

Title Page

“Happy Friends”

Motion sensing interactive suite

A proof of concept aimed to encourage youth physical interaction with technology

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Project Proposal and Management

Identification and exploration of MDP need

Design Situation

Children visiting hospital generally do so because they are sick or have health related issues. I have noticed that the expressions on parents and children's faces as they enter a hospital are quite sad and they this generally makes those people visiting, reluctant to do so.

Being interested in multimedia and 3d character animation, I have identified an opportunity to combine this area of interest with endeavouring to improve the mood and feeling of children and people visiting hospitals through motion graphics. This technology is still emerging – and I would like to explore its application and effects on assisting children who are sick by impairing their feelings and potentially their health.

Investigating into the root of body emotions, it is certain that being happy does play a positive role in keeping one psychologically healthy.

Christina Nelson, renowned motivational speak says "being happy eliminates fear, anxiety and stress," while internet blogger moiiponetsoka mentions "being happy can bring better mental health, better work productivity in life."

In addition, being happy has known to play a positive role in maintaining good physical health.

As said by Jerry Lapper, a prominent book author on personal development, "happy people are more likely to have stronger immune systems, researches find."

Conclusively, boasting happiness within a community has many positive effects. Therefore it is important to encourage one another towards living a happier lifestyle, as evident by research and experts.

Design Brief

To create a digital activity suite, utilising aspects of motion sensing technologies, in order to approach and encourage positive youth interactions with technology to improve their happiness in hospitals.

Target market

This project is directed to young children in hospitals ranging from 3-13 years old. This target group is selected due to the initial research indicating they have a very high chance of undergoing some form of sadness due to the fact that they are sick or having health related issues. By deploying in a hospital setting, this ensures a high number of unhappy children are likely to interact with the project, thus have their seemingly dull and uneventful day brightened.

Motivation for doing this project

Formal:

While professionals in the field have mentioned multiple times happiness is the key to better health, contrastingly up to 20% of the younger age pool of the Australian population has suffered a form mental disorder (Australian Bureau of Stats 2007) during their yet short lifetime. *Happy Friends* interactive character suite aims to address this issue by enlightening the importance of being happy in the ever-social, modern, tech-endeavouring society of ours.

In addition, *Happy Friends* aim to address the emerging technology of motion based interactions, which could inspire many potential ideas in the field if the project becomes a popular success.

Informal:

When I was a young (around year 1 and 2) I used to get sick a lot (Gastroenteritis) due to my weak immune system. Heading into the hospital for extensive treatment was almost a half-yearly occurrence, and every time I stay there'd be nothing to do except sleep and reading comic books that I couldn't fully understand. So in light of the marvel of current technology development, I aim to provide a new and emerging medium for children who'd been in similar situations as me the source for another form of non-contact entertainment, through it brightening their uneventful days in the hospitals.

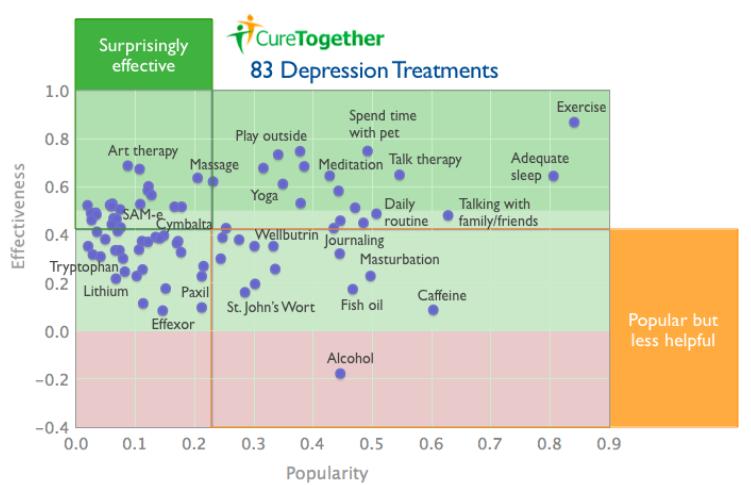


Justification of selection of the PSE

It should be well noted that “optimism” on kids have major branching positive side-effects in regards to the mental development of children. Inversely, lack of optimism in children’s lifestyles can lead to unhappiness, lack of enthusiasm, and potentially lead to various mental issues (depression, bullying, etc.)

According to survey data from the Australian Bureau of Statistics, 21% have experienced signs of depression throughout their lifetime in the younger age range.

In addition, the conclusion drawn from the popular findings (graph below) from CureTogether, it is suggested that physical activity is both a popular yet effective cure for depression and essentially low level unhappiness.



ONGOING EVALUATION

Throughout my exploration and justification for a genuine need, I've discovered a lot about emotions within society and issues arisen from it. And from it I have drawn out a suitable conclusion to justify selection of my PSE. In addition, the way I identified my need was also done sufficient, and helped me get a real grasp of my concept.

Areas of investigation

Areas to be considered

Due to the large scale of a Major Design Project, there are many essential ideas that need to be planned, researched, and analysed in advance in order to ensure the highest efficiency is achieved in the production process. These are:

- Materials

“A close study of things to be applied to ensure maximum efficiency and appeal”
What materials are needed to ensure the success of my project? What are the equipments required for interactive motion graphics? What aspects are essential to appeal to the target audience? What exactly to avoid in order to maintain aesthetical appeal? Which specific colour to be chosen/ avoided? What is the optimal shape/ size for selected parts of the design? What are the concerns regarding to effective product advertising?

- Tools

“To determine specific choices of tools which enable development at maximum efficiency “
What programs/ software are needed? Where can I obtain said software? Where will I be able to acquire the skill set to use the software? Why? Would the chosen software be time efficient to use for the project? What are the selected tools' availability? Accessibility? What are the costs associated with obtaining said software packages? What is the relative difficulty in implementing the final product produced using these programs? Should past experience be taken into account?

- Techniques

“Actions to be performed on tools to enable production”

What are the various techniques required for production? Where will I be finding resources for instructions? Man page (software help manual)? Internet? Staff? How much prototyping and alpha testing is going to be required? What is the relative difficulty of the techniques?

- Availability of resources

When are such resources available? What are the resources?

Internet (YouTube tutorials, discussion forums...)

Teachers, various staffs

Library

Actual programs used

Previous experiences, common knowledge and logic?

- Time

How exactly should I be allocating time for each section of the project? How much time do I have to complete the entire Major Design Project? How much time should I allocate for buffering in case of delays and other unpredicted hurdles?

- Cost

What are the costs associated with the development and deployment of the project? How will I be obtaining the funding? Where will I acquire the funding? Would additional decorative expenditures be justified?

ONGOING EVALUATION

Throughout the initial analysis on ideas being considered, I have learnt lots of little things about each and every step, program, and other potential relevant areas. In addition, I have gotten a general understanding of everything I need for the production of my major design project, which is destined to benefit my workflow at later stages as I will now know what I am and going to be doing.

Research plan

Areas to be considered	WHAT needs to be investigated?	HOW I am going find out about this?	HOW is this going to provide direction for further action?	Evaluations
Materials	What materials are needed to ensure the success of my project? What are the equipments required for interactive motion graphics? What aspects are essential to appeal to the target audience? What exactly to avoid in order to maintain aesthetical appeal? Which specific colour to be chosen/ avoided? What's the optimal shape/ size for selected parts of the design? What are the concerns regarding to effective product advertising?	I plan on conducting a survey investigating colour choices, design styles and favourites etc. in the targeted audience group (young children) as primary research. In addition, internet research and analysis of previous professional survey data could be used to aid in obtaining a more reliable data set for the final choices in materials.	The final selection of materials could assist me in efficiently sketch up appealing characters with a firm theoretical basis. This significantly decreases the chances of unsuccessful designs, saving precious time and establishing uniqueness in designs. Thus, correct implementations of selected materials have also placed a suitable psychological message on the characters, which also subconsciously applies a positive mood change to the target audience in relation to the project aim – to make people happy.	In regards to primary research, this part was pretty straightforward. In addition, my past experience with young children in youth events (church, holiday kids clubs etc.) somewhat helped. These data positively influenced and placed firm ideas on my design ideas (such as themed animals, Chibi styling). However, internet research did take more time than intended , as there are lots of tutorials aimed for parents raising children, yet not many proper citations. So I ended up reading entire summaries of professional research data. However, the final results yielded were definitely very helpful.
Tools	What programs/ software are needed? Where can I obtain said software? Where will I be able to acquire the skill set to use the software? Why? Would the chosen software be time efficient to use for the project? What are the	I plan on conducting brief internet research to find out the relevancy of each program and their counterparts in designing my project. I also plan to ask around people with experiences (e.g. staff, classmates). My previous experiences also	Proper selection of tools used can greatly speed up the production process by minimising the time needed to learn how to use, and also save time required to debug when coming across hurdles, saving time. Efficient tool choices can also allow additional polish to the final product,	The extensive toolset in Autodesk Maya catered brilliantly in terms of character design. In conjunction with my previous experience in using this program (Year 11 DT project). Additionally the wide compatibility Maya concluded it being a very suitable tool for most of the production process, massively increasing rate and

	<p>selected tools' availability? Accessibility? What are the costs associated with obtaining said software packages? What is the relative difficulty in implementing the final product produced using these programs? Should past experience be taken into account?</p>	<p>considered and weighted against the time taken for learning if a new tool or program selected.</p>	<p>raising the level of professionalism and appeal to the target audience. Also, suitable program selections can end up being a joy to work with as they tend to result in less frustrations and rage during production.</p>	<p>efficiency.</p>
Techniques	<p>What are the various techniques required for production? Where will I be finding resources for instructions? Man page (software help manual)? Internet? Staff? How much prototyping and alpha testing is going to be required? What is the relative difficulty of the techniques?</p>	<p>Previous experiences and techniques for creating motion graphics (my year 11 design project) can be used extensively, which significantly reduces time taken to learn the required techniques. In addition, tutorials and documentations can be found on the internet for more complex operations and techniques.</p>	<p>Acquiring proper techniques for modelling, rigging and labelling can greatly reduce time taken to fix up buggy parts of the model later, minimises distortions, easier texturing etc. These are all vital considerations as they tie in closely to the time that will be taken for production of the project.</p>	<p>Previous experience on modelling in Maya helped significantly which saved a lot of time. However, reading documentations in other more complex parts did consume a lot of time, while the extensive instructions provided were informative, they were often not needed for this particular project. [I did end up building two models – cat and dog, for the project]</p>
Availability of resources	<p>When are such resources available? What are the resources? Previous experiences, common knowledge and logic?</p>	<p>I plan on conducting primary research, which includes asking around the appropriate people in the sector, or looking up opening times etc.</p>	<p>By initially researching the availability of resources, this can assist in the planning of my action time plan, enabling proper time allocation, ultimately saving precious time that could be used for actual production of</p>	<p>The wide availability of resources (mainly internet and software) due to the ease of access was highly beneficial to my project. This made the project a pleasure to complete with relative ease, which ultimately contributed to a high quality major design project.</p>

			the practical work.	
Time	How exactly should I be allocating time for each section of the project? How much time do I have to complete the entire Major Design Project? How much extra time should I allocate in case of delays and other unpredicted hurdles?	Through my own research and organisation I could plan ahead in brief the time required for each and every section of the project. Thus, could be managed by properly documenting the action time plan.	Due to the sheer complexity and the large scale of a major design project, proper time management is a must in terms of effectively completing each component.	By using the initially-prepared action time plan, things became much easier to manage and to keep in check progress of each part. Extra time were available at the end for polishing of the final product, but unfortunately not enough for addition of more complex features (multiuser etc.)
Cost	What are the costs associated with the development and deployment of the project? How will I be obtaining the funding? Where will I acquire the funding? Would additional decorative expenditures be justified?	Internet research to find out most of the costs associated with components need (software licenses, sensor module). The rest I plan on asking for advice from staff, and investigate the possibility of using lower cost replacements.	By knowing the costs associated at the beginning, I could avoid budgeting issues that I may run into halfway, minimising the overall financial stress of the design project.	The costs were investigated and managed efficiently. Fortunately all the costs involved in the initial design plan did not sum up into a large figure, and educational/ free licenses were available for most software. This relieved most of the financial stress and made the production of the project an ease.

Limitations and Parameters

It is important to note that there are various limitations and parameters that could affect the project, therefore they must be addressed thoroughly in the beginning in order to avoid running into problems at later stages. These are:

- Difficulty/ complexity associated with usage of software
- Time required for the completion of the project
- The amount of research and work needs to be done (This is simple yet complex project)
- Availability of software resources at home/ library
- Cost

Expanding on these sections:

Software complexity;

My project relies extensively on Autodesk Maya and Unity, therefore if there happens to be any complex parts that I may not yet be able to fully comprehend the required techniques or processes for its operation, it may very well become a hurdle in the progress of my major design project, hence limiting by slowing down the overall progress. Fortunately, due to the wide adaptability of these two

programs, there are plentiful resources on the internet, and most complex problems can easily be solved by long sessions of research and reading, which were to be taken account of in the action time management plans.

Time limit;

It has been allocated approximately 39 weeks for the entire production of this major design process. Thus, it is very important to allocate time wisely in order to use the available time effectively, and also to stick tightly to the action time plan. If the actual production of the project happens to fall out of the intended allocated timeframes for each section, then it is likely that the certain specific part will result in a lowered degree of professionalism, lowering its final quality. Therefore, it is extremely to stick to the action time plan, due to the complexity of my design project.

Work load;

Although my project is based off a simple idea, it involves highly complex software manipulations. In order to solve these complications and difficulties, large volumes of initial research will need to be conducted to ensure I will be able to do the project. Therefore I need to make sure that my work load is organised well. This means it is very important to stick to the action time plan and make sure my work load is well organised.

Cost:

To be expanded further in the finance plan. Initial budget allocated for the project would be ~\$400, which includes all the costs associated with cost of projector, projecting screen, software licences, printing and marketing.

Availability of resources:

Software resources in particular. Although this is generally not as important as the other parameters, due to the fact I would be spending most of my time at school working. However, during weekends it will be important to pre-arrange software licences and downloads (they are certainly not small packages) so I can work on it at home more extensively.

ONGOING EVALUATION

From extensive thought processing about my limitations, it's been clear that there are many things which could limit my project from reaching its full potential and level of professionalism. It is well noted that these parameters are all very important. So it is vital to be well organised in order to complete everything on time to ensure a top quality project is produced.

Criteria to evaluate success

What factors must I consider for the design to function satisfactorily?

