual design needed to be a fraction bigger to better fit the robot and it would also make it more durable.

Because of the complexity of the robot designs, I decided to use modelling clay to create scale models of the concepts I had developed. Modelling clay was perfect for this task as it was readily available from the art department and did not require me to order or buy any which would waste time. The modelling clay allowed me to quickly and efficiently replicate the intricate parts of the concept I had designed. The texture of the clay allowed me to mould any shape I wanted and would be a lot quicker than trying to make a model from wood. (As this would mean hours of work on the lathe.) The purpose of the clay models was to test the size and proportion of the design. I made these based on the vehicle I had previously made from MDF. Using the clay meant I was able to easily make any adaptations to the design (although there was none) and it also meant I could quickly increase or decrease the size of the model by either adding or taking away more clay. Once the clay set I was left with models of the two robot heads and the robot bodies. These were set hard and represented the real solution when it came to testing the size and proportions.


The intended location of the toy played an important role in the project because the solution needed to fit into the environment of my client's living room. The toy needed to function in this location as well as being stored. The construction of the model allowed me to work out if the design was the right size. If it was too big then it would be useless in serving its initial purpose of keeping Tom occupied in the living area where Kate could keep an eye on him. The size restriction also meant the toy would not function. If it was too big it would not be able to roll around or properly be used. It would be a hazard to the paint work on the walls and the furniture, as well as anyone in the room. The model of the vehicle allowed me to see the design in full and decide if it was the right size for the location. After viewing the room I was able to decide without having to take any measurements of the room. I knew what would be too big and what wouldn't. The toy was also restricted by size because of where Kate wanted to store it. This was in the living room on top of a toy chest. Kate chose this

position because it was “up out of the way” and would also sit on display. The size of this chest restricted the size of the toy to no bigger than 400mm x 400mm. The model ensured that it was going to fit and would be successful.

My knowledge of wood led me to the decision of the wood I wanted to use. I knew from the development that the wood needed to vary in colour tones and also hold up in the work shop. As I did a lot of work on the lathe, the wood needed to be able to turn well and not split. I new from previous projects cedar was a really easy wood to turn on the lathe, hence my decision to use it. My prior lack of knowledge on the other two woods lead me to a woodwork resource book that had a lot of information on many wood types. The two other woods I wanted to use (Beech and Kwila) were listed in the book as being able to “turn well”. This made my decision final as to which woods I would going to use as they all varied nicely in colour tones.

Finally, my knowledge of where I could access the wood saved me a lot of time in the project. If I needed to order wood, it would have cost me at least 3-4 days construction time. Also the fact that I only needed small amounts of wood would have made the orders difficult as most companies like to order in bulk. But luckily to avoid this problem, I knew we had off cuts of Kwila lying around at home, as well as a plank of Beech. I also luckily found an off cut of cedar at school on the same day so I wasted no time ordering any. The wood I found was more than enough and I also saved any expence.

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Options 

Commentary on Evidence

Reflective comments on the knowledge the student learnt and skills he developed though undertaking this project.

Considerations of social implications.

I had to understand the social implications that would affect the toy in the location where it would be used because of the specific requirements that were identified. Because I wanted to design something completely unique that would function properly in its location, I needed to consider the issue at hand, the client, and wider stakeholders.

As Tom wanted the toy to have guns, I needed to consider other people who do not think it is socially responsible to give children toys as guns. But as I mentioned this to Kate, she assured me that she does not mind if Tom wants his toy to feature harmless guns on his toy. She was happy for the guns to be a feature as they would be completely harmless. She knew they would not actually fire anything and could not harm any one or any thing. Kate convinced me that any wooden gun I built would not be any worse than the types of guns Tom already has with his action men. So if Kate was happy with this decision, then so was I as it was only Tom she would let play with this toy.


Through investigating Kate's living area of her house, and speaking with the wider stakeholders who also live there, I was able to identify the environmental implications that would affect the original issue and the functional aspect of the toy. These wider stakeholders (Tom's Father and sister) were chosen as they live in the house where the toy will be used and therefore will have full knowledge of the location and the surroundings. Therefore, they would offer insight into the location. As both the client and wider stakeholders lived under the same roof in the house where the toy was intended for, they luckily were able to agree on their opinions of what the toy should look like and what it should do. They were all familiar with the location so they each knew what was needed and what wasn't.

