Design Technology - Trip

Design Situation:

Trip to

On the 12th of September , I visited the for the Habilitation and Rehabilitation of the Physically Challenged' in a school trip with my grade. The aim of this trip was to get to know the available facilities in this institution as well as to see what kind of needs it had for both the children and the supervisors. This would later help each student choose a product to create in the workshop to satisfy their needs.

In this two hour trip, we got to take pictures as well as take notes to end up with a list of needs and solutions to help out in the institution. We additionally got to question the supervisors in order to answer our interview questions. There were various equipment already available for the children's use, nevertheless, most were of low quality and needed to be replaced by more attractive and efficient ones.

Through this trip, we got to know about both the supervisors' and the children's needs. The supervisors' main needs were of better storage area, in order to safely and neatly store the children's equipment. As for the children, they needed both educational toys and equipment to help their physical problems. Educational toys were needed to teach the children about the world around them and help them learn through playing. As for the other equipment, they needed things that would help them physically. Since the most common physical problem they had was Spinal Bifida, the children needed motivation to straighten their backs. They also needed equipment that would help them deal with their problems and teach them to grow up to be independent.

This was a really interesting trip that made me feel with the physically challenged and realize how much help they needed in order to grow up to be independent and successful people. Knowing that I as a student can find a way to help them out was a remarkable feeling that boosted my energy and motivated me to accomplish my goal. From this trip, I concluded how much help the children need and how capable we as students are of working to provide them with almost any possible need.

Pictures in the Institution...

Entering the for the habilitation and rehabilitation of the physically challenged"

A large ball lacking storage space

A supervisor talking about the children's needs

A physically challenged child using one of the availble equipment

Storage needed for clutches to be neatly stacked and organized

Availabe equipment adjustable for each child's need

Available equipment needing modification and this being a transfer board used to move the disabled from chair to wheelchair

One of the available equipment- an object used to lay physically challenged children on their back

- **Design Situation:**

The for the habilitation and rehabilitation of the physically challenged" institute is a shelter for any physically challenged child with needs. It does its best to provide all possible facilities to aid the child surgically and physically as well as provide him/her with normal education. It aims to help the children become independent in the future.

Nevertheless, the children are not provided with the best standards of equipment. The equipments are of low quality and are in limited amounts. Therefore, the children cannot be properly taken care of. They still have needs. They require entertaining and educational toys as well as more equipment to help them physically.

- **Design Brief:**

Design and create a product that will satisfy the need of one or more physically challenged children.

This product should be done in the limited time before the 16th of December It should be made in school using the available resources in the DT workshop. It should also be done individually with minimum guidance.

- **Links to Areas of Interaction:**

Approaches to learning (ATL):

Through this project, I will learn a variety of new techniques to create my product. I will learn to handle different equipment and materials from those found in the workshop. Some of the equipments I might have to tackle are machinery, needles, tools and drills. I would also use materials such as wood or plastic.

Through all this, I will learn new skills and values. I will learn how to work in a new environment, as I would have to manage work in a noisy crowded workshop near dangerous tools and equipment. Dealing with other students would also be a skill I will tackle, as I would have to share tools, wait for my turn in getting them, learn to focus and concentrate despite the noise level, and learn to cooperate with others.

I will also develop my time managing and organization skills, as I would have specific targets and deadlines to meet and fulfill. I would have to plan out my work and make use of outlines and brainstorms in order to stick to due dates and avoid time pressure and keeping things to the last minute. I would also need to manage my time according to everything else that's going on in my life, including due dates of other school subjects and homework. I will organize my work and work step by step to avoid confusion and stress.

Another important skill I will learn is independence. Although I already am an independent student, by working individually with minimum guidance from others, I will now learn to apply this skill in school and in the workshop. I will try to minimize my questions and use my instincts in working. I will learn to use tools and materials individually and rely on only myself to complete my work.

Creative and logical thinking is another useful skill I will learn. Other than learning to choose a creative subject for my product, I will learn how to think logically and be environmentally friendly. I will learn how to take everything into consideration and make wise decisions in choosing the materials I will use. I will use my creativity in producing the product and designing it.