Factors such as costs of the cut-out models for the campaign, care taken when modelling the character, frequency of saving progress, organisation skills, ability to concentrate over extended periods of time, and ease of access must all be considered thoroughly. All these factors were essential for my design project to achieve a top-notch quality. In addition, for the project to function optimally, the interactive characters must allow the user to interact with the binding poses accurately, so as a mirror image of the movement could be displayed accurately.

Analysis: The actual consideration in regards to the various factors concerning the design project was crucially important, as the correct steps taken can lead to a significantly fluent workflow, which ultimately increases the production efficiency and also the overall quality of the project. However, if I happen to make a mistake such as forgetting to save my progress, this can lead to negatives of wasting a lot of precious time and possible demotivation due to the need to redo everything again. Personally, I believe these criteria would work efficiently if every component of it was well organised and evaluated effectively.

What aesthetic qualities will my project need to have?

Aesthetic qualities such as colour choices, effective characters, specific facial features, logos and labels, ability to please the eye, shape and line were comprehensively thought about in the production of the project. However, most of the aesthetic qualities were very dependent on whom the target market would be – in this case children of the primary school or younger age group. Therefore it is evident that my characters will need to have an element of engagement with a blend of immaturity, and the theme (pet animal) choices would need to be appropriate in order to establish a sense of familiarity within the targeted children groups.

Analysis: The aesthetic qualities of my project are a positive in my character designs and play the important role of attracting young children into participation with my interactive character suite. The positive aesthetics of the character designs can also engage spectators and further encourage participation of my project. Thus, the proper colour schemes used can place a suitable psychological message in order to passively boost up emotions and moods of the participants, making them feel happier. However, the negatives of this is that since the aesthetics play a very large role in regards to the success and potential popularity of my project, a lot of research would be needed to ensure the final aesthetics of the character designs are appropriate for the set purpose.

Are there limits on the final project budgeting allowance? (cost)

Although most parts of the design project are digital based, cost is not a priority concern in this project as most software can be obtained via low cost/ free educational licences. There are also other considerations, which include printing costs and the price of the sensor module. These costs can easily accumulate to an expensive sum if not properly managed.

Analysis: Fortunately, cost is a minor part of my major design project, due to the fact that most of my resources/ software were licenced at no cost. And due to the inexpensive nature of this design project, the negatives of the need of a proper finance management can be kept minimal, hence placing negligible strain in terms of budgeting allowance.

What factors must I consider to ensure occupational health and safety were kept optimal?

Due to the physical interactive nature of my design project, there are amounts of potential risks to be account for in order to ensure a smooth operation. This includes allocating space around the projected image and area of activity in order to minimise risks of hitting walls or other unwarranted obstructions.

Analysis: My interactive character suite poses the positive of encouraging physical activity in children which ultimately assists in youth growth and development. Meanwhile, it is vital that actions must be monitored in order to avoid hitting surrounding objects and to minimise injuries.

What will I need to consider to ensure the design project is of a high quality?

I will need to consider my own experiences and technical abilities in regards to character modelling and animating, and then investigate areas for improvement. Also additional researches are to be conducted in order to create deeper understanding in regards to the operations and technical parts of the design project.

Analysis: Technical skills (proper model rigging in particular) was fairly difficult, but it was then improved. This then allows the production to resume as a high quality product. Smoothness of movement of the characters can also be raised by percentage blending in pre-baked animations with the minor-fragmented motion data received from the sensor.

How do I ensure the project would not become obsolete?

The character designs and the actual scripting will need to be ensured that a top-notch polishing is applied and entirely appropriate for the targeted audience group. It should also include a great degree of play in the project so it would not be deemed boring and obsolete over a short time period. In addition, the characters could be set to be updated or changed periodically (every few weeks, for example). This would be able to provide a sense of freshness into the character suite thus prolonging its product lifetime.

Analysis: The character designs are positive due to the specialised characterisation to ensure each character has a common distinctive feature easy for recognising and remembering. The actual interactive idea with the motion sensor has not yet* been done before as a major design project so this should be largely effective for all generations.

Evaluation methods

Criteria	How the criteria will be evaluated so that the success is checked?
Function	At the end of the constructing and modelling period, the entire program should be exported and compiled, and run through one final time so as to ensure it functions smoothly and without issues. This should be done with plenty of time prior to the actual due date in order to be able to solve any issues beforehand and relieve stress.
Aesthetics	Character design and colour samples should be shown to children around the target market age range and a general idea of successiveness should be made before the designs commence being modelled and rigged.
Needs	The needs of the mood enlightening (making people happy) successiveness are to be evaluated through various interviews and actual testing with the target audience prior to the final publishing of the project. This would ensure whether or not the project is truly genuine or if it is something that deems to be less significant.
Finance/ cost	A finance plan will be created and a list of what should be used so as to keep everything within a reasonable budget will be written up. Though, keeping well within the allocated budget shouldn't be too difficult due to many parts of this project is done digitally, therefore not many physical materials should be needed to be purchased.

Occupational, health and safety	The final build should be thoroughly tested and the areas surrounding where the project will be deployed should be surveyed briefly to ensure there are no significant mediums for causing unwanted injury.
Quality/professionalism	At the end of the modelling and scripting before exporting the build, the entire program should be evaluated and reviewed if the quality is as good as it can be. Large amounts of effort should be made along the way to ensure maximum effort is applied so at the end of the project everything comes in together well (which includes avoiding lazy modelling, proper texturing and rigging). Same amounts of effort should be put into each component so as to show consistency.
Obsolescence	To ensure the project will have continued usage and the idea would be able to be adapted and developed further, the character designs should be appealing and welcoming so that the target market for each generation would continue to enjoy the project.
Target market	The target market will be evaluated according to the need . The relevancy of the target market in relation to the project will be comprehensively considered.

ONGOING EVALUATION

Through thorough analysis of my criteria to evaluate success, I have gained far greater understanding about aspects of my project and areas I will need to address. These analyses also helped me to further understand various design factors, such as aesthetical components and target market considerations I will need to cater in order to make my interactive character suite to a high quality end result.

Action, Time and Finance Plans and Their Application

Term 4,

Folio/ Week	1	2	3	4	5	6	7	8	9	Holidays
[Innovation Case Study]								→		
Exploration of design situations, possibilities	█			→						
Initial research, surveys		█		█				→		
Areas of Investigation				█	█	█		→		
Practical Components										
Idea generation				█	█			→		
Research				█	█			→		
Investigation of techniques (tutorials)					█			→		

EVALUATION:

Proposed: I hope to get my initial explorations and investigations done as soon as possible in the first few weeks so I may be able to use the remaining time to start sketching and generating ideas. This way, more character candidates could be drawn up and shown to target audiences for evaluations. I have also allocated a rather long period of time for investigation of techniques. This is to ensure I can be able to go through most tutorials in regards to various techniques on modelling, and also be able to start practicing creating characters for my design project.

Actual: The exploration of design situations and possibilities unfortunately took way longer than I expected it would be. Although this delayed the other tasks, the progress was quickly caught up. Also I ended up commencing my research on practical components and tutorials together because they are both heavily based off using internet to gather data.

Term 1,

Actions/ Week	1	2	3	4	5	6	7	8	9	10	11	Holidays
Documentation and experiments									-Ongoing			
Sketches	█	█	█						→			
Modelling		█		█	█	█	█	█	→			
Research, learn how to use each tool	█	█	█	→								
Research on Unity/ sensor implementation								█	█			→

EVALUATION:

Proposed: This term I aimed to create more sketches at the beginning so in case one fails to appeal to the target audience, I would have spare characters to be used as viable backups. This explains the segmented times I have allocated for sketching. Later towards the middle of the term, I aim to start researching and setting up the Kinect motion sensor and methods for its implementation.

Actual: This term I managed to stick to the action time plan pretty well, so most of the allocated tasks were gone through smoothly with minimal stress, with the exception of sensor implementation. Since there is no one at school that has previous experience on this matter, and documentation on this is fairly limited on the internet, therefore this took significantly longer than intended.

Term 2

Actions/ Week	1	2	3	4	5	6	7	8	9	Holidays
Modelling						→				
UV mapping (texture)						→				
Rigging							→			
Unity/ sensor research and implementation										→
Testing										

EVALUATION:

Proposed: Without the hindrance of exams this term, I aim to get most of the modelling and rigging components of the project completed before the holidays. This will allow me to dedicate my time to concentrate on the difficult task of figure out how to get the sensor working in Unity, in which I have no previous experience with, and also be able to work on parts of the folio.

Actual: The rigging aspect took slightly longer than originally planned on the first go which was due to me having no experience with weight painting. This was however overcome quickly since the process was pretty straight forward once I grasped the basic concepts. And as predicted, sensor implementation did take a long time, but that's no surprise due to the complexity and having to deal with JavaScript which I also have no previous experience.

Term 3

Actions/ Week	1	2	3	4	5	6	7 marked
Modelling							
UV mapping (texture)		→					
Rigging							
Unity/ sensor research and implementation							→
Testing						→	
Folio work and finalisation							

EVALUATION:

Proposed: Due to trials taking up most of my time, this leaves significantly low amounts of time left for actual work on the project. I aim to use the first week of the term to fix up the rest of the minor mistakes and errors I have on the modelled characters. The rest of the time available I aim to allocate them to the completion and finalisation of the Unity/ sensor implementations.

Actual: The initial week character fix-ups took shorter than originally planned, which was a positive as it left me more time to work on sensor implementation. I was able to have enough time to produce a working project within the deadline and have it tested. However, there wasn't enough time left for extra polishing (expanded further on final project evaluations).

Finance Plan

At the beginning of this project I budgeted approximately \$400. This was to cover the cost of the projector, software licences, printing and other miscellaneous areas. After research, it's evident that the only physical material I would need in my project is the Kinect sensor, and both software needed have free educational licences available (given I am not selling my project for commercial benefits). In addition, I was fortunate enough to have Barker College lending me usage of their projector. Therefore I was able to keep the final budget to a relatively low cost.

Item	Quantity	Source	Estimated Cost	Actual Cost	Balance
Foam core material	1 sheet	Barker	\$10	\$8	\$8
Laser cutting	depending	-	-	-	-
Folio printing, etc.	-	Barker	\$20	\$25 combined	\$33
Kinect sensor	1	Internet	\$120	\$125	\$153
Software licences	2 total (1 ea.)	Internet/ Barker	Free (educational)	0	-
Projector	1	Officeworks	\$200	\$248	\$401
Total required					\$401
Total needed on my part					\$41

Application of time and finance plans:

Due to the extensive initial research I have conducted, I was able to allocate proper timings to each of the tasks. Thus, the action time and finance plans were easy to stick to. The Kinect sensor module was also gladly purchased by the department so the overall final cost was able to be kept low on my part.

ONGOING EVALUATION

I believe I have done my action, time and finance plans thoroughly. These plans enabled me to grasp a clear understanding of everything I need to manage for the project well ahead. The plans also easy knowledge into where I should be heading, which were very useful and able to keep me on track throughout the year.

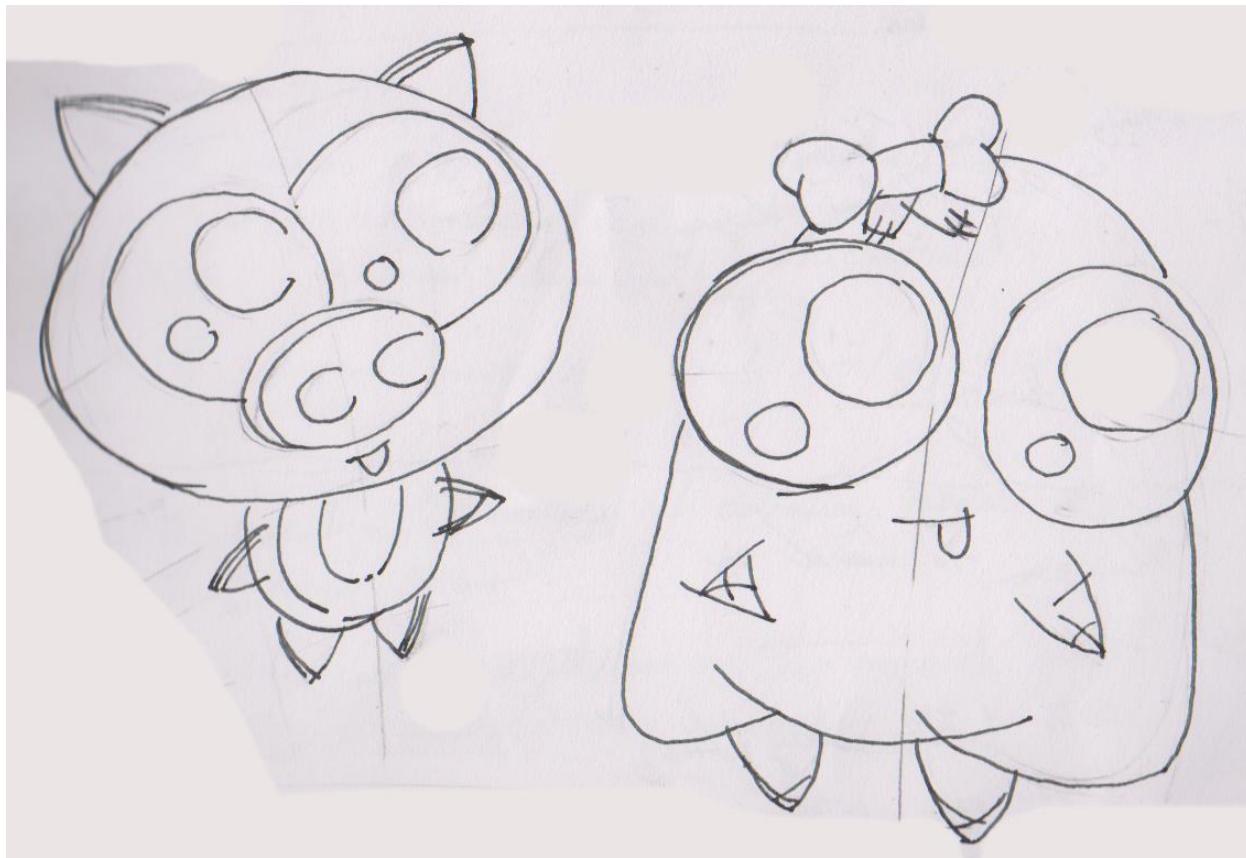
Project Development and Realisation

Evidence of creativity

1.) Ideas Generation

Concept Sketches

Initial concepts for potential character candidates were sketched. The end results were shown to a lot of people, especially the targeted audience age group.



