



Candidates must complete this page and then give this cover and their final version of the extended essay to their supervisor.

Candidate session number			
Candidate name			
School number			
School name			
Examination session (May or November)	May	Year	2013

Diploma Programme subject in which this extended essay is registered: Design Technology
(For an extended essay in the area of languages, state the language and whether it is group 1 or group 2.)

Title of the extended essay: To prove the potential of the use of Computer Aided Design models and an interactive 3-D world, such as open wonderland, help promote learning and understanding of safe use of tools and equipment in Design Technology environment for students with English as a second language background

Candidate's declaration

This declaration must be signed by the candidate; otherwise a grade may not be issued.

The extended essay I am submitting is my own work (apart from guidance allowed by the International Baccalaureate).

I have acknowledged each use of the words, graphics or ideas of another person, whether written, oral or visual.

I am aware that the word limit for all extended essays is 4000 words and that examiners are not required to read beyond this limit.

This is the final version of my extended essay.

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Name of supervisor (CAPITAL letters)

Please comment, as appropriate, on the candidate's performance, the context in which the candidate undertook the research for the extended essay, any difficulties encountered and how these were overcome (see page 13 of the extended essay guide). The concluding interview (viva voce) may provide useful information. These comments can help the examiner award a level for criterion K (holistic judgment). Do not comment on any adverse personal circumstances that may have affected the candidate. If the amount of time spent with the candidate was zero, you must explain this, in particular how it was then possible to authenticate the essay as the candidate's own work. You may attach an additional sheet if there is insufficient space here.

Major Project

I am a new teacher at _____ and have taken over the supervisor's role of the Major Project for _____. He initially had some difficulties with clarity of the research question but through discussion was able to resolve this issue and defined an area which was both relevant and probing. I appreciated his interest in developing Design Technology with International Students within the school

This declaration must be signed by the supervisor; otherwise a grade may not be issued.

I have read the final version of the extended essay that will be submitted to the examiner.

To the best of my knowledge, the extended essay is the authentic work of the candidate.

I spent hours with the candidate discussing the progress of the extended essay.

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Date

Assessment form (for examiner use only)

Achievement level

Criteria	Examiner 1		Examiner 2		Examiner 3	
	Score	maximum	Score	maximum	Score	maximum
A research question	0	2		2		
B introduction	1	2		2		
C investigation	1	4		4		
D knowledge and understanding	1	4		4		
E reasoned argument	1	4		4		
F analysis and evaluation	1	4		4		
G use of subject language	0	4		4		
H conclusion	1	2		2		
I formal presentation	2	4		4		
J abstract	1	2		2		
K holistic judgment	2	4		4		
Total out of 36	11					

Extended Essay

Design and Technology

To prove the potential of the use of Computer Aided Design models and an interactive 3-D world, such as open wonderland, help promote learning and understanding of safe use of tools and equipment in Design Technology environment for students with English as a second language background

Subject: Design Technology

Supervisor:

Name:

Candidate Number:

Word count: 3975

Abstract

With the development of computers and 3-D modelling the way an object is designed has changed drastically. The advent of 3-D modelling has allowed the creation of an interactive 3-D world for variety of uses. The use of 3-D worlds using 3-D models is often to promote learning, teaching and understanding of certain subject.

I have intended to define learning and teaching problem in the Design Technology course through surveys to people who have taken or taught Design Technology course before. After defining the research question I've researched methods to solve this problem. I've researched 3-D modelling tools and chosen an easier and efficient tool, Google Sketch up, to create my solution. After exploring the tools of Google Sketch up I've researched about creating and the using 3-D worlds. Then I continued my research and measured objects in the DT room and downloaded models from Google sketch up warehouse to help in preparing the virtual room. Then I've uploaded them back onto an open wonderland server to allow students/teachers to access it. Then I've gained feedback from them again through surveys.

The use of the Computer Aided Designs uploaded in an interactive 3-D world has gained interest among students. Students found 3-D world appealing and was able to learn about tools. Students who have trouble understanding demonstrations believed that this would be a good revision tool. It has shown that the use of Computer Aided Design (CAD) and 3-D world, such as open wonderland has motivated student's interest and improved their understanding of safe use of tools in Design Technology environment. From this investigation I was able to prove the potential of the use of CAD and 3-D worlds in learning and understanding of safe use of tools in Design Technology environment for students with English as a second language.

Word count: 300

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Research Question and Scope

How can the use of Computer Aided Design (CAD) models and an interactive 3-D world, such as open wonderland, help promote learning and understanding of safe use of tools and equipment in Design Technology environment to students with English as a second language background?

From the 5 years of experience and interest in Design technology I have chosen this topic to explore a method on how to make it more interesting for other students also. From the skill I have developed whilst making a virtual BISS¹ for my personal project in grade 10 I thought I could expand this project but highly DT related. I think there will be a high learning potential for other students and would allow them to be more interested in the subject and gain a lot from it.

My Extended Essay addresses the Design Cycle through several ways.

I will follow the design cycle in the creation of my virtual DT Room. **Planning** involves defining what the challenge is. Designing and Creating a DT Room will assist students and teachers in the study of the subject of DT.

Research involves investigating the best methods to solve the defined challenge. It also involves physically measuring of the Design Technology room and furniture and tools within that room. The main research will be based on primary and qualitative data such as student and teacher's opinion about virtual world. The research will also help define what methods will be the best to solve the challenge.

Development involves sketching the virtual room and planning out its structure. It will also involve me to create the furniture, tools (hand & machine & portable tools), and develop a way to connect a 2-D drawing to an interactive 3-D world. Although there may not be a radical development of the room, it is an essential step to go through in order to create an appealing and efficient virtual room for revising and learning tools. In the development stage I will evaluate if there are problems in the initial planning of the project.

Realizing the solution involves creating an interactive virtual room using 3-D modelling programs. It involves me to create model, export it, upload it on virtual server, and allow students and teachers to access the server. It will require me to create minimum of one of the tools (hand tools, power tools or machineries) using 3-D modelling program. There will be a video tutorial on how to use the tools for revision.

¹ See Appendices, P. 21 - Virtual 'BISS' project that I did for Gr10 Personal Project

Evaluation involves gathering qualitative and quantitative data through user trials and user research. User research will require me to use screenshots showing the features of the virtual room and gather student's opinion. User trial will require me to allow access to the virtual room to the community (my school) then gathering their opinion through online surveys. The virtual world will be evaluated against the specifications and accessed its potential for educational use in design technology.

Introduction

With the advent of new software technology computers allow the designers to incorporate it in to the process of design. Computer aided design is being used in numerous aspects of product designs. Google Sketch up is one software that allows designers to create 3-D models. Google sketch up is a free, easy-to-learn 3-D modelling program² that allows uploading of a model to Google Earth or to 3-D warehouse. Google Sketch up has been used in the field of teaching: it is being used in numerous schools to explore geometric concepts, like explaining the Pythagoras theorem and designing models and all types of product design with sketch up.

A virtual world is a network of people presented by avatars and facilitated by computers. The use of virtual world is increasing in many different fields. Virtual worlds are increasingly used in education, such as online courses. The demand for online courses has increased since the past few years. According to research cited in Pittsburgh Post-Gazette, almost one in three college students takes at least one online class³. Virtual classrooms are advantageous especially for older-aged working professionals looking to obtain an online graduate degree. Many education analysts and college students emphasize the convenience of online classroom, which allows more flexible schedules to earn college credits. There are many advantages of virtual classroom over traditional classroom. The optimum advantage of virtual classroom is its flexibility. Virtual classroom allows flexible schedule and can attend class without having the person to actually go to the classroom. A report issued by the U.S. Department of Education showed that students who attended online classes performed better than their peers in traditional classrooms.⁴

Creating Virtual room using 3-D models has a great potential in education. Its flexibility allows people from other parts of the world to access and attend online classes. In middle of February 2012 there was an ongoing test debate on Open

² "Sketchup - TIE Network." Home - TIE Network. <http://tienetwork.wetpaint.com/page/Sketchup> (accessed September 29, 2012).

³ Folliot, Brooke. "The Current State & Future of Online Education Â« Wonderblog." Wonderblog. <http://blogs.openwonderland.org/2012/04/19/the-current-state-future-of-online-education/> (accessed September 29, 2012).

⁴ Folliot, Brooke. "The Current State & Future of Online Education Â« Wonderblog." Wonderblog. <http://blogs.openwonderland.org/2012/04/19/the-current-state-future-of-online-education/> (accessed September 29, 2012).