Moreover, I will learn how to not only create a successful product, but to take into consideration the safety precautions in order to ensure it is suitable for a physically handicapped child.

After working on the product, I will start feeling with the handicapped children and will learn to appreciate even the smallest things.

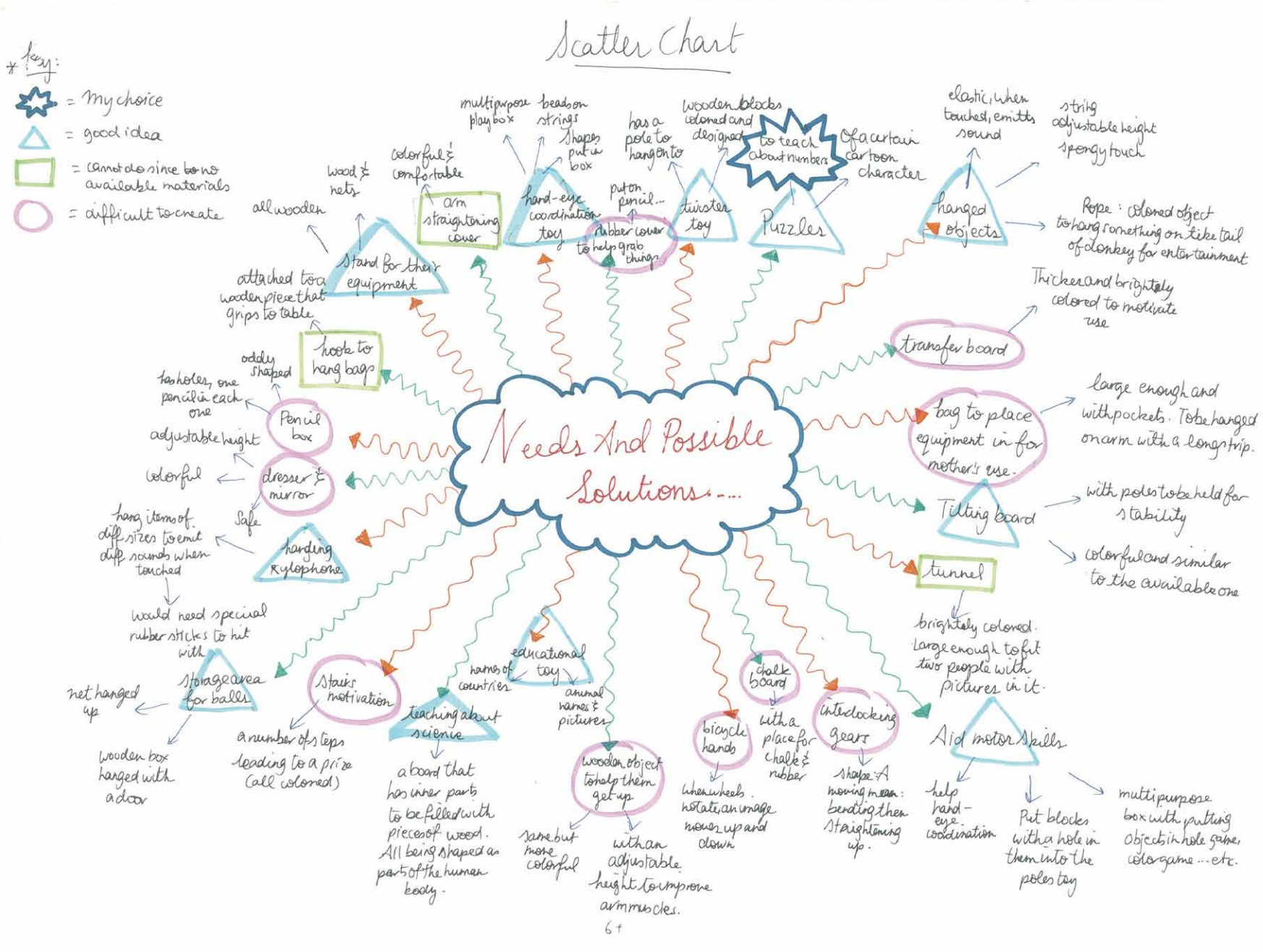
Lastly, I will learn new research skills, as I would need to use a wide range of resources. Not only would I use the internet for information, I will need to make interviews, analyze case studies, create surveys, test my product in various ways...etc. I will also apply my previous knowledge of workshop tools and how to handle them successfully.