I analysed the intended location (the living area in my client's house) along with my client and wider stakeholders. We looked at all the features of the room that would affect the toy in any way. Things like the size of the area, the surface where it would be used, any valuable things that could be at risk (such as furniture, ornaments, televisions, etc.) Other things we looked at included the style of the room and colour tones. We talked about whether or not the colour choices of the toy would ruin the style of the room. From doing this we were able to move on and decide on things like the possible sizes of the toy, possible functional aspects and colour tones.

Another implication was the child toy safety standards which was something I needed to really consider in the design of the toy. As I have already expressed earlier in the report, these standards apply for toys that are meant for children less than three years of age. As the stakeholder was four years old, these did not apply. Yet I still had to be aware of any dangerous parts that the toy featured that could be a choking hazard or even too dangerously sharp. From researching this, I found that the choking reflexes of four year olds are quite developed in the way that they could cough up most things they swallowed. But as each child is different, I kept on the safe side by not including any really smaller parts that had any chance of being swallowed. I also skipped out any sharp edges or points in my design for the risk factor.

As the overall success of the toy would not be determined for a long period of time, I used the initial and feedback I received once the toy was finished from the wider stakeholders and my client. Tom appeared to be happy with the toy and put it to use straight away and the wider stakeholders agreed that the toy would be suitable for being used in their living room.

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Commentary on Evidence

Reflective comments that explain the students consideration of moral (such as the mother's stance on the types of toys her child should interact with), legal (such as safety requirements for a child's toy, copyright) and social factors (such as the child's toy preferences, where the child will play with the toy, what the child's mother expects in a toy

The construction.

The overall construction of the toy was very successful in the way that I did not experience any problems along the way. As the toy was quite a unique design, in the way that the woods all needed to be glued together, I believe it went a lot smoother than I originally thought it would. I expected the process of gluing the right coloured wood together and cutting each piece at the right time would be a complex and difficult task. But I managed to complete it without a hitch because I thought very carefully before I made my next move. I was continuously thinking ahead of what piece goes where? Do I cut it first or glue it first? I also believe the construction of the functional model I had previously made gave me better understanding of the steps I needed to take to create the unique shapes. The model helped me to understand the order of which each piece should be cut and when it should be glued. By making the model I was able to trail each step first. As well as at the same time as thinking what to do next, I also had to work quickly and efficiently to ensure I would meet the expected deadline. I have also been taught to plan my next steps in technology and so was able to draw on past experience.

I had no previous experience in manufacturing a children's toy that needed to meet specific requirements, but I had manufactured many other items using wood in the past. These items include a sculpture of a rugby ball, and bedroom furniture etc. the experience of creating these things gave me the confidence to design a more complex toy and successfully manufacture it. Also from past projects I knew that I needed to allow myself time for any errors that I made, in case I needed to rebuild a certain part or repair any mistakes.

After viewing the products of an existing wood technologist earlier in the year, I remembered the craftsman's ship and quality of the furniture he made. This was a result of not only his skill level, but he also knew how to select a specific wood to use for a specific reason, such as the finish or the strength of the particular wood. He really took pride in his work. This at the time inspired me to select the right wood for the right reason. Rather than just using what I could find.

The types of wood I used were results of the exploring of materials I did. I looked into possible woods that I thought would be suitable and evaluated each one. They needed to be durable and have contrasting tones that would look aesthetic once they are glued together. The design of the toy also required the wood to be shaped into different shapes. Some would have been more difficult than others (such as Kwila as it is quite hard) but on the other hand they also have the strength factor which was necessary. As the aesthetics of the toy was important, the way the wood finished once sanded was vital. They needed to have a revealing natural grain as well as different tones. After researching the woods I decided on using Beech, Cedar and Kwila as these meet the requirements that were needed.

The gluing of the different woods together is what ate up a lot of my time as I could not use the wood until I had given it adequate time for the glue to properly dry. This meant leaving the wood over night to set. The way I tried to go about avoiding this problem was by gluing each part at the beginning of each period when I was in the workshop. This meant I could then go on and start manufacturing the next piece or

preparing the next piece to glue. This method proved to be effective as I finished the toy on time and very rarely had to wait around for glue to dry. I kept busy at all times and was always thinking ahead for what to do next. It was all about time and motion.