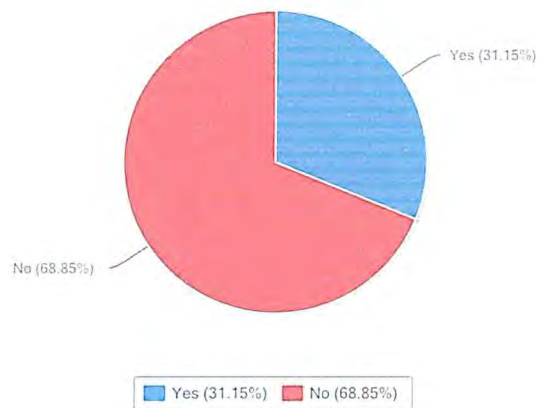
Wonderland virtual environment platform⁵ to host polls as part of +Space project, which is developed to offer citizens and policy makers a space where they can exchange their perspective on certain policy areas.⁶ Students from the University Essex in the UK, together with project partners from the National Technical University of Athens (NTUA) and the Hellenic Parliament participated in this debate.⁷

The virtual world, with great flexibility and educational potential, could be used to promote the learning and understanding of students. Together with CAD models, virtual world has the potential of being used to help promote learning and understanding of safe use of tools in a design technology environment. Not only could it be used for revision purposes but also for teaching. Through the course of my essay I will be exploring the potential of CAD models and 3-D world in promoting learning and understanding of safe use of tools in DT environment to students with English as a second language.

Body

Identifying or clarifying a need or opportunity

Do you have problem understanding DT terms and tools?



⁵ Horan, Bernard. "Students test virtual debating environment â€" Hypergrid Business." Hypergrid Business. <http://www.hypergridbusiness.com/2012/03/students-test-virtual-debating-environment/> (accessed September 29, 2012).

⁶ "+Spaces." +Spaces. <http://www.positivespaces.eu/> (accessed September 29, 2012).

⁷ Horan, Bernard. "Students test virtual debating environment â€" Hypergrid Business." Hypergrid Business. <http://www.hypergridbusiness.com/2012/03/students-test-virtual-debating-environment/> (accessed September 29, 2012).

Based on my surveys⁸, about a third of students who are taking Design Technology class struggles with DT terms and tools used. According to the online survey I have conducted, numerous students have wondered what tools are used for when and what purpose. Quite a number of them asked the teacher to learn how to use the tools. Some of the students search the name of the tool and the use of the tool by themselves. However there were students who are hesitant to do either of the solutions and do nothing to solve the problem.



According to my survey, about a third of the students (17 out of 54) forgot how to use certain tools in the Design technology workshop and needs revising of the tool. While writing their diary of manufacture, some students forget the name of the tools used during class. This hinders the students in writing a precise and detailed diary of manufacture with reference to the name of the tools.

For ESOL students, who's English is not their first language and do not find it an easy language to use, have hard time understanding the use of tools at first demonstration. Because of their English speaking skills, they are especially bashful to ask question to the teacher, which may end up him or her not revising the use of the tool. One student response showed that because of his/her English skills he/she was afraid of asking questions to the teacher because the teacher might think he/she is a reckless person who doesn't listen to teachers carefully during demonstrations.⁹ This will hinder them from writing a precise diary of manufacture and learning efficiently in DT class.

⁸ See Appendices – P. 23 **Survey** – Survey 3 in the link

⁹ See Appendices – P. 23 **Survey** – Survey 3 in the link

Other situations may require the student to research new tools they might need to use in the future. In addition to forgetting how to use a tool, students are often shy of asking how a tool is used. Many students are unwilling to search the tool on Internet and afraid of asking it. Although a student might wonder how a tool is used they might give up because they are afraid of asking.

Students who go to a school that does not have Design Technology as their school curriculum may want to learn about design technology. However because the school doesn't provide any opportunity for them to learn these it is hard for them to learn about the use of tools. These students could access the virtual world via Internet and learn about Design Technology and tools if they had a virtual world.

Not only the design technology students but also the design technology teachers face problems in teaching. Some of the design technology teachers initially demonstrate how a tool is used in order to have the students use the tools correctly. According to the online survey¹⁰, teachers who have taught design technology had to go through burden of explaining a tool to students repetitively. At times some teachers had to go through the same process again to make sure everyone in the class know how to use the tool properly. Teachers felt that students, who cannot speak fluent English, have difficulty understanding his/her explanation of the tool.

Creating a virtual room of an actual DT studio by using computer-modelling program, such as Google Sketch up, has a high educational potential. The biggest benefit of creating a virtual room is that it is flexible compared to traditional classrooms. Students can access the virtual room at home to revise the tools learnt during class, tools that they forgot, and tools that they wishes to know more about. The virtual room may keep the students interested and help them to learn or research the full opportunities of the tools or materials available to the students without having to ask a teacher.

Investigation and specifying requirements

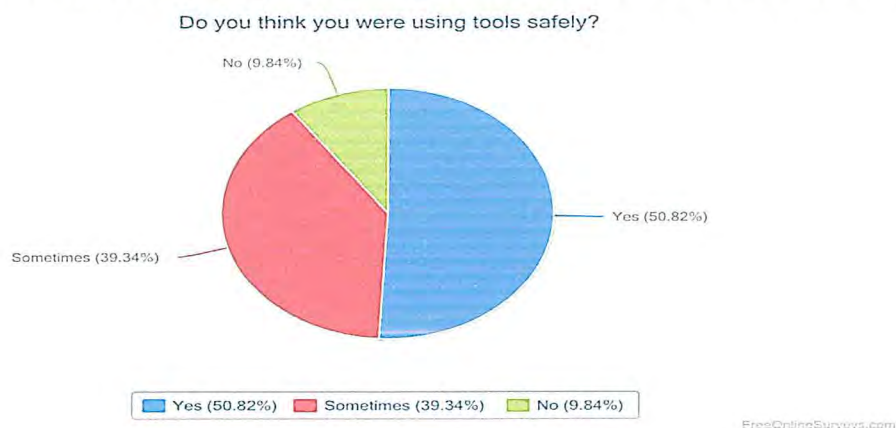
Have you ever felt the need to find out more about tools or what they do?



¹⁰ See Appendices – P. 23 Survey – Survey 1 in the link

According to the Internet survey I've conducted¹¹, 19 out of 31 people who had DT class before said they have felt the need to find out more about tools or what they are able to do. Moreover some of them felt the need to revise the methods of using a tool, researching materials, etc. According to the survey, in this situation, most of them either asked someone else or searched on the Internet while others didn't do anything. It is especially hard for a student who's English is their second language to learn about the tools in the DT studio. I've interviewed one of the grade 9s who is not fluent in English, is new to the school, and have never taken Design Technology before.¹² One of the tools that he had difficulty understanding was the use of the disc sander. As a student who doesn't know English well, he couldn't understand what the teacher was saying during the first demonstration. Additionally, he couldn't understand why he couldn't sand objects on the right hand side.¹³ Not understanding why he shouldn't sand on the right hand side, he sanded a piece of timber on the right hand side of the disc sander. When the teacher found him sanding on the right hand side, the teacher paused the class and re-demonstrated how to use a disc sander. Only after this incident he understood why he should not sand on the right for safety. He also wanted to learn more about the tools that he didn't know how to use. However, as an introverted student, he was unwilling to ask the teacher how to use the tool. He felt very uncomfortable to ask how a tool is used and what for in English, because he wasn't fluent in speaking English. If there was a place where he could easily revise the tool and learn about it without having to research on search engines, he could have learned more about Design Technology. Creating a virtual room would allow a determined destination for students to revise and learn more about a tool.

According to my survey only half of the students were confident that they were using the tools safely. Because unsafe use of tools is potentially dangerous in Design Technology it is pivotal that students understand how to use a tool safely.



¹¹ See Appendices – P. 23 Survey – Survey 2 in the link

¹² Park, Hyun Seo. Interview by author. Personal interview. Beijing BISS International School, April 28, 2012.

¹³ See Appendices – P. 23 'Disc sander with X mark on the right'

The two teachers who have replied to the online survey replied that sometimes they have difficulty in explaining how a tool is used. One of them said that it is especially hard to teach students who's English is not their mother tongue and not fluent in speaking it. In these cases sometimes the teacher had to pause the class and re-demonstrates the tools. One of them said that he asks the student to do it him/herself to make sure that the students understood how to use the tool. Especially for power tool like portable router, the teachers felt that it is essential for the students to experience it for themselves under supervision to get to know the feeling of using the tool.