Shown here are two characters I have drawn up and traced with a dark marker.

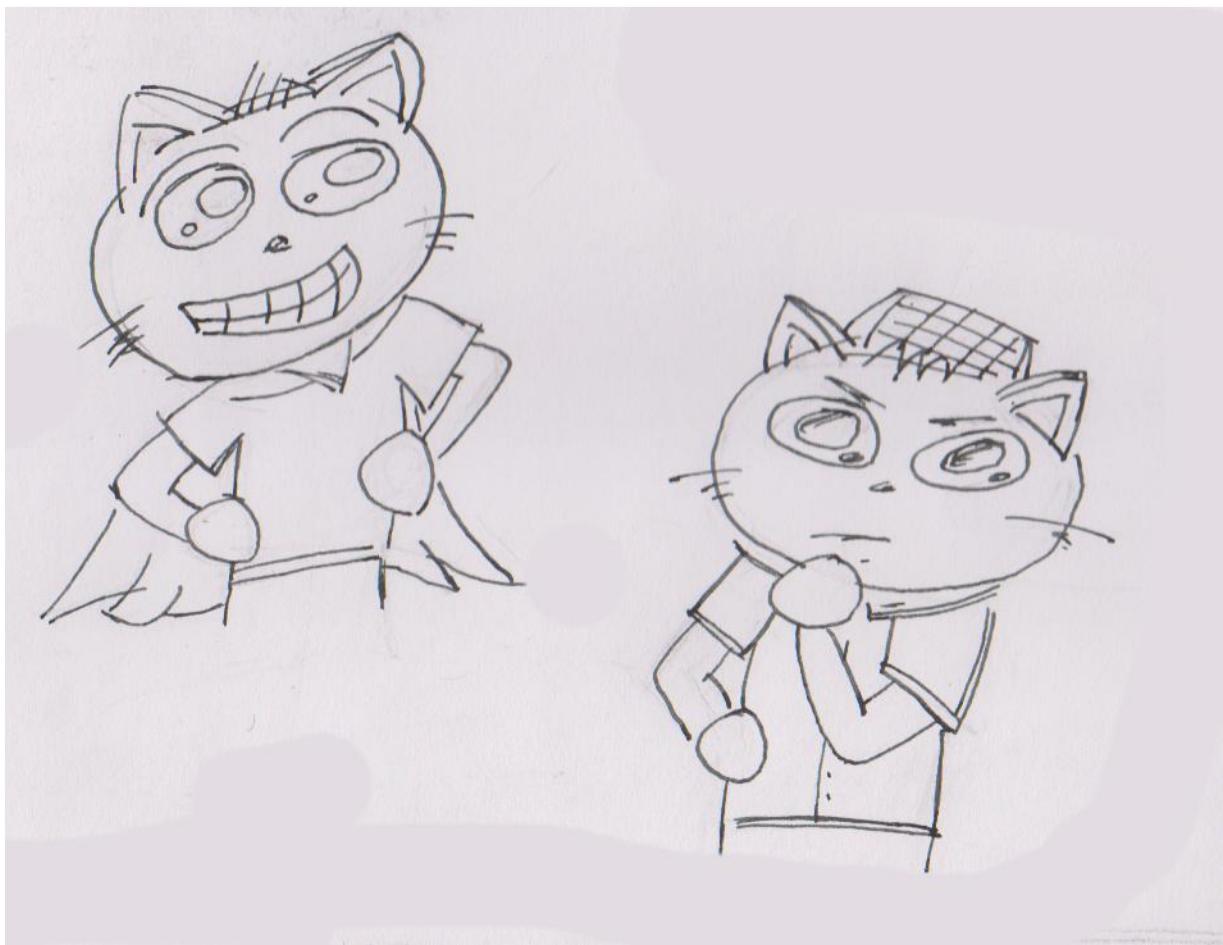
Pig man

- the exaggerated eyes helps create a Chibi/ cute image that is often associated with Asian anime
- out of proportion/ extra-large head further emphasises the cute vibe of the pig
- small hands and legs also help emphasise the vibe of cuteness

Lil' ghost

- again, the exaggerated eyes are here as a unique defining feature of my drawings
- eyes also help create a cute image
- simple bowtie on the head provides a gender distinction (female), which is more likely to appeal to girls that are normally not as interested in technology than typical boys.

These design factors were considered as to induce happiness through the “warm fuzzy feeling” of overwhelming cuteness.



Shown here is the same cat character, yet with differing clothing. This is done so as an exploration on possible clothing/ fashion choices.

Left cat

- simple t-shirt boasts a sense of casualness, easy to approach and potentially easy to relate to
- cape worn is typically associated with superhero, symbolises power, strength, and vitality
- uplifting eyebrows portrays a sense of enthusiasm

Right cat

- a sleeved, button-up shirt creates a sense of seriousness
- little hat also creates a vibe of seriousness, while closely resembling a detective look

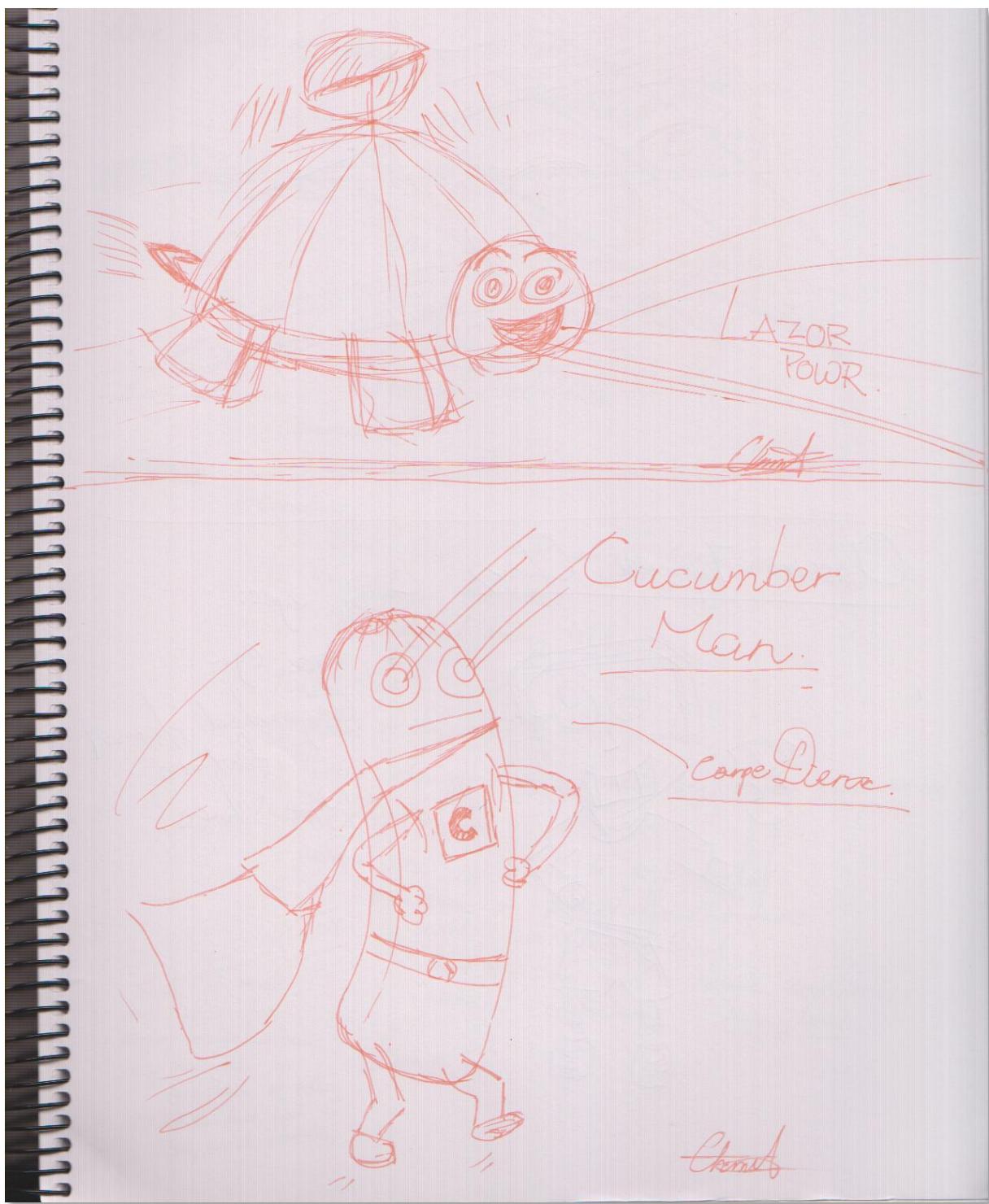
These design factors were considered as an attempt to create humour (hence induce happiness) through the “coolness” portrayed in the seriousness of the characters.



More sketches

the above cat-like character was drawn to explore the possibility of having swappable eyes

Below were two sketches of a dog-like humanoid character, drawn as an attempt to practice how to draw visually appealing dogs.



Character generation – sketches of two rather unique ideas

Above is a turtle with a propeller attached to its back

- named "the helicopter turtle"

- laser firing mouth is an attempt to reference the internet meme 'shoop da whoop',

- an attempt to establish a sense of relatability through common interest

Below is a sketch of a humanoid cucumber

- named "cucumber man" as annotated

- wearing a cape, symbolic of power and might

- irony here contrasts with the fragility of a stick of cucumber, thus attempts to induce humour within

More sketches

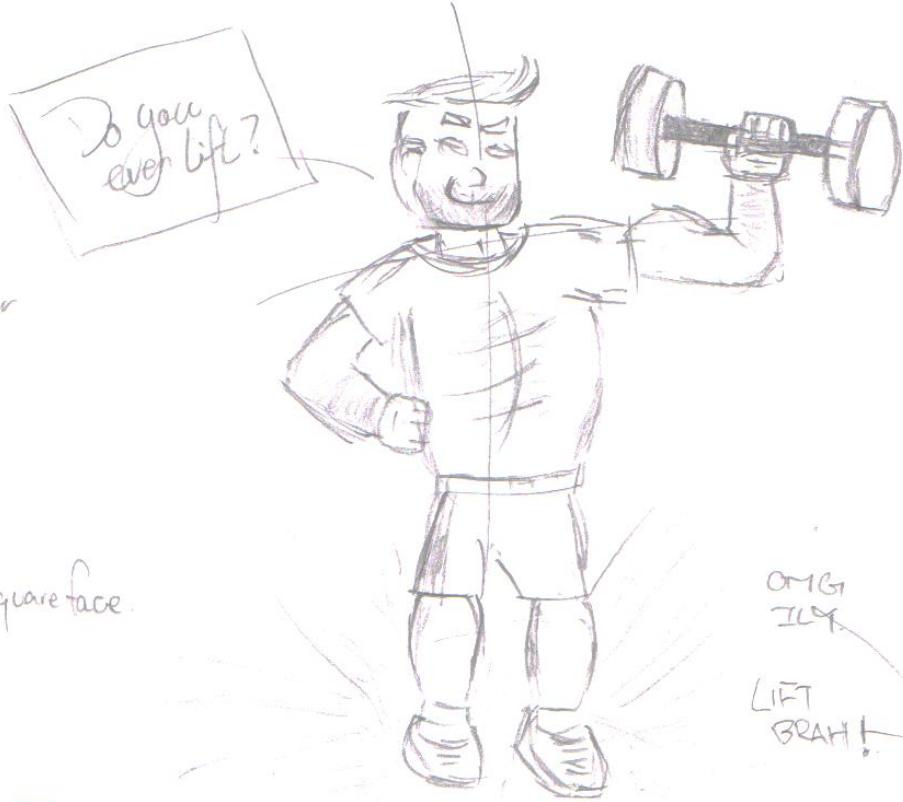


Exploring different styles of characters.

Character designs #7.

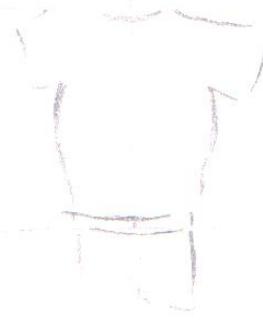
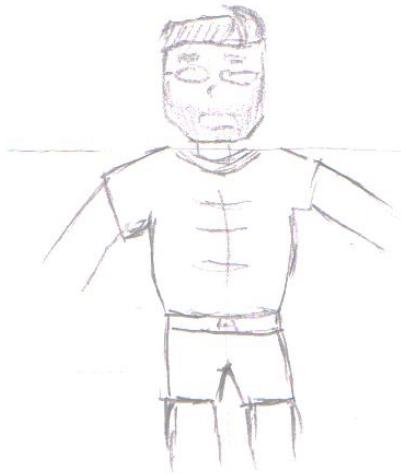
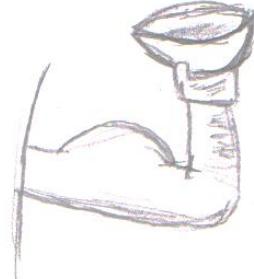
LIFT BRO

- Mad Hair
- 8 pack.
- Muscle.
- LIFT.
- Gel Hair.
- Tough guy - square face.



shopping
bag bro

Cereal
Brah!



Character Design. # 4.