Human Ingenuity (Man the Maker):

Through this project, I would have achieved producing a useful creative solution to a problem while showing recognition to previous solutions of others. Although I would have created an original piece of work independently by using my mind and my own hands, I would have also recognized other solutions to this problem through case studies and research. By creating the product myself with my two hands, I will gain satisfaction that I have helped a needy child.

Community service:

My product is not only a design to be put on show. I will be creating a product that would actually be useful to people. It will hopefully aid the handicapped children in a specific way. Therefore, by creating this product, I would be benefiting the community or at least one needy child in a way that will hopefully satisfy him/her. This benefit could be either physically (the product could aid the child physically), mentally (it could aid his/her education) or it could be aimed to help the supervisors aid the children, by providing them with more storage area, better organization, modifications for equipment...etc. No matter how we help, we would still be aiding the unfortunate and deprived people of Jordan in a way that would hopefully satisfy them and give them hope of either improvement or recovery from their problems and difficulties.


Scatter Chart
key:
= my choice
= good idea
= cannot do since bans available materials
= difficult to create
Needs And Possible Solutions....
Stand for their equipment
all wooden
wood & nets
attached to a wooden piece that grips to table
arm straightening cover
colorful & comfortable
hard-eye coordination toy
multipurpose play box
beads on strings
Shapes put in box
rubber cover to help grab things
put on pencil...
twister toy
has a pole to hang on to
wooden blocks colored and designed
to teach about numbers
Puzzles
Of a certain cartoon character
hanged objects
elastic, when touched, emitts sound
string adjustable height spongy touch
Rope: colored object to hang something on like tail of donkey for entertainment
transfer board
Thicker and brightely colored to motivate use
bag to place equipment in for mother's use.
large enough and with pockets. To be hanged on arm with a long strip.
Tilting board
with poles to be held for stability
colorful and similar to the available one
tunnel
brightely colored. large enough to fit two people with pictures in it.
Aid motor skills
help hand-eye coordination
Put blocks with a hole in them into the poles toy
multipurpose box with putting objects in hole game, color game ... etc.
interlocking gears
shape: A moving mean: bending then straightening up.
chalk board
with a place for chalk & rubber
bicycle hands
when wheels rotate, an image moves up and down
educational toy
names of countries
animal names & pictures
wooden object to help them get up
same but more colorful
with an adjustable height to improve arm muscles.
teaching about science
a board that has inner parts to be filled with pieces of wood. All being shaped as parts of the human body.
Stairs motivation
a number of steps leading to a prize (all colored)
Storage area for balls
net hanged up
wooden box hanged with a door
hanging Xylophone
hang items of diff sizes to emit diff sounds when touched
would need special rubber sticks to hit with
dresser & mirror
colorful
adjustable height
Safe
Pencil box
has holes, one pencil in each one
oddly shaped
hook to hang bags
6+

Conclusion on the Scatter chart:

This Scatter chart was a way to clarify everything and place all my options in front of me. I wrote down all 24 problems and solutions and added a few comments, clarifications, and sub-ideas to them.

After creating this scatter chart, I needed to decide what topic I would be choosing, and whether it would be providing aid for the children or the supervisors. I also needed to take into consideration the time I had to create the product, the space I had in the workshop, and the level of difficulty each product had. I wanted to choose something useful and creative, but that is at the same time easy to create.

In the end, I chose to do a puzzle. This puzzle would be an educational game that would help the children practice their numbers and maths in an entertaining way. It would not only aid them educationally, but would also help in their hand-eye coordination as well as their motor skills. It would have to be colorful and creative since it will be aimed for young children from grades 3-5.