The majority of the students agreed to the question: Do you think the use of 3-D models and interactive 3-D worlds would help you with revision of the tools and help keep you up to date and interested in Design Technology? How do you think this could help? However there were few who disagreed to this because they think that the 3-D models cannot explicitly show how the tool is used. Some of the responses said that the virtual world may be interesting but may not be useful to keep students interested in the subject. In contrast, most of the students liked the idea of using 3-D models and virtual worlds to help revise the tool. They liked the idea of having 3-D models to visualize the tool, revise their names and uses, and to see videos of the correct procedure of using the tool and equipment of what materials can be used with 3-D models.

Most of the teachers agreed that the use of 3-D models and or interactive 3-D worlds could help promote learning and understanding in Design Technology. All of them thought that it could be a good revision tool for students because it could be accessed whenever and wherever.

My initial target market is aimed at students who have trouble understanding tool demonstration in class, often forgets how to use a tool, have trouble understanding tool demonstrations, shy to ask teachers questions and English as a second language.

Generating ideas and solutions

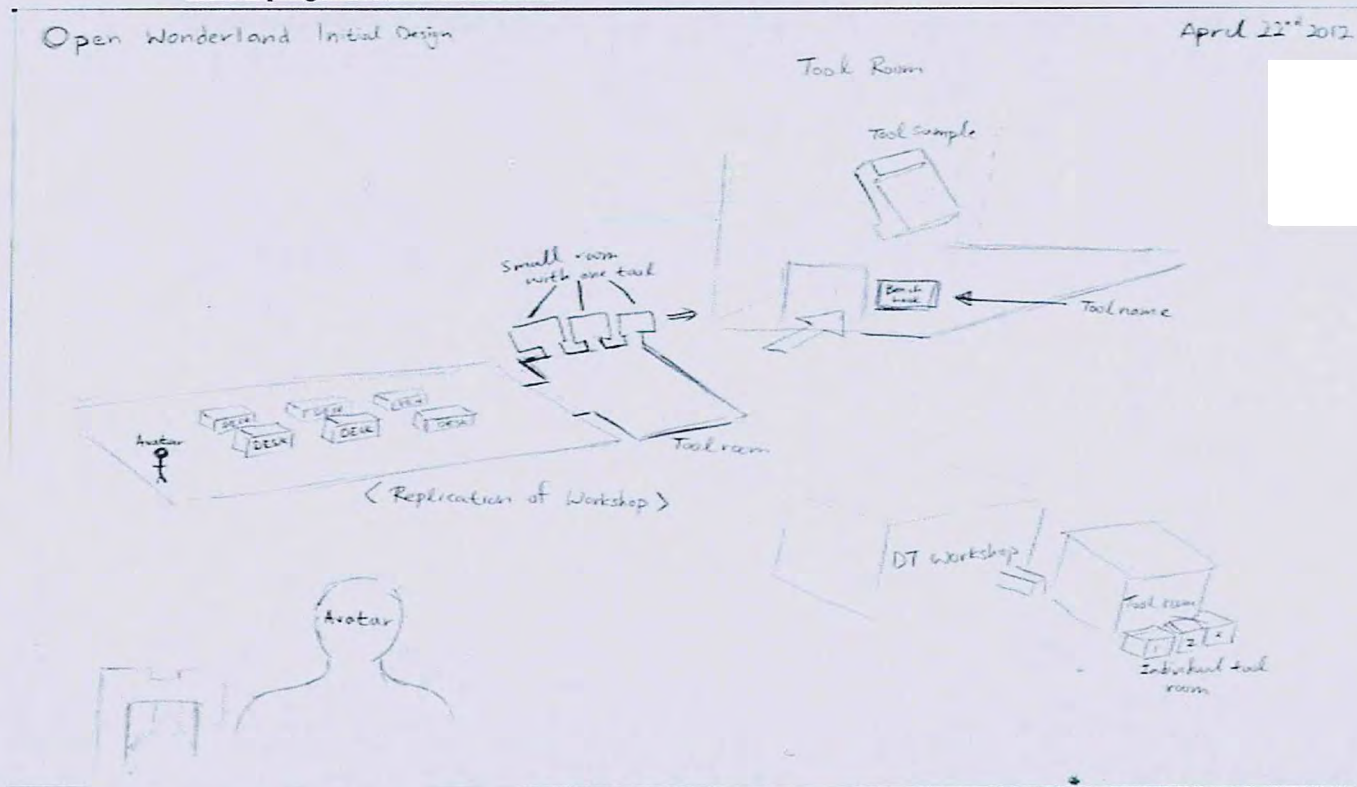
Interactive 3-D world with a simulation of real Design Technology workshop and in-depth explanation of tools could be used to revise and learn about the tool in an interesting and appealing way. Moreover it will be very helpful for students who's English is their second language and finds it difficult to speak it to learn or revise the tools demonstrated during class. Many students who are uncomfortable with speaking English feels embarrassed or shy to ask question to the teacher and end up doing nothing to revise the tools that they do not know. Creating an interactive 3-D world will allow a determined destination for students to look up to when they feel the need to revise the tool or learn new tools.

Open Wonderland is one of the free virtual worlds that anyone could use. It is a 100% Java open source toolkit to create collaborative 3-D virtual worlds. Anyone

who is willing to create a server can create a world for free. It is run through Java, therefore compatible with Windows, Macintosh, Linux or any other operating system (OS) that allows Java. In open wonderland, users can communicate with audio, share live desktop applications, and collaborate in an education, business, or government context.¹⁴

There are many features in open wonderland server; it varies depending on what application or utility is installed on the server. Open wonderland servers are accessed via URL. Java web start technology is used to start Open Wonderland Client. Open wonderland provides in-world avatar configuration. Personalized avatar could be dragged and dropped from evolver.com. It also provides audio, voice chatting, text chatting, and webcams for communication.¹⁵ Model files exported from Google Sketch up such as .dae file could be uploaded on open wonderland. Therefore open wonderland will be suitable for creating a virtual Design Technology Room.