A generic male cat design, with a blend of droid-like elements

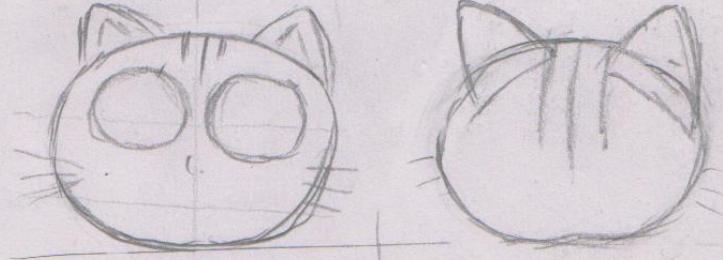
- robotic eyes attempts to engage typical male children who are interested in robotics
- being a cat may be able to draw in resemblance to pets children may own, thus establishing a sense of connection



Paws:



Heads:



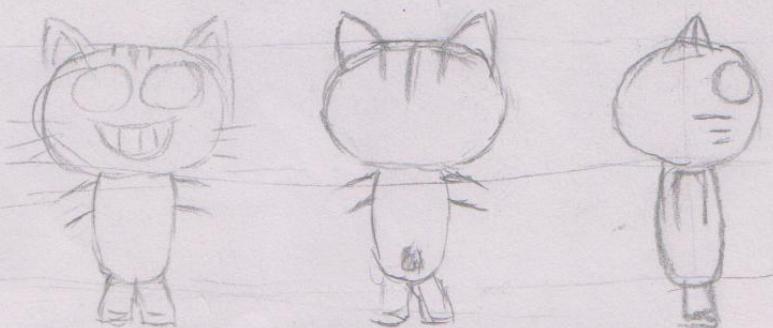
Mouths:



Happy



Funky

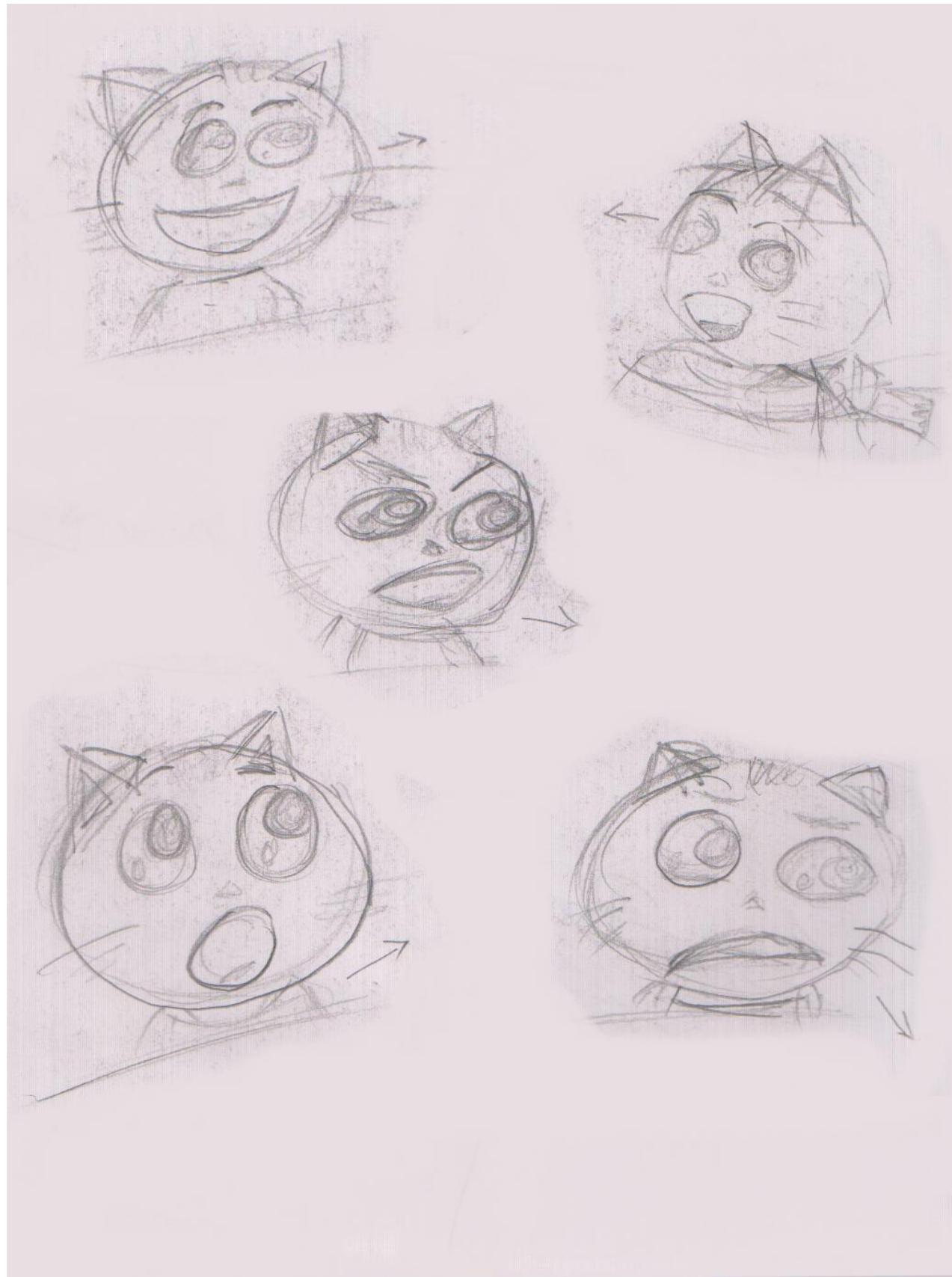


Logo and icon designs



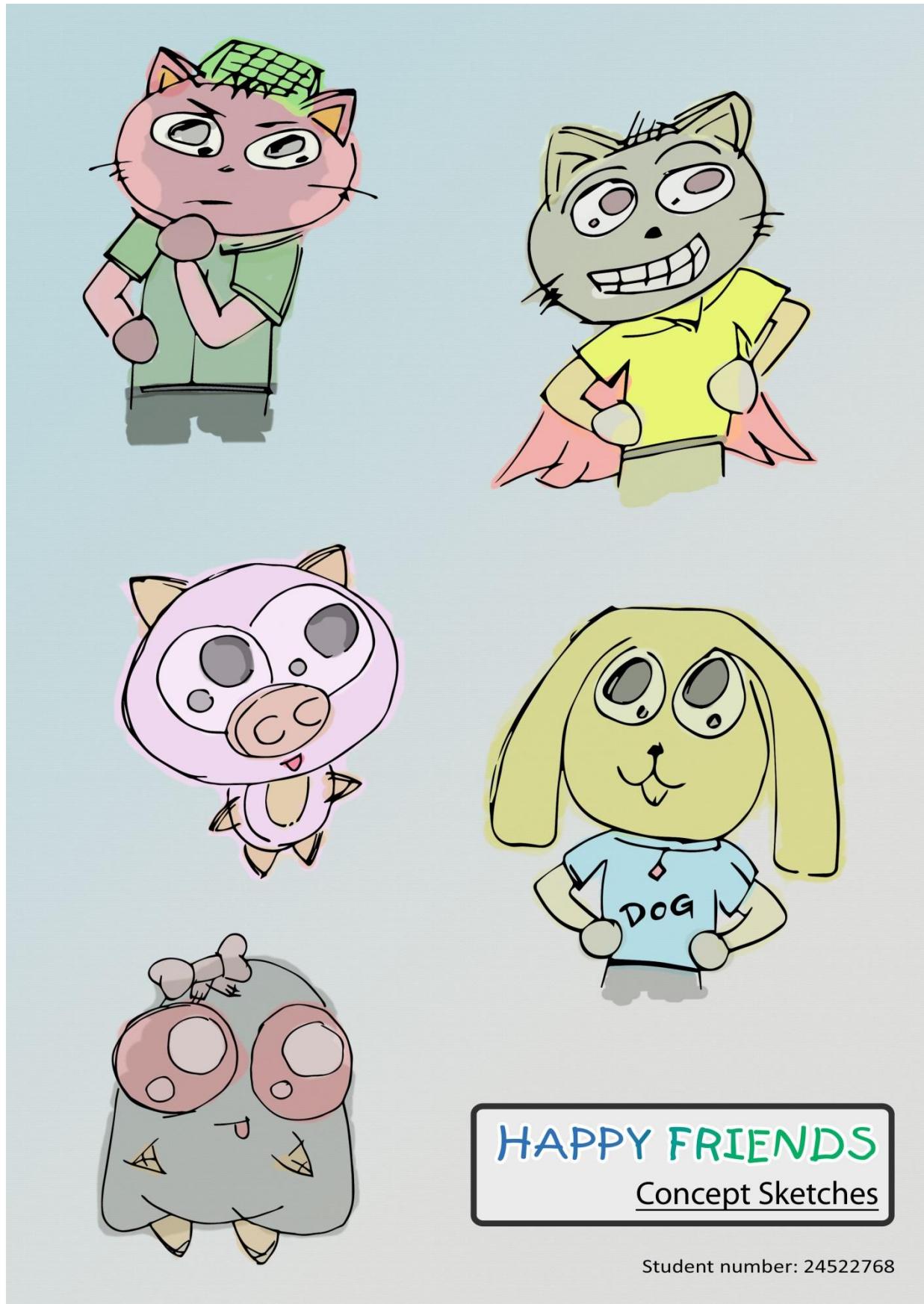
Exploration of different facial emotions

And the angle eyes are looking at



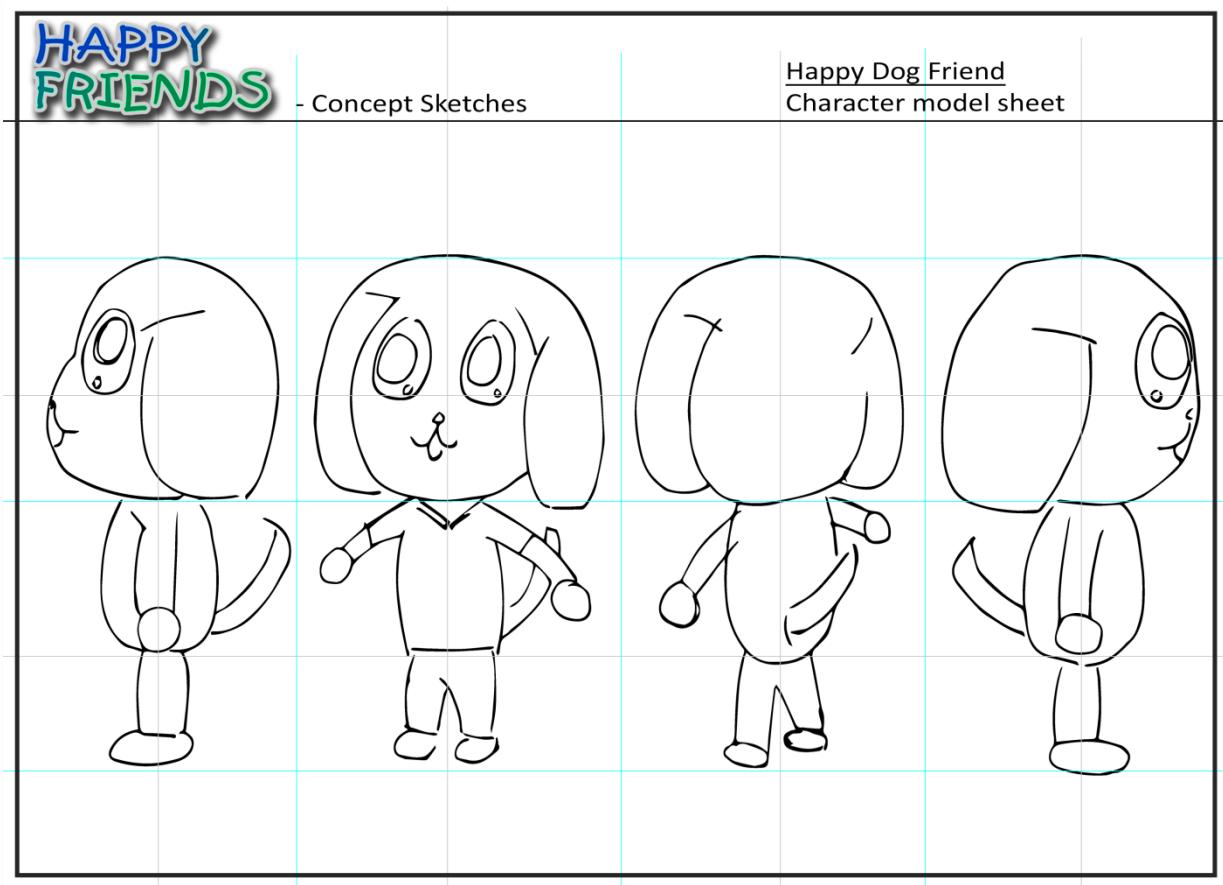
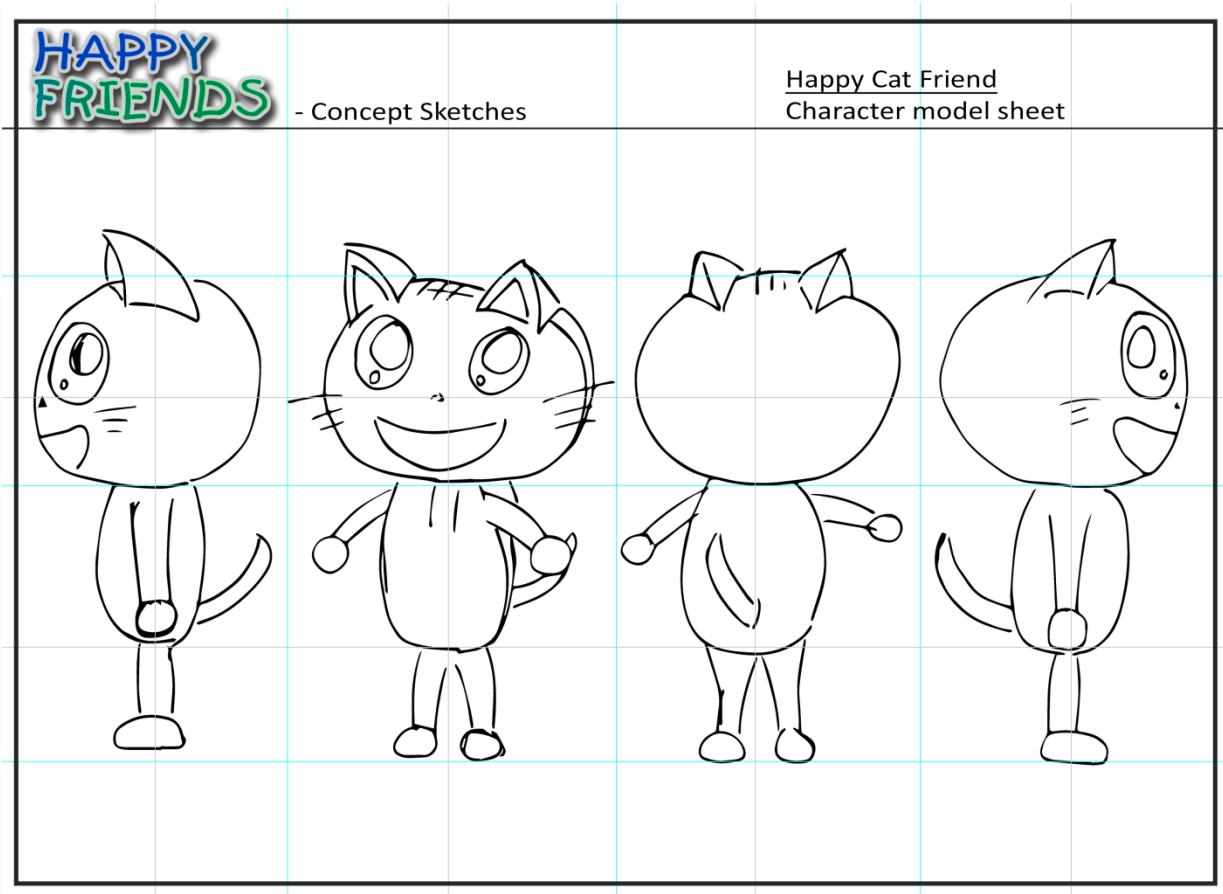
Concept Sketches:

Coloured and assorted sketches of the potential candidates I have drawn up. These characters were then shown to sample target audiences and inquired preferences. The most preferred characters were then illustrated as turnaround face panes, which I then imported for 3D modelling.