I was lucky that there were no set backs or complications in the manufacturing of the toy which I believe I because of the drawings I did before hand. The working drawing and the computerised CAD drawing allowed me to see the finished solution while I was still making it. This meant I could refer to the drawings for any size or design feature I was unsure of, rather than just guessing. Also the development of the concept I did was quite precise as it did not leave a lot of room for last minute modifications as I had basically planned where and decided why for everything, from the guns to the robot heads. The proportion of the robots to the vehicle was based on the "Take-G" toys and the sizes of their models. As I did not have real and accurate sizes of these examples, I just guessed them and hoped that the sizing would look right. The use of the models I made of both the clay robots and the vehicle ensured me that my estimate was right and the proportion looked proper.

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Commentary on Evidence
Reflective comments that explain the manufacturing process used by the student.

Consultation and feedback.

My client for this project was Kate Murphy and the issue was based on her son Tom who became the main stakeholder. Tom's father Shayne, and older sister Grace were the wider stakeholders as they could help and give input into the project as they know the intended location and the stakeholder well.

Kate was an obvious client as she had an issue with her young child that needed to be solved. She knew Tom better than any one else and it made sense to make a young child's mother the client for this context. She was able to give insight into Tom like and dislikes as well as what he was allowed and what he wasn't. Kate also now what toys Tom already has and how often he plays with them. Kate's knowledge of these things and constant feedback help me to create a successful outcome.


Kate's feedback was most important during the design and development process as she had the final say on each development I made. This was important because she knew what was best for Tom and what he should and shouldn't be playing with. This is vital information that I needed to receive directly from Kate as I would not have been able to make these important decisions on my own about a young child. Kate had a lot of experience with children's toys as she is a mother of two and knows all about what is safe and what is not. It was good to have feedback from someone who is not familiar with the technological process or wood as a material to give an outsider's view. By approving the toy from a mother's perspective was a real not a bad thing because it means other mothers would want this toy for their children.

I was pleased with how reliable Kate was when it came to having contact. If she was unavailable at home, she would plan for the next time she would be and let me know in advance before she went away. I could have personal contact with Kate so I did not need to talk through other people. This made it easy when it came to making important decisions as I needed to hear her direct feedback on the matter.

As the stakeholder was my client's son, this also meant the contact with him was easy when I needed it. Every time I spoke with Kate, Tom would be around so I could ask his opinion on the design features of the toy. But as Tom is young, it was easier to talk directly to Kate rather than him because she could understand him more and knew what he wanted.

I was happy with the choice I made of selecting Kate as my client as I was able to gain important and necessary feedback from her whenever I needed it. I believe the success of my project is due to this ongoing feedback and opinions I received.

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Commentary on Evidence

Reflective comments on the interactions the student had with his clients and how these interactions were used to inform the design and development of toy that was later evaluated as 'fit for purpose'.

Brad Donovan

Implications for further/future practice

The final solution that I have manufactured has resulted in me lifting and increasing my knowledge and skill level from year 12. Skills such as lathe work, and sanding along with a better understanding of the technological process has been uplifted since last year. Although my year 12 project was a success, my whole level of working has lifted and has allowed me to produce such a quality project with a far better understanding of the technological process.

After evaluating and looking at the final solution that I have manufactured, I believe the future viability of this toy could be very successful if I was to pursue in manufacturing them. If I did continue to make the toys I would look at taking them to specialist toy stores or I would make them to order. Because of the uniqueness of the toy I do believe it would sell well and the feedback I got from Kate just enforces this idea. The style of toy is very unique in the way that it is made up from different woods with different colour tones. The only thing I know that is remotely similar is the "Take-G" toys that are only available to magazines and companies in Japan. So to mass produce the toy I have developed would be a successful idea as this style of toy is unavailable in New Zealand that I am aware of.

A future development I would look at doing would be making the limbs of the robot adjustable. Because of time restrictions I did not attempt to do this because if I was to do it, it would need to be done properly. The reason for this is because the limbs are already small so by adding adjustable joints would make these very fragile and would not be suitable for young children as they would break easily. I would look at developing a simple and durable answer for this to make the overall toy more interesting for children to play with.

If I was to build more of these toys, I would set up a specialized jig that would assist the cutting and gluing of each shape quicker and more efficiently. Another option I would look at would be creating a series of these toys so they are collectable and would sell more.



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Commentary on Evidence

Student comments about opportunities to for the toy as a potential commercial product and what may need to be considered in order to enable this to occur.