Developing the chosen solution

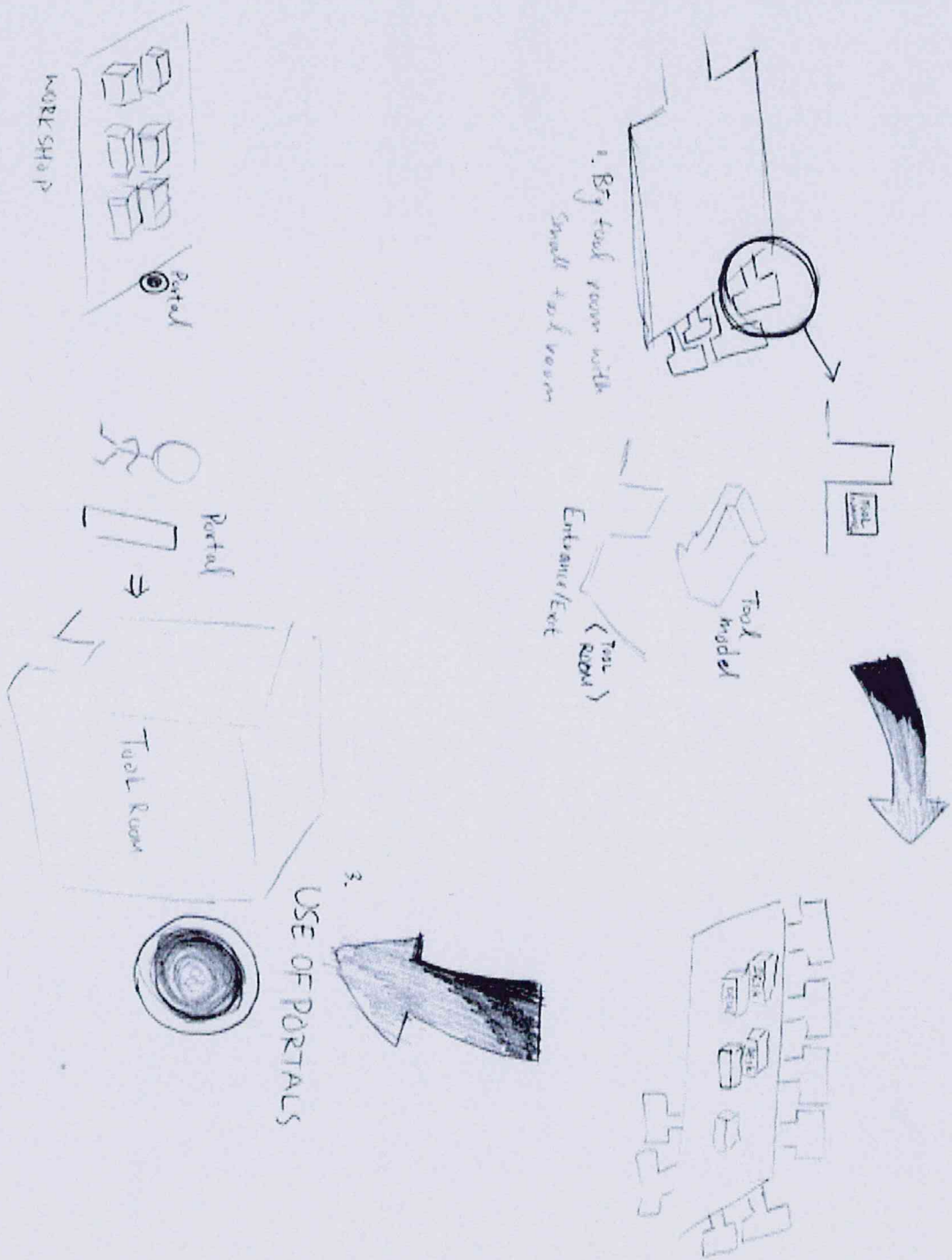


¹⁴ "About Open Wonderland | Open Wonderland." Open source 3D virtual collaboration toolkit | Open Wonderland. <http://openwonderland.org/about/about-project-wonderland> (accessed September 29, 2012).

¹⁵ "Features | Open Wonderland." Open source 3D virtual collaboration toolkit | Open Wonderland. <http://openwonderland.org/about/features> (accessed September 29, 2012).

I've first designed to include a tool room to be connected to the workshop so that the avatar could walk in the room through a door. Considering the features available in open wonderland I developed my design to make it more appealing to students.

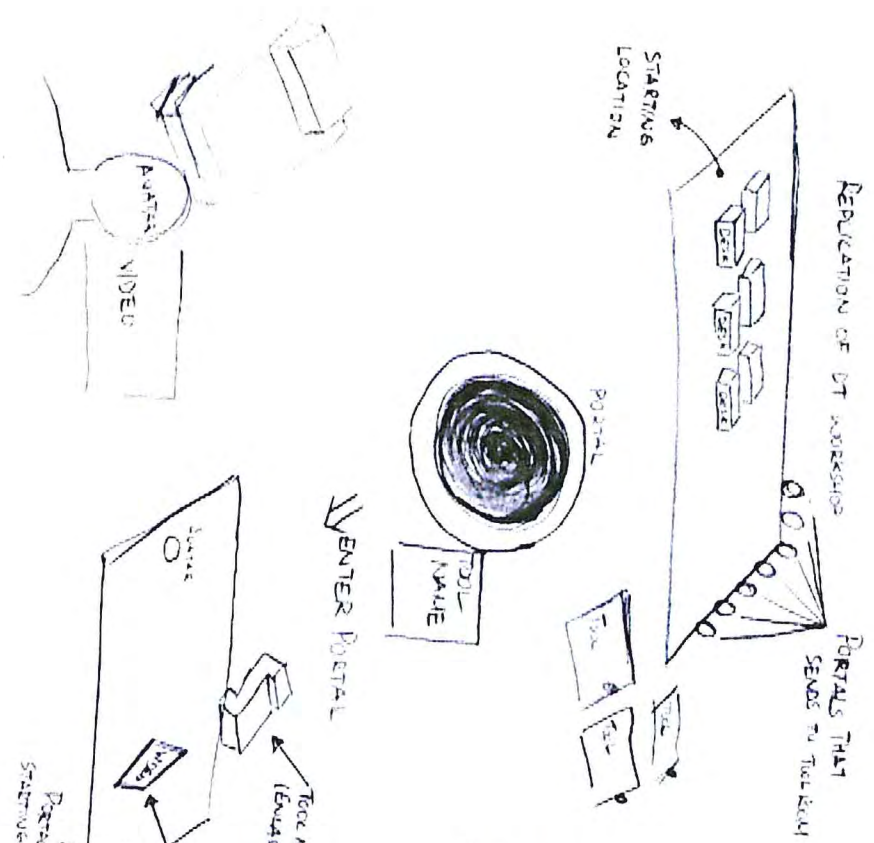
Tool Room Design Development



1 Tool Room ATTACHED TO DT WORKSHOP

FINAL DESIGN

In my final design I decided to make portals that sends to a tool room that includes large-scale model of the tool and a video that shows how to use a tool.



FUNCTION

VIRTUAL WORLD OF SCHOOLS DT WORKSHOP A PORTAL SENDS THE USER TO A TOOL ROOM CONTAINING AN ENLARGED MODEL OF THE TOOL AND A TUTORIAL VIDEO OF HOW TO USE THE TOOL.

A VIRTUAL WORLD USED FOR LEARNING AND REVISING TOOLS USED IN THE DESIGN TECHNOLOGY WORKSHOP.

TARGET MARKET

THE TARGET MARKET IS MAINLY STUDENTS WHO'S ENJOYING TO TRY THEIR HAND LANGUAGES OTHER TARGET MARKETS INCLUDE STUDENTS WHO GETTED FRAGILE HAVE TO USE A TOOL, HAVE TROUBLE UNDERSTANDING TOOL DESIGN RITUAL AND TRY TO ASK QUESTIONS TO THE TEACHER.

MATERIAL

COMPUTER GRAPHICS (CAD)