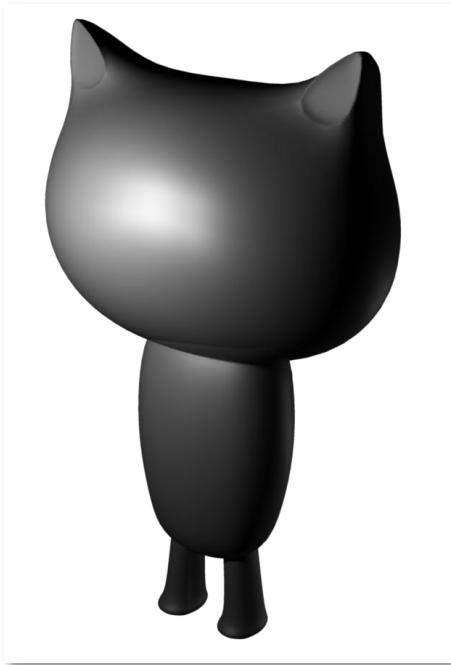


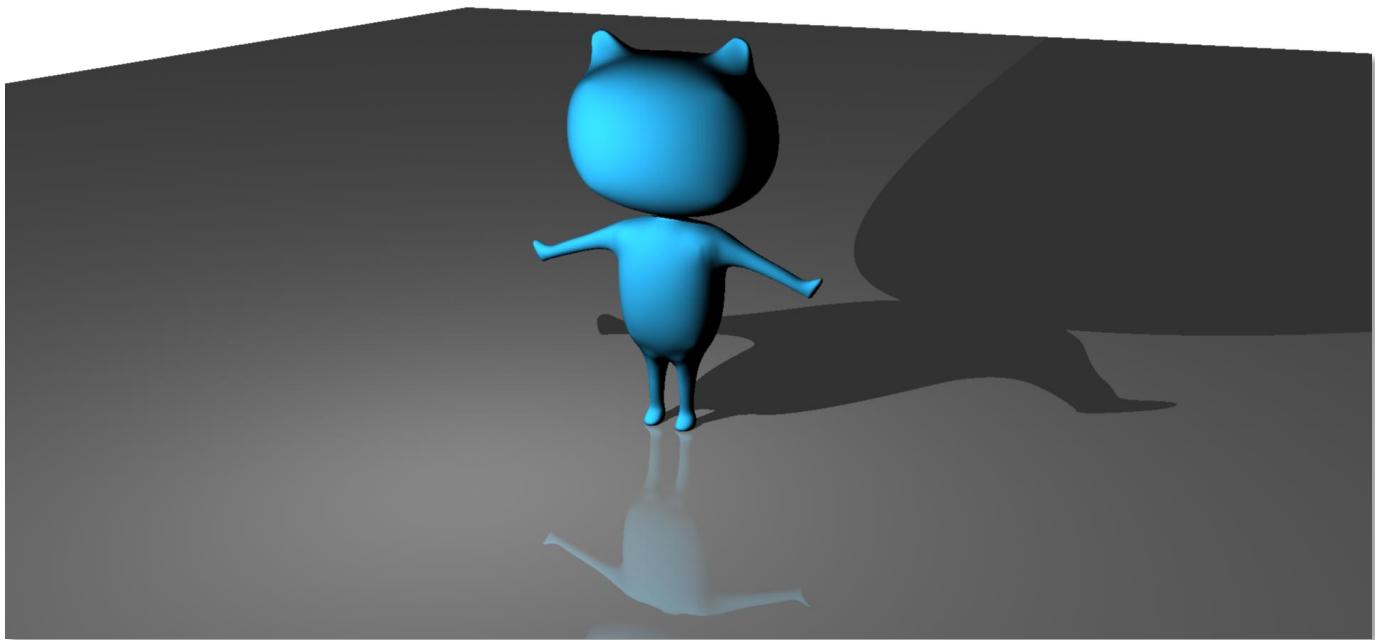
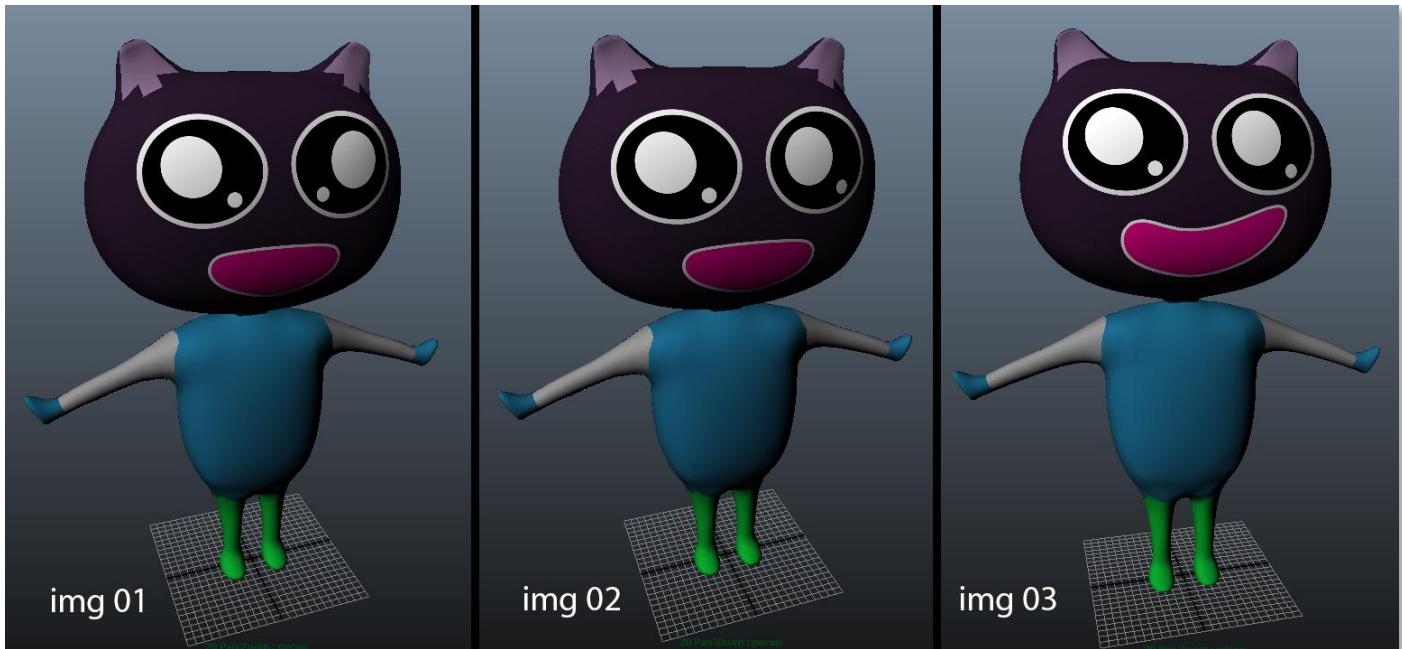
"Turnaround" modelling illustrations:

These are the face panes to be imported into Maya for modelling, drawn up after refining research data based on target audience's preferences.



3d model renders





ONGOING EVALUATION

Through finalising the digital images, I got a good sense of my animation and the aesthetical components of it. I also got a great deal done, and finished every visual component that I needed to. I believe that these were done to a high standard, as they effectively reflected various design ideas I have had over the period of idea generation.

Exploration of Existing Ideas

Comic strips:

This one was used as a digital method to seek inspiration for ideas and potential solution to the genuine need.



Consideration of design factors relevant to the Major Design Project

Through researching and the development of my project, I have thought of the various relevant design factors that I will need to take into consideration, as they will impact on my final design. Thus, I will need to address these issues and find appropriate solutions accordingly.

Elements and principles of design

The elements of design and principles of design are elementary guidelines which address all the factors designers must consider in their work in order to make it as professional as they could be. These elements of design were conveniently applied when designing the characters, logos and icon in my program. They include shape, line, direction, size, colour and texture. The principles of design include aspects such as contrast, gradation, repetition, balance and dominance. All these were considered and applied in the design of my characters.

Ease of use

The ease of use addresses the logic behind simple manipulations of the design project. By creating an easy to use design, this can bring in the positives of the design being broadly approachable by a range of audiences, effectively marketing the idea and increasing potential widespread success of the project. In contrast, a hard to use design would most likely scare off most of the potential audience, simply due to the complexity presented up front, therefore it is very important to keep designs easy to use relative to the target audience in order to ensure success of the design project.

Since my project places a heavy emphasis on interactivity among a young aged target audience, it is extremely important to ensure everything is very easy to use. This was achieved, in my project, as evidenced by the seemingly ease-of user interface, and the click-and-run nature of the whole interactive suite.

Materials, tools, and techniques

The materials used in this design project are mainly Autodesk Maya and Adobe After Effects. Using Maya, I can successfully 'convert' my sketches and image panes of character designs into a computer-generated 3d model, which was then rigged and bound. This was made easier due to my previous experiences with the program, meaning I'd be familiar with most of the toolsets and processes that it provides.



The tools provided in Autodesk Maya are similar to most 3d modelling programs (e.g. 3ds max, blender) with the exception of a harder-to-learn interface in the beginning. All of the tools were considered, and it was concluded the organic-based modelling toolset featured in Maya is the most appropriate for my design project because of the need to model characters. In conjunction with my previous experiences with the software, minimal learning of individual tools was required and the actual modelling was able to commence relatively early on, and was an efficient process.

The techniques in Autodesk Maya include mesh building, rigging, UV painting and mapping, skin binding and painting. These were all explored and considered when designing my characters initially, and were able to be fully taken advantage of to ensure optimal production of the project components/characters.

Cost

The costs of all the programs which I have used were considered. In addition, all the costs of the materials I may need, including the sensor module and printing were also considered. These were analysed through the use of the finance plan and the budgeted money was set aside so that the cost would not be an issue.

Time

Time is an important factor which is highly relevant to my major design project because the quality of my project and overall mark depends heavily on it in conjunction to my own organisation and work ethics. The layout of the whole entire year which I may be able to work on the project was analysed and the resulted data were shown in my action time plan.

Quality

Quality is another factor to be considered to ensure a high level of professionalism and polish is achieved in my major design project. Since a quality project will likely result in prolonged usage due to the lower chance of it being replaced by more sophisticated or modernised designs. Because of this, the character designs and modelling processes were detailed accordingly to ensure the final designs will guarantee to be appealing to a majority of the target audiences.

Built in obsolescence

Built in obsolescence refers to a product that has been designed to fail once its usage past a certain predefined value (usually time). While this can create benefits in areas such as technological gadgets in order to keep the market up to date with the rapid ongoing advancements, it can also generate a large amount of waste products if a recycling plan is not thoroughly planned of at the beginning. In regards to my design project, this factor was considered early on to ensure the preforming lifetime of the interactive suite is prolonged as distant into the future as possible. This way the project will be able to be exposed to many generations of children, enlightening their emotions/ keeping them happy while keeping the need of replacement to a minimum.

Aesthetics

Since the aesthetics play a huge part in my character designs, this factor would need to be greatly considered, due to the fact that each child needs to be able to establish a sense of emotional encouragement through physically ‘connecting’ with the characters.

ONGOING EVALUATION

Throughout this section I was able to have a comprehensive grasp each components and factors that were involved in my interactive character design. These considerations enabled me to strive towards a high quality end product, and also allowed me to get an overview for my research and experimentations.

Research and Experimentation

Eye designs

Eyes are parts of every single human being. They are also one of the most important medium which we communicate our emotions towards each other (the other being our mouth). For example a pair of wide opening eyes can convey a sense of shock, confusion, and stun; while a narrow linear-like pair of eyes can convey a sense of uncertainty, and doubt. These all lead into ‘methods of conveying emotion’, which is a major part of my MDP tying in closely with bringing happiness and encouraging interaction with children.

Ultra realistic eyes

Ultra realistic eyes, as title described, puts a great emphasis on degree of detail in the eye texture. While they sure ‘look’ good on paper, when improperly implemented onto a CGI model they can easily hit the ‘uncanny valley’ in CGI, resulting in a creepy looking character that would just scare kids away from engaging.

Examples



brilliant eyes example



classic “uncanny valley” example
(*Tin Toy*, short film, Disney Pixar 1988)

Evaluation

Due to the difficulty of drawing realistic looking eyes, hence the likely chance of ending up with the creepy character, I have decided to steer away from this idea from implementing into this project.

Toon eyes

Toon eyes, or ‘anime eyes’ are generally a vector simplified interpretation of eyes, with a focus on emotion conveying features, e.g. size and shape. They are implemented in most animation and cartoon aimed at the targeting demographic of mainly children due to their easily acceptable nature, hence not having to worry about causing a response of revulsion from human audiences.

Evaluation

Due to the low degree of difficulty of implementation and its wide regarded acceptance from my target audience – children demographic, I have decided to implement toon/ anime eyes onto my character designs.



Exaggerated toon eyes

Exaggeration on facial features

Exaggeration of facial features in characters can force the audience to put a specific emphasis on that certain part. A common use of this can be found in political comics. Meanwhile in character design, this emphasis can also be put onto facial features such as mouth, eyes, and eyebrows in order to further emphasise the emotion conveyed within.

Examples

Image of exaggerated eyes compared to normal eyes, putting an emphasis on sheer joyous emotion of the character displayed. (see previous page)

Evaluation

Since this part theoretically requires minimal work on top of drawing toon eyes, and are able to further emphasise and deliver a sense of happiness towards the target audience of children, I have decided to greatly exaggerate the size of the eyes and the mouth on my character designs.

Conclusion and its application

I have decided to implement sets of hugely exaggerated-in-size toon eyes, as an effort to emphasise the happiness to be conveyed through my set of character designs. The low amount of time required to manually draw these eyes also translates to more troubleshooting and better overall efficiency on my project which is a plus in this regard.

Colour

This section of research focuses on my selection of colours used in my character designs, mainly based on the theory behind specific colour choices, and how they aid to achieve the purpose of drawing interest and engagement from kids.

Specific colour choices

“Colours convey different meanings to different people.” (Colourcom Research)

While different people may have differing interpretations on the meaning a specific colour conveys, it is concluded (from Colourcom’s 100k people survey sample) that elevating emotions, e.g. happiness and joy, are usually associated to bright colours

approaching the bright, primary colour spectrum. This spectrum can closely be interpreted as a “vibrant selection of colours”, hence the term “vibrancy”.

Conclusion and its application

This section of research in simpler terms indicated that kids (people in general) love bright, vibrant and fancy colours. Hence this is the reason I have chosen to implement specifically vibrant colours in facial features that greatly express emotion – mainly mouth, and eyes (more on this next section).



Colour samples based on emotions
(source: pawfal.org)

Character base model choices

“Character base model choices” generally refers to my decision and reasoning behind my choices on design aspects on parts of my characters, and why they resemble the appearance of typical animals.

Exaggeration in body parts

It has been established previously under the last section that exaggerated facial features can emphasise messages and feeling it is trying to present. This theory also applies to body parts and features.

Examples

In popular culture, body features of characters are often greatly exaggerated in order to emphasize a specific personality or feature of a set character. For example superman, as seen in the image his abs and muscle are greatly exaggerated and up-scaled in order to emphasise his immense strength and power.



Implementation

In my project, I have implemented aspects of exaggeration onto increasing the size of the head of my characters. This can further emphasise the emotions that are presented on its facial features as well as emphasise the overall likeableness of the character itself.

Resembling appearance to typical animals

This section refers to the usage of specific animal features on my character designs and the reasoning behind it - to increase relatability, hence making the character more child-friendly looking on first sight.

Inclusion of selected features

This includes extracted characterising components of a relatable animal, and putting it onto my characters, for example the cat ears and tail on my character model. These features help kids to gain confidence and calmness when interacting with the characters by interpreting them as something they can relate to, say a typical household cat that they would likely have as a house pet, through it finding acceptance.

Conclusion and its application

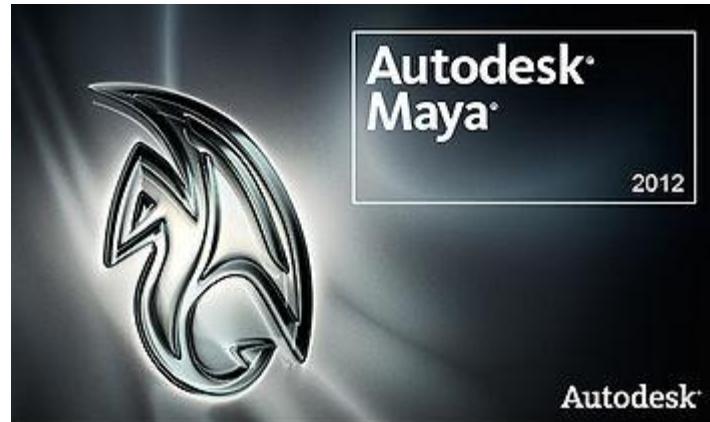
Since these two researched aspects and the minimal time taken to implement are both beneficial to my project, I have decided to fit in elements of both theories. As a result my characters will have overly-large heads with elements from relatable features of common animals.

3D modelling programs

3D modelling programs are generally a suite of tools that allows the designer to replicate a design idea onto a 3D space, virtually, instead of the traditional 2D form (e.g. sketches). They usually have limited capability in rendering heavily-detailed scenes in real-time and are require extensive learning and practicing in order to excel to its complete functionality.

Autodesk Maya

Autodesk Maya is a 3D computer graphics software originally developed by Alias Systems Co which Autodesk has currently acquired the rights to. The program itself is used by many major design studios, more commonly in the gaming industry due to the program's robust toolset on modelling and animating, with an extensive emphasis on character creations. It is also widely regarded by its steep initial learning curve compared to other 3D CGI software, such as 3DSMax and Blender.



Pros and cons

- + Used extensively by major game design studios (e.g. DICE Sweden)
- + Attracts wide community interest and support due to its robust tool set
- + Excellent tool set for character/ figure design
- Hard to learn and use efficiently initially due to the complex UI
- Expensive to purchase and deploy commercially

Evaluation

Autodesk Maya's extensive character design toolset makes the program extremely appealing to be used for my MDP. My previous experience on it from my Year 11 work also puts a positive bias to my choice in using this program.

Blender

Blender is an open-source 3D computer graphics software initially developed in-house by NeoGeo. It was later released into public due to popular demands. Its open-source nature hence the free cost, and its long history has attracted an incredibly large (and to some degree loyal) user base. It is currently maintained by the Blender Institute developed by the community.

Pros and cons

- + It features a built-in game engine
- + Free to set up and deploy, available under GNU General Public Licence
- + Huge support community gathered over a long time period
- + Wide compatibility; can be used on lots of platforms (e.g. Linux support)
- Minimalistic tool set for increased time efficiency at cost of detailing
- Tool set comes at a harder to learn interface

Evaluation

Blender's ease of set up and built-in game engine makes it another tempting option. However, its hard-to-learn interface hence the time needed to learn it would be otherwise better off used for finer detailing on Maya.

Conclusion and its application

Autodesk Maya is chosen and used in this MDP, due to its extensive toolset in character design which is highly relevant to my project. Hence my previous experience with the program minimises time taken to learn how to use, which in turn translates into more time for fine detailing and efficiency. Educational licence available from Autodesk also makes cost of deployment (free, not for commercial usage) less of a concern.

Game Engines

In the specific MDP, game engines are used as the ‘bridging gap’ between my character models and sensor signals. The game engine also functions as a real-time renderer that allows the simultaneous display of the final form factor of the character on screen in response to the actions registered on the motion sensor. This in turn allows the user to move around and see the animated character on-screen in real time, without having to wait hours for a graphical rendering.

Microsoft XNA Studio

Microsoft XNA is a set of tools bundled with a managed runtime, developed and provided by Microsoft. It is aimed primarily for lightweight video game development. The program itself is based on the .NET Framework with wide compatibility across Windows, Windows Phone, and the Xbox. It is widely popular amongst indie game developers aimed to publish on Xbox Live. Microsoft XNA is also officially supported by the Microsoft Kinect SDK package.

Pros and cons

- + Ease of cross-platform support across the Xbox, Windows, and Windows Phone
- + In-house support for the Kinect motion sensors
- + Extensive official documentation regarding to program usage
- Limited support for other platforms (almost Microsoft products exclusive)
- No longer developed officially (discontinued 1 January 2013)

Evaluation

Due to the complexity and the time constraints placed on this project, I have decided time needed to learn the interface would be better off used for project development instead on a simpler counterpart.

Unity Engine

Unity (Unity3D) is a game engine with a built-in integrated developing environment (IDE) developed by Unity Technologies. It is available over an extensive range of platforms (web, desktops, mobile, consoles) and it is used by a high community (> 1 million) of developers. Unity Engine also supports the Kinect sensor with a set package of scripts that are very easy to implement and are maintained publicly.

Pros and cons

- + Available as free and a low-cost paid version
- + Plenty of community support due to its attractively low cost/ free set up
- + Extensively cross-platform
- + Very easy “click-and-drag” set up for use with Kinect
- Subjectively weak in rendering compared to other current-gen engines
(e.g. CryEngine)

Evaluation

Widely acclaimed praise and huge support of the Unity Engine community, in conjunction with the easy set-up (essentially click-and-drag) has gained massive favour and interest from me. This is why I chose to use Unity Engine for this project.

Conclusion and its application

Unity Engine is chosen for this project for the specific purpose of being the ‘bridging link’ between rendering my characters in real time, and processing controls and interactions received from the Kinect sensor. This is due to its flexibility, sheer simplicity in implementing the Kinect controller, and ease of use.

Motion Capturing Sensors

Overview

Since this major design project puts heavy emphasis on physical interaction, it would be certain that this is be a requirement to have a motion capturing sensor capable of interoperating human body movements and translating them into digital controller signals. This section addresses the research involved in justifying the choice in the range of motion sensors currently available in the market.

Microsoft Kinect

* Introduction and brief description

Kinect is a motion sensing input device developed by Microsoft, attempting to address the previously barely-touched consumer market on physical interactions. It was the first controller in this generation that requires no additional input devices (i.e. controllers/ sticks) in order to function.



Pros and cons

- + Requires no additional controllers
- + Open-source source code which translates into a wider community support
- + Relatively low cost (~150AUD) compared to other industry solutions
- + Wide availability, can be purchased in most department/ electronic stores.
- Limited field-of-view on sensors translates to limited room for physical interaction
- I have zero previous experience with this genre of technology

Evaluation

The Kinect's wide availability and it's wide developer base hence the extensive amount of pre-written scripts, this makes the sensor very appealing as a choice for my project.

Xtion Pro

The Xtion PRO is a motion sensing input device developed by PrimeSense Technology in conjunction with Asus as a response attempt to Microsoft's Kinect sensor. The sensor is designed with the main focus on PC usage, which is different from the Kinect's original intended console only approach prior to its open-source.

Pros and cons

- + Extensively backed by a major motion tech company – PrimeSense
- + Extensive closed-source documentation
- Minimal availability in Australia

Evaluation

The Xtion PRO's lack of community support hence my minimal knowledge in coding has negatively biased me into not selecting the sensor for my project, despite the sensor module is backed by the industry leading research company PrimeSense.



Conclusion and its application

I have decided to use the Kinect sensor for this project. This is mainly due to its open-source nature which translates into a large library of pre-made scripts and documentation suitable for my project. Also the Kinect sensor's broad availability has contributed to a positive bias in my selection choice.

Experimentations

> Tools and Techniques

Mapping textures to model

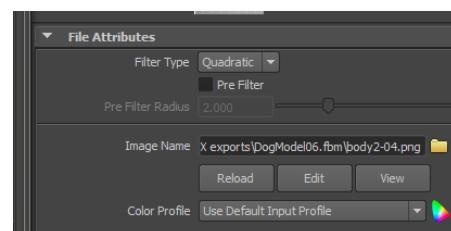
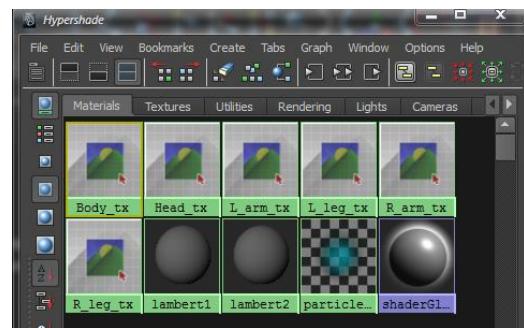
The purpose of this experiment is to investigate the method to key a painted .png file onto the material to be ‘textured’ on Maya.

Aim:

To investigate the method of keying an unwrapped, then painted .png texture onto the specific assigned material in Maya.

Method:

- 1.) The originally exported UV was painted and saved as a .png file
- 2.) The ‘hypershade’ panel in Maya is opened, and the specific wanted material was selected, as per labelled previously during organised modelling process
- 3.) The .png texture was imported into Maya, and was keyed to the specific material in the attribute editor as selected in the hypershade panel.



Results:

An elegant textured model was created



Conclusion

Texture maps were linked to its assigned material to be displayed on the model mesh. This is another essential process in constructing a character model as a proper texture can greatly assist in characterising a model.

Application of Conclusions

I have used this technique extensively throughout my character designs. By putting on a texture map, this creates a sense of personality within the characters, which ultimately encourages engagement from children.

Evaluation

Although this experiment does not detail on a complicated process, it goes through the essential skills required to implement a texture map onto a mesh, which is essentially a very important aspect of every character design.

Creating skeleton

Skeletons are the ‘bridging link’ between proper deformations on the mesh and Kinect controller data in this MDP. Although they are easy to be set up, they do require a solid understanding of joint relationships to be created, and a high degree to tidiness so ensure things don’t get mixed up later.

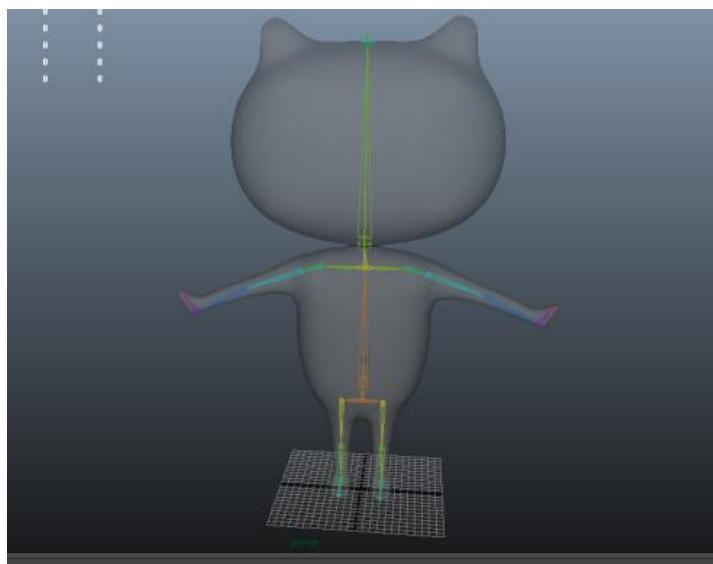
Aim

To create a well behaved skeleton for my character mesh

Method

- 1.) Key joints were created in core locations that experience plenty of bending
- 2.) Joints were linked by parenting, and were named accordingly along the process
- 3.) The final single-skeleton was rerooted using the “reroot skeleton” option

Results



screenshot of a properly created skeleton for this character mesh

Conclusion

A proper skeleton mesh was created and joints within were named accordingly. This is another essential process of a model creation for animation use. Creating skeleton is also the important process prior to mesh binding and weight painting as you cannot bind anything without the skeleton.

Application of Conclusions

I've used this skeleton building method extensively during the rigging stages of my character designs. Since this is the only yet essential step to enable a character mesh to be binded onto a bone structure while maintaining the ability to perform basic bipedal movements.

Evaluation

Skeleton creation is another simple yet essential process of character creation. It is a valuable set of skills to have, and ultimately an important aspect of my MDP.