SIZE

THE REPLICATION OF THE SCHOOLS WORKSHOP IS IN RELATION TO THE AVARAGE IN OPEN WAREHOUSE

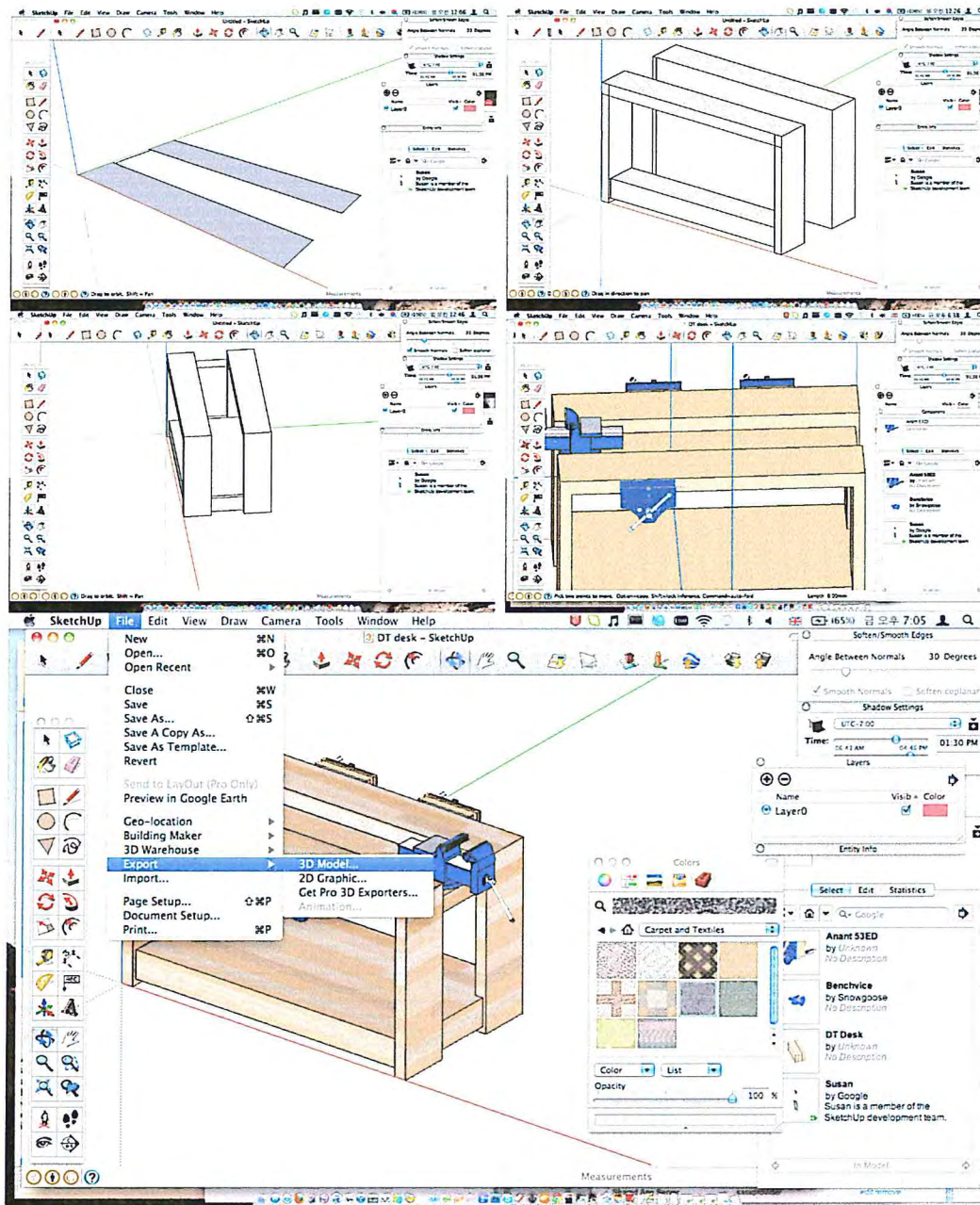
CONSTRUCTION

USING COMPUTER PROGRAM (GOOGLE SKETCHUP) TO MAKE MODELS AND UPLOADED THEM ON OPEN HOUSEWEAR

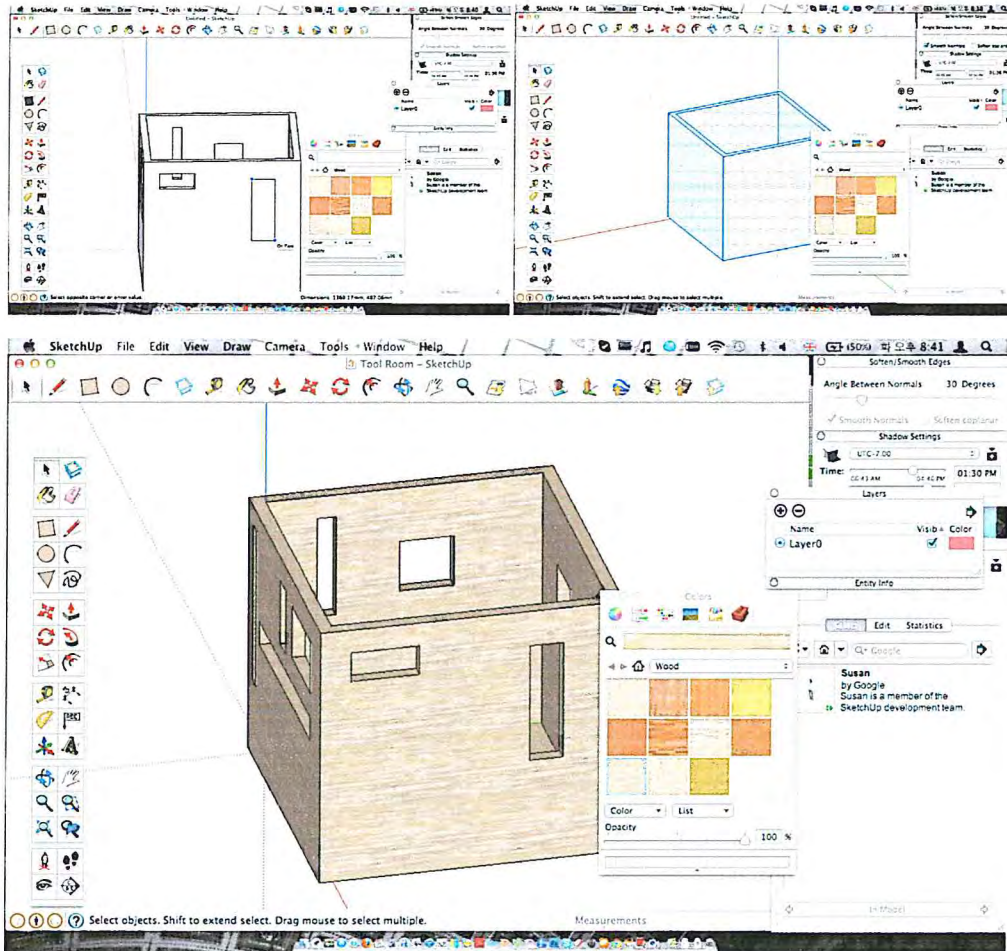
Page 20/20

Realizing the chosen solution

The school has helped me to set up the virtual room. Using the measurements I collected with tape measure and Google Sketch up, I created the benches in the DT studio using google sketch up. Considering the time constraints for such a large project, I have downloaded some already-made model samples from the Google warehouse to add on to the bench, such as wooden and metal vice devices.



After creating the design technology studio benches in 3-D model, I exported the 3-D model into a '.dae' model file. Then I've inserted the model file in the open wonderland server. I also created the DT workshop room and a tool room to put into the server.

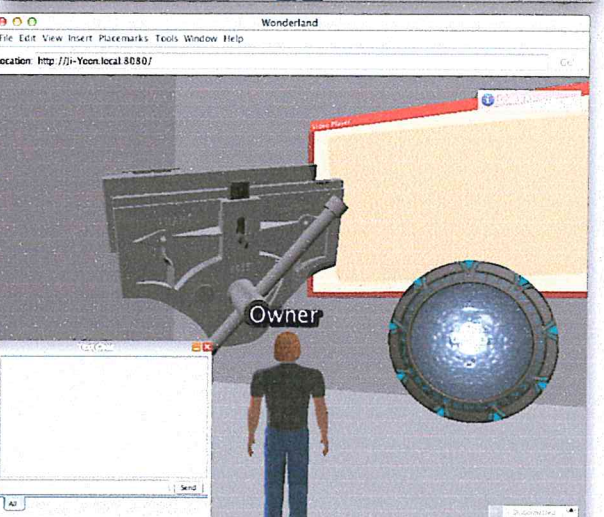
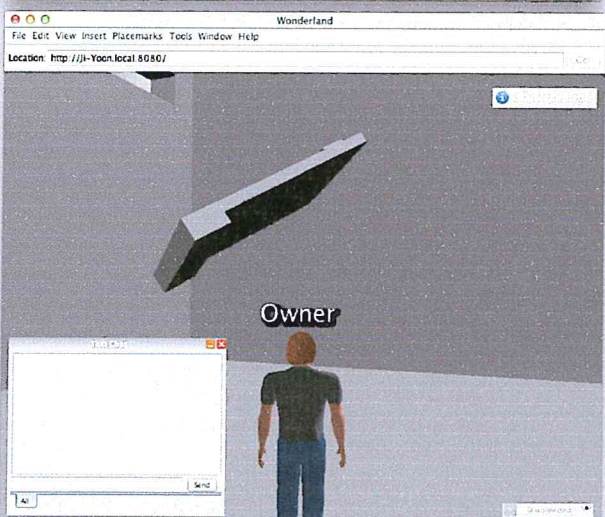
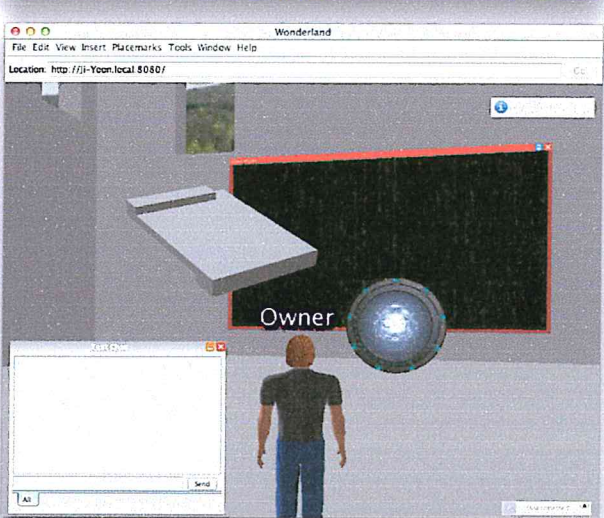
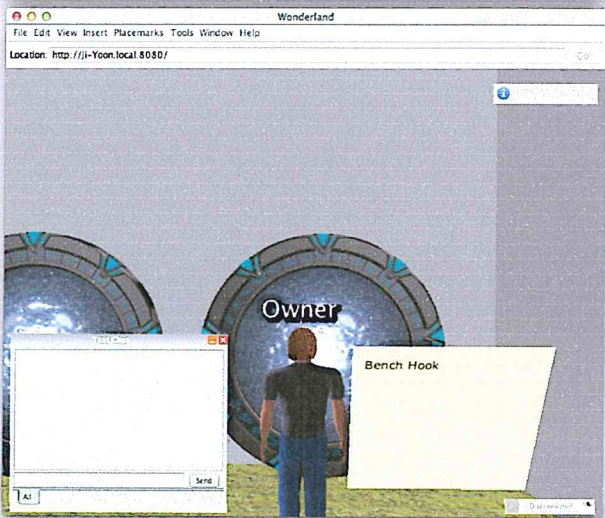
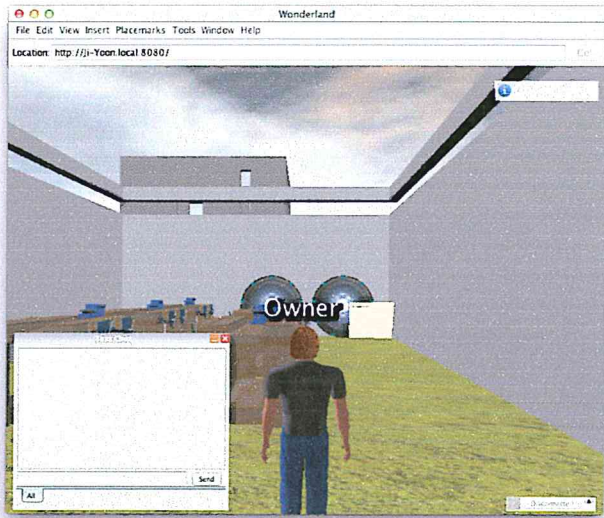