Skin Weight Painting

As previously detailed in the research section, skin weight painting is the process that distributes weight influences onto skins per bone joint. A proper skin weight paint can effectively minimise most to all unwanted skin deformations through a repetitive and long process.

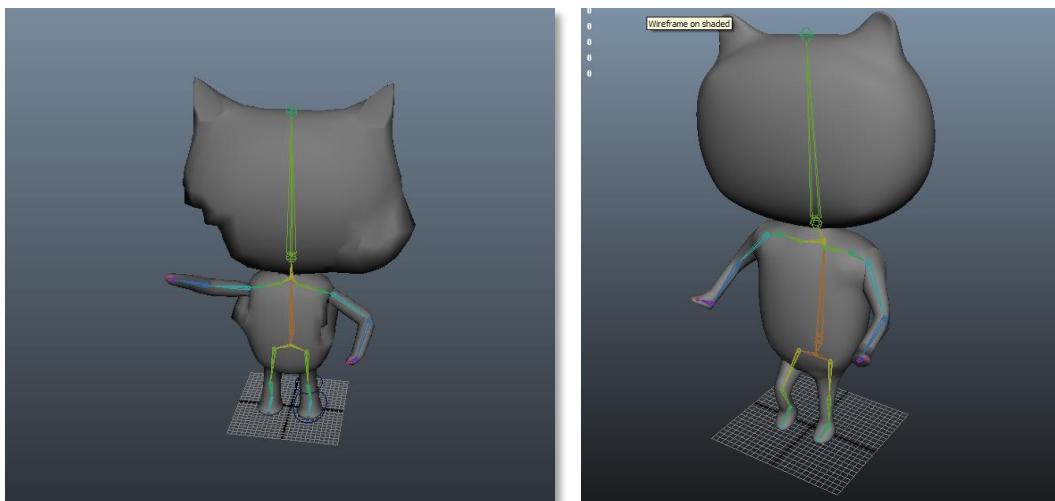
Aim

To investigate method of manually weight painting a character geometry

Method

- 1.) Skeleton for model was constructed and smooth binded using heat map
- 2.) The 'weight paint' tool, mesh, and skeleton were selected. The mesh then appeared to be coloured by weight influence in monochrome
- 3.) Parts with unwanted weight influence were painted black using the paint brush
- 4.) Joints were rotated throughout the process, previously unobserved deformations were appeared
- 5.) Step 3-4 were repeated, processes were fine-tuned until minimal unwanted deformations were observed

Results



-before (left) and after (right) shot of weight painting

Conclusion

Skin weight painting is another long and repetitive process, however essential considering there is an element of animation in the project. Otherwise the deformations would lead up to having a horrifying looking character that will just scare kids away from engaging.

Application of Conclusions

Skin weight painting removes unwanted mesh distortions. I have used this process extensively on all the characters I have modelled for this project (cat x2, dog) in order to achieve the result I wanted – smooth, natural-looking mesh bending.

Evaluation

Skin weight painting is yet another difficult, repetitive, and time consuming process. However these efforts put in are ultimately paid off, having a wonderfully deforming character at the end is totally worth the pain.

Kinect controller in Unity

This section is essentially the testing conducted to ensure the scripts obtained from the source functions as intended with the sensor under Unity Engine.

Aim

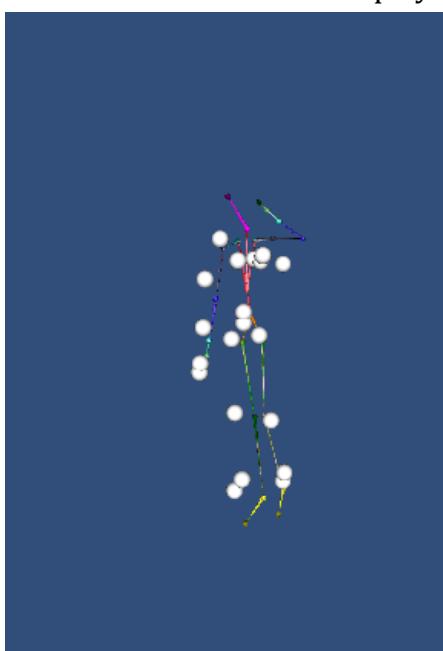
To investigate whether the scripts work as intended or not under Unity Engine

Method

- 1.) Scripts for Kinect were downloaded
- 2.) Scripts were imported into Unity Engine
- 3.) Kinect drivers were installed, and the sensor module was connected to the computer
- 4.) Test subject (me) was danced in front of the sensor

Results

Motions were detected and displayed properly in Unity Engine.



- Screenshot of sensor linking to the template bone structure (left)
- photograph of me testing the sensor accordingly (left)

Conclusion

Simple experiment works out as intended. This concludes the documentations bundled were functional and up to date with the package.

Application of Conclusions

Component testing, debugging and evaluating are essential processes to ensure a working project is produced. By doing so, this allows the design situation to be assessed so further actions can be made.

Evaluation

Simple experiment that was able to set up a milestone in confirming the sensor module working. Also possibly served as a major morale boost, confirming a previous major uncertainty due to no one in the school has had previous experience on this before.

>Testing of Design Solutions

Character styling

This section attempts to address the passive psychology presented in the initial researches, and determining the accuracy on whether colour and styling have a differing effect on the target market.

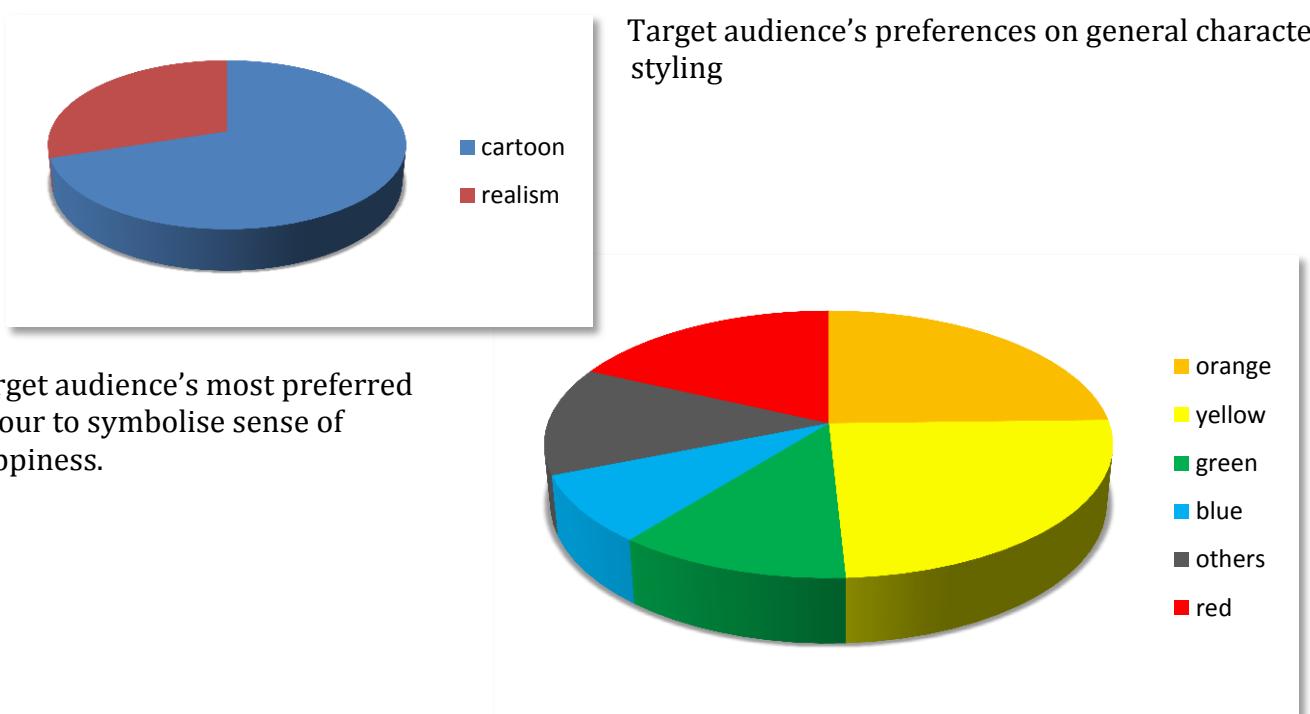
Aim

To decide whether the characters should be created with bright colours and cartoony, or plainly more realistic, in order to appeal to the target market

Method

- 1.) A survey in regards to the areas being evaluated were issued to a sample size of 50 in the target audience group – children
- 2.) The final data were collected, and were then plotted into excel
- 3.) Results were graphed

Results



Conclusions

Clear majority voted for a cartoony and vibrant character, while a minority voted for realism.

A dual majority voted for the vibrant colour of orange and yellow, while a seemingly equal minority voted for red, blue, green, and other colours.

Application of Conclusions

The results from the survey were considered and were taken into account when designing my characters, in order to effectively present the idea of happiness on the projected character models.

Evaluation

This section aims to gather actual up-to-date data in regards to the potential target audience group. Also this is a very important research, since it primarily affirms the aesthetic directions my character designs heading towards are proper and successful.

Interactive suite testing

This section details the actual testing conducted to determine the conditions of the project – whether the whole motion sensing implementation works or not.

Aim

To determine whether the motion sensor scripts functions properly with the Kinect sensor or not.

Method

- 1.) Specified joints on the model were keyed to the specified points on the motion sensor scripts
- 2.) The engine is then run, while the scripts functions computationally
- 3.) Test out various body movements in front of the camera if the sensor works.

Results



Photographs of friend testing with a working model on Kinect using my laptop



Me personally testing the Kinect/ unity implementation with my model

Application of Conclusions

As noted, continual testing is a very important step in ensuring the final aspects of the project works as intended.

Evaluation

I was able to set up a working model inside Unity working with the Kinect sensor. This is another major breaking stone for me as it again provided passive guidance in regards to whether I am heading towards the correction direction or not.

Applications of conclusions

I have placed this in my Appropriate Research and Experimentation of materials, tools, techniques and testing of design solutions section, highlighted in **purple colour**.

I have discussed the way I am going to apply my conclusions right next to the experiments.

ONGOING EVALUATION

The research, experimentations and testing section of my folio is highly important to the entire project. Throughout the progress of my major design process, I have selected, trialled and investigated every resource, and applied them accordingly in my project. And thus, demonstrated how proper research can guide the project towards the correct direction and play an important role on the production of my final design.

Identification and justification of ideas and resources

Through the progress of my major design project, I have used a range of resources in order to complete the final product. They are as detailed below:

Resources	Identification	Selection	Justification
Materials and Tools			
3D computer generated graphics (CGI) software	Autodesk Maya	It is the most suitable 3d modelling program for my project as it houses a well-regarded extensive toolset catering to character creation. Whereas other candidates (Blender, 3ds max) specialises in modelling general 3d objects. In addition, my previous experience with Maya minimises the time needed to learn how to use, which in turn translates into more time for project polishing and an overall greater workload efficiency.	I used Maya mainly due to its extensive toolset, and the slight sense of elitism achieved from successfully learning how to navigate in its complex interface. In my project Maya was used extensively for modelling, rigging, weight painting, UV mapping and rendering, as it is easy to use the pipelined toolset to manage all of the tasks associated once it is understood.
Engine for sensor implementation	Unity Engine	The Unity has one of the biggest pools of community support available. This means documentations for troubleshooting and instructions for usage would be available at plenty of places.	I used the Unity Engine due to its straightforward user interface, as I was able to navigate within with ease despite having no previous experience. The scripts which enable Kinect sensor connectivity were easily imported into the engine (setup was hard, however), which quickly allowed tweaking and debugging for the sensor implementation.

Image processor for UV maps and others	Adobe Photoshop	Adobe Photoshop is an easy and effective way to create and/or edit graphics in my project. Its straightforward user interface (UI) and its extensive toolset enables great amounts to tweaking with minimal effort. I have Photoshop on my home computer also, making it a great ease to transport and port my work files between school and home computers.	Image exports UV (texture) maps for my character models were imported into Photoshop, which were then edited and painted. Various effects were able to be added on top due to the ease of use of the extensive toolset. In addition, many of my posters were scanned sketches imported. This allowed me to easily colour and stylise distinct features I'd like to stress on for each of the characters, to ensure maximum appeal to the target audience.
Equipment for deployment	Projector	The projector is a critical component for my project because it allows interaction with the characters through projecting an image.	Initially I budgeted for projector, but later on I was able to borrow one from the school. The projector is then connected to a computer, which processes all the motion data and sends out the visual signal for projection.
	Projector screen	This is, also, another essential component for the practical deployment of my project. A projector screen is able to provide a clean surface to capture the projected image.	As explained, a projector screen is a vital component for the deployment of my interactive characters. Originally I plan on projecting the image onto a clean and appropriately painted wall in the hospital setting, due to the increased flexibility of not needing to maintain another piece of equipment. Yet, in the case of the presentation, the display was projected onto a projector screen, as I would not be able to paint the walls in Boyce Hall.

Human resource

Staff	Mr N Staas	Mr Staas is a professional in character designs so he was able to provide sensible comments and advice in regards to my character ideas and models.	Being my course teacher, Mr Staas was able to comprehend the general direction of my project and is always available, both in person and via the class Facebook group.
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Ideas

Promotion and advertising package	Happiness promo campaign	Initially I had thought of creating a range of physical promotional media as a method of distributing the message regarding importance of happiness in the society, especially in the audience group.	The simplicity of the idea also translates into lots of potential spare time at the end, which would then be used for great amounts of polishing and detailing.
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3d animated video		Due to my inherent interest in 3d computer generated graphics (CGI) and Autodesk Maya in particular, I have always wanted to utilise the animation toolsets bundled in the software. By creating a 3d animation this could satisfy both my personal interest and the genuine need.	The animation idea is a strong and effective way to raise awareness on the importance of happiness within the target audience. It also creates an easy-to-relate-to environment which in turn enhances the effectiveness of the message conveyed over a short period of time.
Motion sensing interactive character suite		Similar to the animation idea, except an interactive suite provides an element of play, which associates with happiness very well in most cases.	This idea would get the message of happiness across while boasting the aspect of physical activity. The uniqueness of the idea (since it's not very often attempted) would be able to further stand out from other design ideas.

ONGOING EVALUATION

As I finished this table after my research section, identifying the resources needed was relatively straightforward and simple, since for most of them I've already have a general grasp of what I am going to need to achieve using each one of them.