From the knowledge I have learnt about how to use a tool, during the 5 years of DT class, I made a video of how to use a bench hook and a vice.

After uploading the models to server, I've changed the positions and scales of the models to make the DT workshop.¹⁶ Then I've made portals that send the avatar to a tool room where there is a large-scale model of a tool and a tutorial video. In the tool room, I made a portal that sends back to the starting location. Because this is such a large project, to prove the potential of the project I included only two hand tools, wood vice and bench hook, in the server as a prototype.

¹⁶ See Appendices – P. 22 Image of BISS DT workshop

<The Virtual World>



Testing and evaluating the chosen solution

Considering the safety, the school did not allow the access of the virtual world from outside of the school. Therefore, going to such a small international school, I wasn't able to garner large sum of data through short period of user trial and user research. I have conducted an online survey¹⁷ to gather responses; I was able to get 16 survey responses for my product. The questions were set up to evaluate the final specification of the prototype of this project.

Out of 14 people who answered the question of whether open wonderland was easy to use or not, 11 people answered yes. It is crucial that people, who does not know what open wonderland is, has to be able to comprehend its functions easily because it won't be beneficial to create a virtual world that only the minority could understand how to use it.

According to my survey, it has shown that all of the people benefited and were more motivated to learn more about the tools used in DT. 15 people who answered question 4¹⁸ agreed that enlarged 3-D model and a tutorial video have helped them understand more about the tools. There were two people who thought this wouldn't be a good revising tool if there were all the tools in the workshop and accessible outside of school. Their reasoning was that it could be dangerous to have outsiders accessing the school network or preferred alternative ways to revise tools. In contrast, the majority believed that it would be a good revising tool when accessible outside of school because of several reasons. One reason was that it is a very interesting and fun tool to revise, as it resembles games. One student responded that as a student living far away from school, therefore cannot stay after school to revise the tools in the workshop, it will be beneficial to be able access the workshop virtually to revise the tools. The accessibility outside of school will allow people who have interest in DT to learn the tools that they might not have access to. Because it provides not only fun but also DT skills and knowledge it will be an invaluable tool when it could be accessed outside of school.

Realizing the fact that there are alternative ways to revise tools, I wanted to make this a better learning tool than what exists currently. Therefore I asked the question 6: Do you think this is a good revising tool compared to Internet research? Why or why not? The majority, mentioning the benefits of a virtual world (the visual element – being able to see the tools, and interactivity – looking at tools as if you were in the actual room) agreed that it was a better tool than an Internet research. The most critical reason why people agreed that it was a better tool was that it is motivational, specific and DT oriented while Internet research is broad and requires time to search for the correct information. Because it is specifically dedicated to learning and understanding of all things in Design Technology and based on an

¹⁷ See Appendices – P. 23 **Survey** – Survey 4 in the link

¹⁸ See Appendices – P. 23 **Survey** – Survey 4 in the link

actual design technology studio it is a better research tool compared to an Internet research.

Most of the people agreed that it would be beneficial for students who: 1. Often forget how to use a tool safely, shy to ask questions to the teacher, does not understand the tool demonstration, not fluent in English. One of the students who responded said that it wastes his/her time if they go through a class demonstration again because one of the students has forgotten how to use a tool safely. Therefore, this would help students who forgot how to use a tool to revise it and not waste other's time. The virtual world could be accessed when it suits the people listed above. People who are shy to talk to teachers in front of other students or does not understand tool demonstrations can revise the tools in an interesting way using 3-D worlds and tutorial videos. The fact that it resembles games will allow students to be more interested to learn and utilize this revision tool.

The user research¹⁹ has shown that I was able to hit not only the initially intended target market but also other target markets.

Conclusion

From the user research²⁰, it has shown that the use of CAD models and an interactive 3-D world, such as open wonderland, has the potential to motivate learning and understanding of safe use of tools and equipment in Design Technology environment not only for students with English as a second language, but also students with English as their first. As a place for revision, it is more motivational, fun, and specific to Design Technology than a broad Internet research. Therefore, if investigated further, it will be beneficial to students who are interested in Design Technology, often forget how to safely use a tool, uncomfortable to ask teachers questions, does not understand tool demonstration, have trouble understanding design technology terms or not fluent in English.

Because this project was a prototype of a potentially beneficial learning tool there are many aspects that could be improved on. There were suggestions made by people who did the survey to include more textures that are more aesthetically appealing. Because this project was to test the potential of the project I didn't make amendments to the prototype. However, responding to the user research and improving on the prototype is a crucial process in order to create the most effective and appealing product, and to meet the needs of the people.

This project could be expanded on to include other aspects of Design technology, such as but not limited to explanation of construction techniques and materials, for more in-depth learning of Design Technology through the use of CAD and interactive 3-D world.

¹⁹ See Appendices – P. 23 **Survey** – Survey 4 in the link

²⁰ See Appendices - P. 23 **Survey** – Survey 4 in the link

Reference and bibliography

<Website>

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Metal Vice

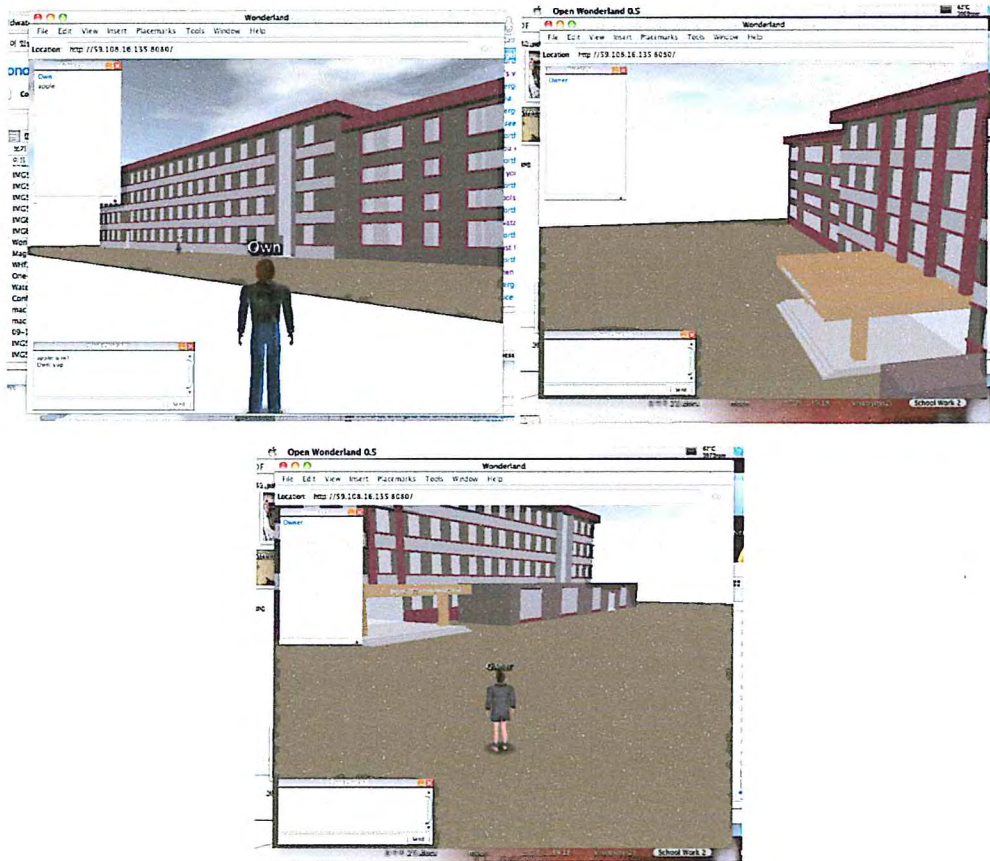
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Appendices

<Virtual 'BISS' project that I did for Gr10 Personal Project>



I measured the size of school and made a virtual version of our school using Google Sketch up and Open Wonderland.