Use of Communication and Presentation Techniques

This section of my folio outlines the various presentation techniques I have used in my folio and practical components.

Folio presentation

Font

The font I have used for my folio is “Cambria”. While not as fancy looking as other like “*Comic Sans MS*” and “*Old English Text MT*”, Cambria closely resembles the classic “Times News Roman” font, its signature serifs and most importantly its ease to read. This is very important as it creates a sense of neatness and professionalism in the documentation. Although I did consider using “*Roboto*” as one of the alternatives, due to it being pretty minimalistic, young and designed by Google. But Cambria would work just fine since I do not have to go into installing the font on every computer I’m using to work on the folio documentations.

Colour scheme and formatting

Throughout the folio, I have used several distinct colours on various important headings, in order to highlight them from the large volumes of textual content flowing within. Such, **red** is used on each and everything related to **evaluations**; **dark blue** is used for major sectional headings in size 30; and **green** is used for every sub-sectional heading throughout the folio in size 20, so that the markers can clearly comprehend which and where the sections are located when marking.

Graphics

Images and graphics are placed throughout the folio, as I have tried to include as many of them as I can. This is done so to enable an aesthetically pleasing experience for the reader, and to help breaking down walls of text and soothing the overall text flow. Also every image is applied a basic drop shadow effect, to further highlight the message within by passively signifying the distinction between two medium of content closely placed together.

Practical presentation

Due to the large nature of the projected image, and the need of using a projector screen, these equipments will not be able to fit inside the display booth and will need to be allocated somewhere else. Because of this, I have chosen to use a backlit projection method for this particular presentation. The flexible backlit projectors are able to project images under confined spaces where it is not viable to place a projector in front of the display – in this case the compactness of Boyce Hall and there being other projects.

In addition, I have chosen to display 2d cut outs from the laser of my character model. This is to ensure the quality of my aesthetical appearance is high, and also to show the viewers what to expect in the interactive suite. This is useful as a blurb of the interactive character design and assists those within initial information for them to comprehend before watching the video.

ONGOING EVALUATION

From completing this section I was able to understand how to correctly present a folio and how clearly I wanted to display my ideas. Through the information processed during the completion of this section, I was able to grasp an overview of the entire project from an “outsider’s” perspective, thus draw out conclusions in regards to the level of professionalism in my interactive character suite.

Major Headings

Sectional subheadings

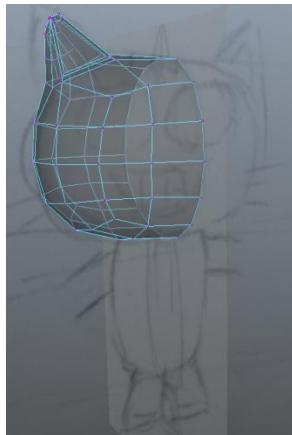
EVALUATIONS

Evidence and application of practical skills to produce a quality project

Step by step process outline of the practical work

1.) Initial research

2.) Sketches and other methods of idea generation. A lot of sketches were drawn up and surveyed for peer opinions. Some of them can be found in the creative idea generation section



Sketches imported as facepanes

3.) The sketches were then scanned, *optional step* live traced on Adobe Illustrator, rearranged in Photoshop, and finally imported into Maya as facepanes

4.) A mesh was then modelled according to the imported face panes. This was done so (almost) according to professional's reddit post outline on proper modelling technique

/u/stubbornPhoenix, render farm manager, graduate from MCAD

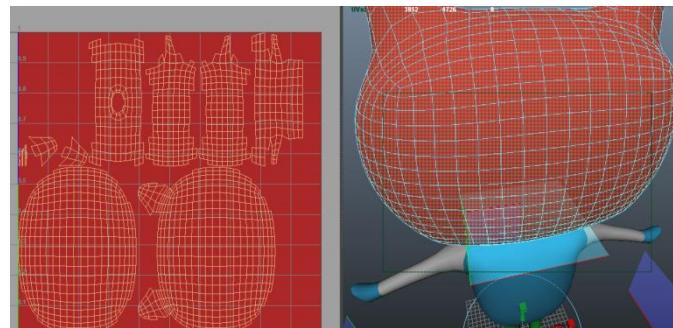
For the head? start with a cube. Two subdivisions on each side. You should have a cube with nine faces on each side. Pull the center of each face out just a tad until you have a nice sphere, and tweak that until you get the head shape the way you want. For the ears, grab the face that's top and center of the sides of the head, and extrude. Add a couple subdivisions since it'll need to bend. Tweak those vertices until you've got them looking like ears. The ends of the ears will be boxes right now, that's okay. Tweak until you've got a boxy head the way you want it. Don't add any more edge loops than you can help to, you're gonna double the edge count once you've modeled the boxy version. If you want to see what it will look like smoothed, hit 3 with the mesh selected to view a smooth version, but don't model in 3, always model in 1 (unsmoothed).

Make another box with nine faces on each side for the body, extrude the same faces you did for the head out until you have arms. Add a couple subdivisions for the shoulder, a couple for the elbow, and a couple for the wrist. Tweak until you've got it looking like a boxy version of your final product. Select the top side's middle face and extrude up a bit for the neck, throw an edge loop in there, and tweak. extrude the legs out just the same, add edge loops, and tweak. from the joint placement it looks like you've got a tail there, so grab the bottom center face of the back side, extrude, add a couple edge loops, and tweak. Preview in 3 when needed. Merge the head and body together, and you've got one boxy dog dude. Make sure you don't have any unnecessary edge loops.

From here, unwrap your uv's. Shouldn't be hard to figure out where the seams go. Once your uv's are done, smooth just one level. This will get everything looking nice and round, but will also double the amount of edges you have to work with, which is why you do so much before smoothing. Tweak everything as needed. At this point you can press 3 on the keyboard now and then to view the fully smoothed version, but always press 1 to go back to boxy while you model. Same rule goes for rigging. Preview in smoothed mode, but always do the actual work on unsmoothed. I can't stress this enough. If you need to sharpen a curve, like at the hips, try bringing a couple defining edge loops closer together, since with a model that simple you'll probably have more than you need. Avoid adding extra edge loops whenever possible. Do that and you should have a decent working model within an hour or less. Happy Maya'ing!

5.) The mesh was then UV mapped. Specific parts of the body structure were flattened into image files (textures)

6.) The textures were then imported into Photoshop for painting. Afterwards the painted UV maps were imported back into their specific locations



Unwrapping UV for the head

- 7.) A skeleton is then built according to the joint allocations in Unity, specifically catered to Kinect implementation
- 8.) The geometry/ mesh model was finalised, and history was erased to keep everything neat and clean, and also to maximise compatibility when the file is later exported and imported into Unity engine
- 9.) Afterwards, the polygon mesh of the model was smooth binded to the skeleton structure
- 10.) To ensure the model would deform properly/ bend naturally when the joints are rotated, the mesh of the model was weight painted
- 11.) After extensive trial and errors, and the model is properly weight painted, it was exported as a .fbx package
- 12.) The .fbx package was then imported into Unity engine
- 13.) Lighting and scene inside Unity was set up
- 14.) The joints of the model were then assigned into the Kinect sensor script.
- 15.) More debugging
- 16.) Setup black skybox, located camera, lights and model into their proper locations
- 17.) The scene was then tested to see if the whole idea work or not



Rigged and textured (head only)



- 18.) Once confirmed working, the whole project is compiled and built.
- 19.) Testing of design solution
- 20.) Folio work and evaluations

- 21.) Whole process was repeated for second model (dog)



Second model (dog)

ONGOING EVALUATION

I feel that the process that I took towards completing my MDP was successful yet at times challenging. Once I understood how to use a program I usually did better and worked faster, however when I was beginning with the programs I had to experiment a few times previously to understand the software and grasp an understanding of where all the tools are and all of the features. By highlighting my production techniques, I established the difficulty of my project well; however I felt that I could have included more to enhance the difficulty of my project for the viewer. The aesthetical aspect of this section is done fairly well and I made sure to include many graphics such as diagrams and screenshots.

Project Evaluation

Recording and application of evaluation procedures throughout the design project

ONGOING EVALUATIONS

Every evaluation that has been made throughout my folio I have highlighted them dark red and made clearly visible at the end of every section. This includes all the positives, negatives and personal reflections on the process and matter, and these are done as to provide as much information as possible so as to provide an “insider’s grasp” onto the production processes of the major design project.

Analysis and evaluation of functional and aesthetic aspects of design

Function

The function of my project proved well done as planned originally. Although there are some certain obvious areas that I may be able to improve, the high complexity associated with this interactive character design has given me a great sense of accomplishment upon completion. I believe I have placed a great emphasis on ease of use in my project. The simple click-and-run executable file of the *Happy Friends* application and the minimalist user interface ensured children of a young age (my primary target audience) were able to use and play with the interactive suite with minimal effort and prior learning.

In regards to areas for improvement, a far greater amount of work and detailing on the Unity/ sensor implementation end can be applied. These include the possibility of having two different characters running at the same scene, gesture controls for swapping character clothing, idle animations, depth channel implement to enable character movement (walking, running...) instead of staying stationary, physics on a new mesh as characters’ clothing, just to name a few. Since motion based interactivity is still an emerging technology, possibilities and unexplored areas for improvement are endless – thought to take into account if I happen to work with a similar project in the future, given a lengthy time allowance.

Aesthetics

The aesthetics of my interactive character design have been done fluently. I worked hard to ensure many design and modelling techniques were included during the production process, in order to minimise the need of having to backtrack errors – such is the pain of 3d character design, not being able to correct very specific parts on-the-fly. Therefore, all of my character designs were done towards top-notch quality in order to assert maximum appeal among children.

Many subtle yet significant aesthetic components such as the hyperbolically large eyes of the animals, exaggerated emotions, overly large mouth, and Chibi based body proportion of an overly large head were applied to the design of my characters to ensure it would appeal to a maximum percentage of the targeted children group.

As always, every project will have areas of improvement. Personally I reckon I could have placed a heavier emphasis on modelling and rigging, just to ensure certain parts of the models would bend more ‘natural looking’ when the skeleton joints were rotated. Furthermore, building on the idea of periodic replacement of characters for the interactive suite, there are certainly a lot more opportunities for other characters and design techniques to be investigated. These aspects all contribute towards creating more polished, engaging yet cute looking models in the future, further spreading the important message of happiness through effective design.

Final Evaluation with respect to the project's impact on the individual, society and the environment

In this section I will be evaluating how this project has had an impact on me personally, the society, and the environment. By looking at what impacts it has caused and what impacts would encounter in the future, I may determine a success for the project.

Individual

Throughout the process of creating the interactive character design, I have found myself encountering many hurdles and difficulties in areas I am working on. Every attempt of researching for a possible solution I would always find out something new or fascinating along the process, from finding out some of the hidden yet very useful shortcuts in Maya, or simply dazzled by the intelligence of the forum contributors. These aspects greatly broadened my perspective on the design matter, which is always a decent contribution to one's personality.

In relation to the project's design brief, personally I find the idea of simply making people happy through an entirely never-before-touched medium quite fascinating. This idea alone has been a root impact in keeping me motivated to complete the project because I knew the end result would be destined for a creating a greater good within a community.

The project also increased my skills and knowledge in Autodesk Maya and basic JavaScript. The action time and finance plans have taught me valuable lessons on the need to have everything well managed and organised when dealing with a large scale project. These qualities all play an important role in my daily life and hobby activities which are ultimately beneficial.

Society

Happy Friends has a positive effect on society and the community today. The ability to improve the feeling of children in hospitals, shopping centres, schools and more locations can greatly assist society by improving the well-being, happiness and potentially bring about health benefits.

I also hope that the awareness of my interactive character suite would positively alter the perspective of today's society into a more socially aware and happier model. Through functional and aesthetical qualities I feel that my project could lead to a large impact on society and its overall happiness. The way in which my character suite is implemented and located could lead to a widespread distribution of the centric moral message of this entire interactive character design suite – to simply make people happy.

Furthermore, I envision my interactive character design can strive towards a widespread popularity and media buzz. While this idea may seem controversial, in the end it is certainly an effective method to deliver the important message of happiness to every household within the society, thus enlightening the overall mood of the broader society, decreasing personal stress and cases of depressions, while further benefiting the economy by lowering the number of potential mental health patients.

Environment

Sustainability is the study of the use of resources with the present and future in mind. That is products that are designed to not only benefit the present world but also during the future. This takes the form of the use of chosen materials, methods of construction and marketing strategies. Due to the fact that my interactive character suite is purely based on the computer, the sustainability of my project would be both positive and negative. This is due to the increase in pollution that could come from a large amount of computers, projectors and sensor modules. The resources of this kind of technology are non-renewable, which causes an issue environmentally.

However, due to the possibility of ongoing renewal of characters as an active attempt to prolong the active lifetime of the interactive character suite, I hope that the environmental impact of my project is only small, and I strive to create minimal damage due to the decreased probability of failure of gadgets.

In terms of obsolescence, as stated above I aim to consistently setup periodic updates to the character models as an attempt to minimise possibility of it. However, since my project solely relies on the sustainability of existing technology, this reliability would, in turn, have a negative impact on solution over a period of time.

Relationship of the final product (PSE) to the project proposal

Design Brief

To create a digital activity suite, utilising aspects of motion sensing technologies, in order to approach and encourage positive youth interactions with technology to improve their happiness in hospitals.

Evaluation in relation to the project proposal and final design outcome

The application of the design brief wasn't the same as I had predicted it would be, simply due to technological hurdles dramatically slowing down the progress, thus I was not able to test out the design in a hospital setting. However, through my testing of the design solution, it is certain that the impact it is as regarding as per stated in the design brief.

Did I do a good quality project and folio for my Major Design Project?

I believe I did a good quality project for my MDP, and I believe I had achieved this due to the extensive amount of effort I'd put into every aspect of both the folio and the practical. This ranges from formatting, informative content, critical analyses on the folio, to the detailed modelling, thoughtful rigging and UV painting and Unity/ sensor implementations. All of these processes were done to a top-notch quality given the time allocated. Therefore I believe I have completed a good quality project and folio for my major design project.

Professional/ Target market evaluation

Fiona; Age 11

Dear Clement,

"Happy Friends" is a great new game that I have been playing. It is really interesting to be playing with the Kinect. I was able to watch my movements be translated onto the screen. The images were really cute, and I could not stop wanting to play more. It is really fun to just be myself, and not have to use any controllers or anything, and have that be turned into a digital image. I am looking forward to when more features will be added in a software update, making it an even greater game!

Fiona