<Images of BISS DT workshop> from <http://www.biss.com.cn/Gallery/02/5.html>



(Looking towards the door from 1st row Bench)



(Looking towards the door from 3rd row Bench)



(Hand Tool Board)



(Hand Tool Board)



(Hand Tool Board)



(Students working in workshop)



(Students working in workshop view from other end of the room)



(Machines on the left side of the workshop)

<Survey Question and Results>

Link to the raw data and survey questions

<http://s04023.biss.wikispaces.net/EE+survey>

<Disc sander with 'X' mark on the right>

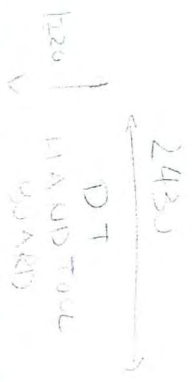
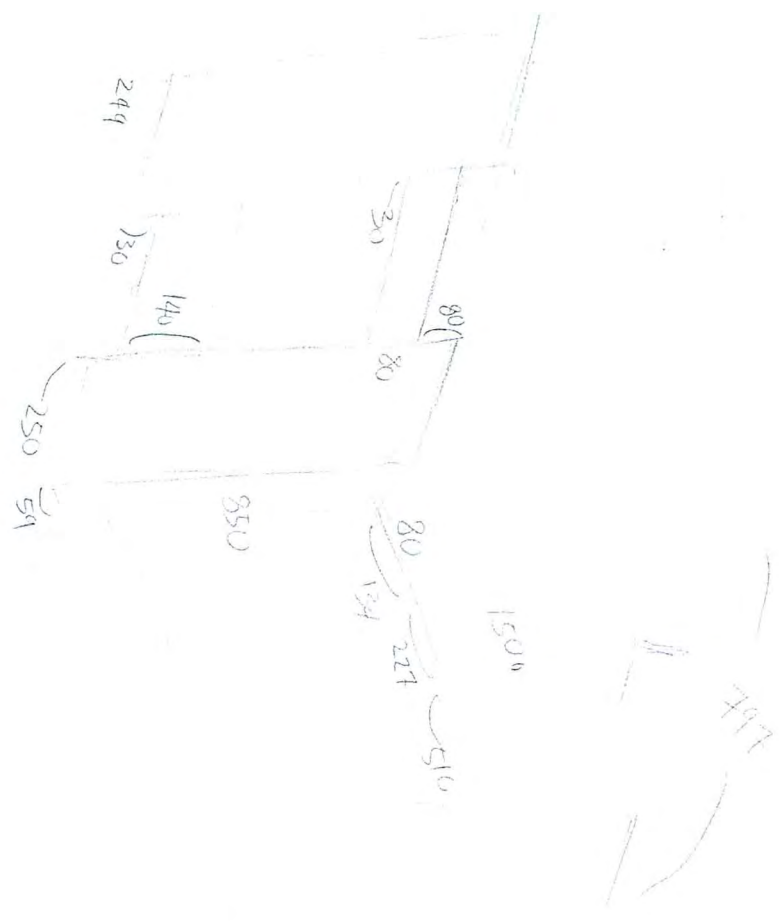


<Images of me measuring the workshop and DT desk>



Height 3640
 Width 6490
 Length 7500 + 5040

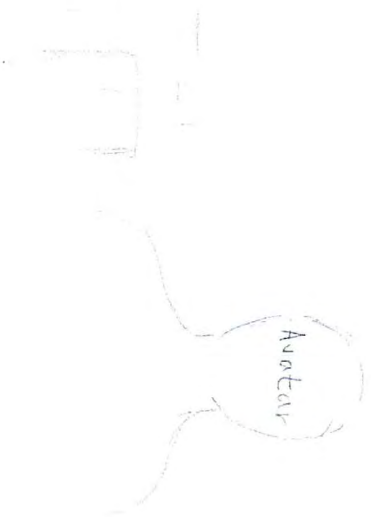
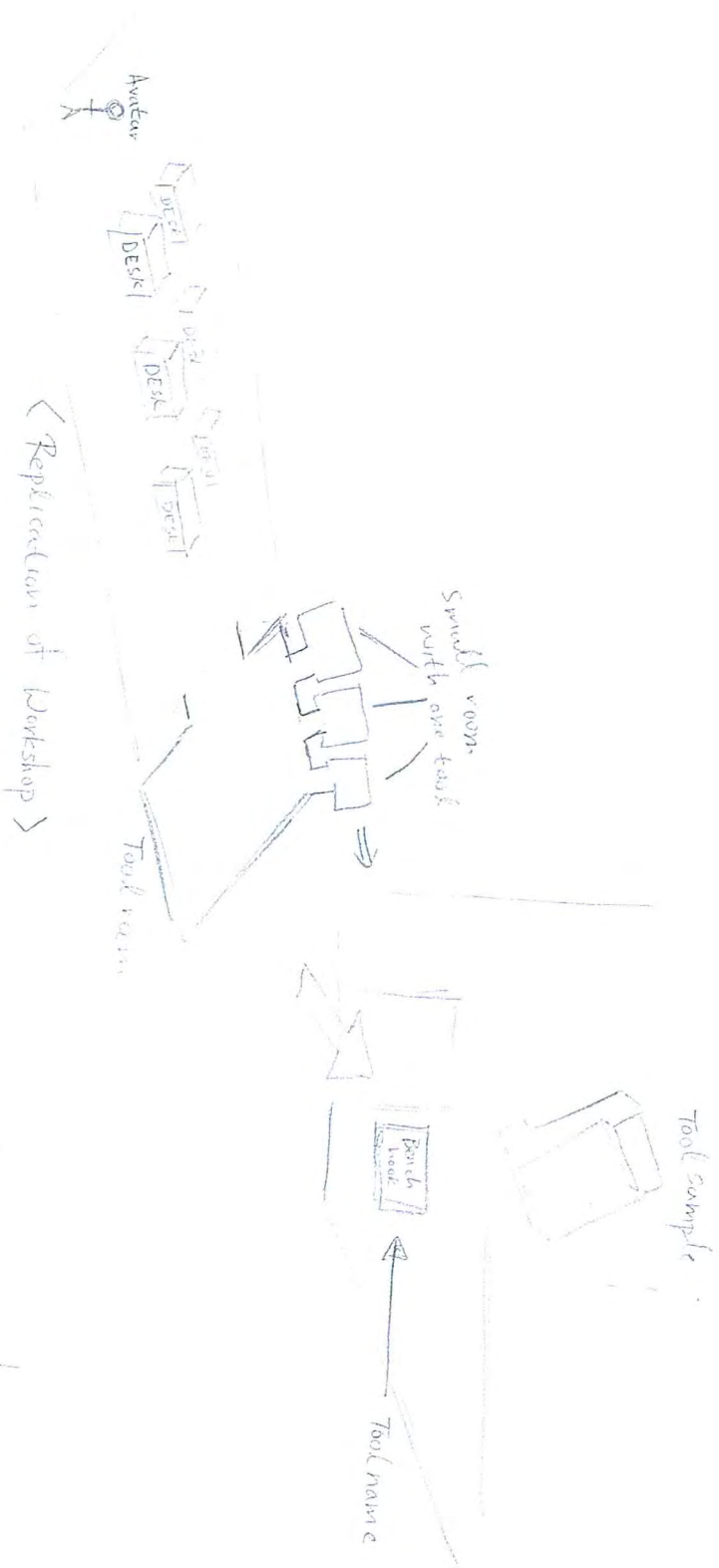
DT DESK
 MEASUREMENT



Open Wonderland Initial Design

Tool Room

April 22nd 2012

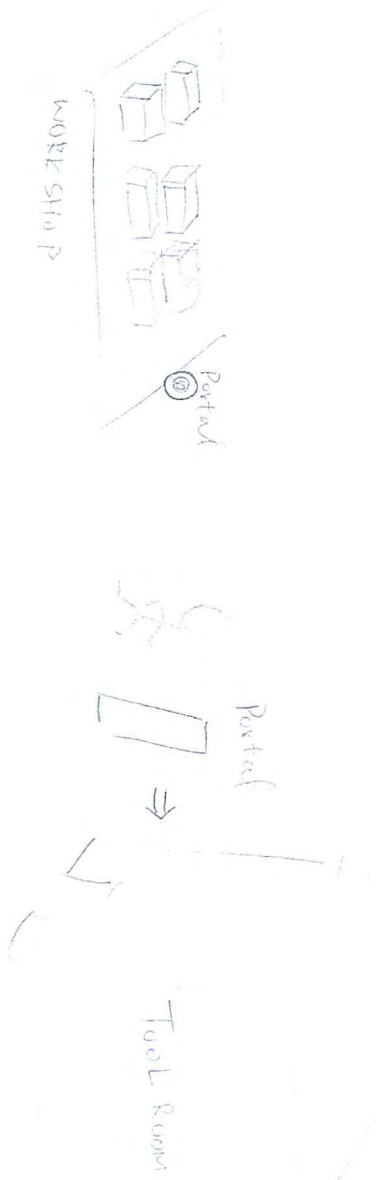


Tool Room Design Development

2. TOOL ROOM ATTACHED TO DT WORKSHOP



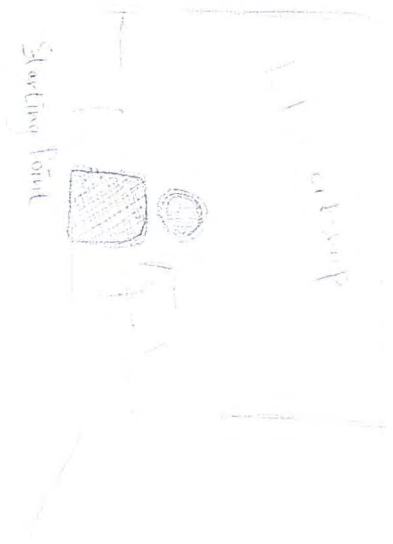
3. USE OF PORTALS



openwonderland

World planning

Aug 20th 2012



Portals move the avatar to different location to explain the use of tools

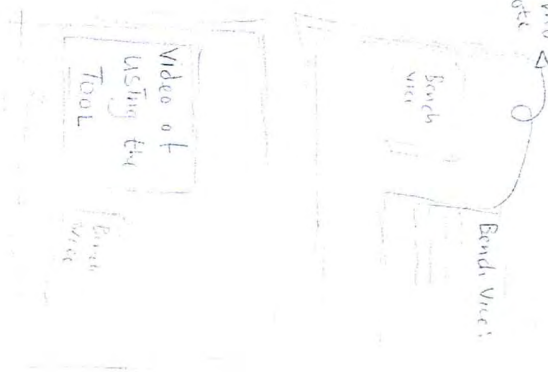
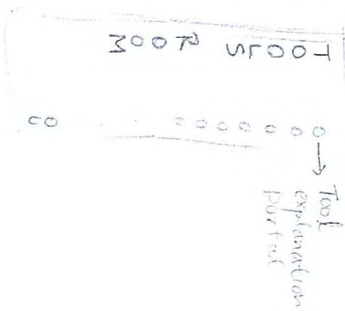
Portals



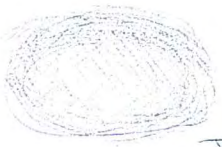
Ex Bench vice



INDIVIDUAL TOOL ROOM



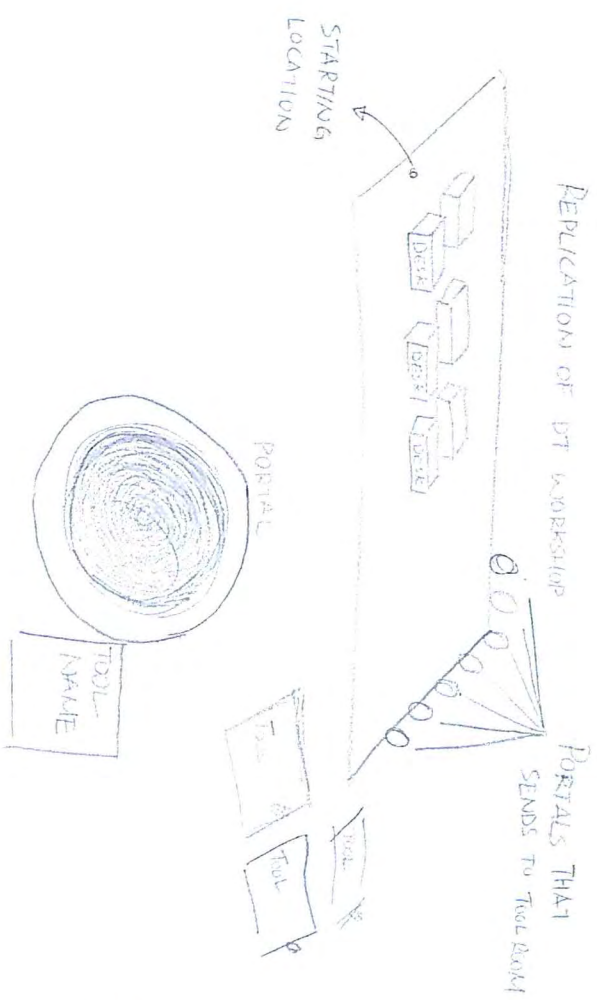
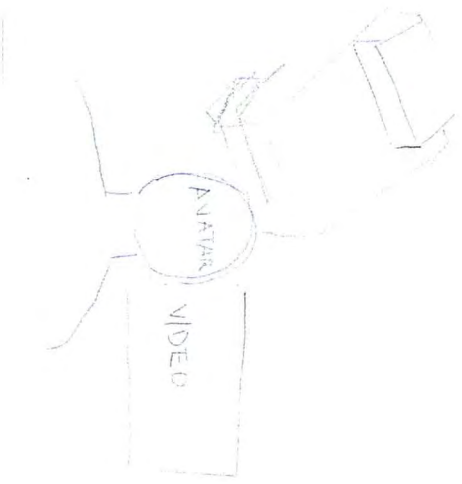
TOOLS ROOM
PORTAL



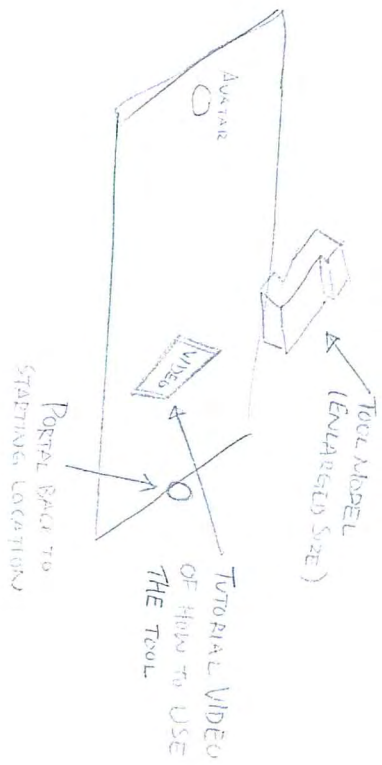
DT Bench

DT Bench

FINAL DESIGN



ENTER PORTAL



FUNCTION

VIRTUAL MODELS OF SCHOOLS DT WORKSHOP. A PORTAL SENDS THE AVATAR TO A TOOL ROOM CONTAINING AN ENLARGED MODEL OF THE TOOL AND A TUTORIAL VIDEO OF HOW TO USE THE TOOL. A VIRTUAL WORLD USED FOR LEARNING AND REVISING TOOLS USED IN THE DESIGN TECHNOLOGY WORKSHOP.

TARGET MARKET

THE TARGET MARKET IS MAINLY STUDENTS WHO'S ENGLISH IS NOT THEIR FIRST LANGUAGE. OTHER TARGET MARKETS INCLUDE STUDENTS WHO OFTEN FORGETS HOW TO USE A TOOL, HAVE TROUBLE UNDERSTANDING TOOL DESIGN RATION, AND SAY TO ASK QUESTIONS TO THE TEACHER.

MATERIAL

COMPUTER GRAPHICS (CAD)

SIZE

THE REPLICATION OF THE SCHOOL'S WORKSHOP IS IN RELATION TO THE AVATAR IN OPEN WORLDLAND.

CONSTRUCTION

USING COMPUTER PROGRAM (GOOGLE SKETCHUP) TO MAKE MODELS AND UPLOADING THEM ON OPEN WORLDLAND.

Aug 20th 200