« Interview »

Interview/ Questionnaire

1. **What are your names?**
   - **A**
   - **B**
   - **C**
2. **How many children are there in this institution?**
   There are about 90 children
3. **What are their age groups?**

   1 day-5 years old ☑ 6-8 years old ☑ 9-12 years old ☑ 13-15 years old ☑

   16-19 years old ☐ 20 years old and above ☐ All ages ☐
4. **What are the most common physical problems the children face?**
   Spinal Bifida and Cerebral palsy (CP)
5. **What is the majority gender of the children?**

   Mostly boys ☑ Mostly girls ☐ Equal number of both ☐

   Specific number: Boys ☐ Girls ☐
6. **How are the children treated in this institution?**
   Children are aided physically and surgically. They are either made normal (overcome their problem) or are taught new skills alternatives for the things they cannot do.
7. **What is the aim of this institution?**
   The aim is to help the children surgically (medically) and physically in order to become independent in the future. The younger children are also prepared for school.
8. **Can the parents remain in contact with their children?**

   Yes ☑ No ☐
9. **Do children sleep in this institution?**

   Yes ☐ No ☑
10. **What type of things do the children need?**
    They need toys (either educational or entertaining ones) and equipment to help them improve physically. They also need motivation to work with the equipment.
11. **What languages are the children taught?**

    Arabic ☐ English and Arabic ☑ More than two languages ☐
12. **What are the children's hobbies/interests?**
    They like swimming and enjoy playing sports. The children (especially the younger ones) like colors and creativity. They also like Disney characters like Spiderman and Mickey mouse.
13. **What facilities are already provided for the children?**
    - A fully equipped music room
    - Desks and chairs with adjustable heights
    - A scooter especially for the handicapped
    - A big ball to transfer and practice balancing on. This would enhance the protective reaction.
    - A tilting board (though primitive with bad quality)
    - A swimming pool and a gym
    - A play room and play ground
    - Class rooms and a science room
    - Education
    - Physical aid equipment and some toys
14. **Do you have a general need or specific ones?**

    General need ☐ Specific ones ☑
15. **What is the children's daily routine?**
    - Come with mother and rest
    - Go to the play room or the room where he/she needs to be treated and helped
    - Learn to be independent
    - Work on muscles
    - Go home
16. **Would you prefer the products to benefit an individual child or a group of children?**

    Individual child ☐ Group of children ☑

17. **What specific things do you need in the institution?**
- Teaching about science (can be in English)
- Teaching toy about the surrounding world
- Don't have stairs for children to climb
- Apparatus to help them raise their legs as if on stairs.
- Some cannot hold the drum sticks
- Some cannot even walk
- Some have poor eye sight and hearing abilities
- A high storage area for the large balls which would save space underneath since room is very small and crowded. Could be wooden or nets.
- Xylophone hanged to help motor skills and help them raise their heads and stretch their backs plus have fun while differentiating between the sounds.
- A small mirror and dresser not too big and maybe adjustable length
- Have a barrier and place to put the pens in on table
- A hook made for the desks to hang the books on
- A stand or hangers for the 3akkazat since they are out untidily.
- A cover to put around the arms to keep them straight which would help improve muscles.
- Toys: To aid hand-eye coordination
- The small wooden object that they use to help them get up
- Use the pencil rubber handle thing to help them hold objects and grab them
- Colored steps (like twister) to help them step on the right colors (coordination).
- Puzzles
- Games to help cross movement and fine movement (strengthen upper limbs).
- Transfer board – Better if plastic but can be wooden. Should be lightweight and have a curve to make it easier to transfer on.
- Something hanged up to help motivate the children to raise their backs. Maybe even elastic to strengthen their muscles when pulling. Can be colored and have characters on it.
- Something to aid motor skills
- A creative bag to put the child's apparatus on to be held on shoulder. This should be long and would help the mother carry both the baby and the apparatus.
- Long tunnel which would help CP and spinal Bifida. Large enough for a child and supervisor
- Toy to motivate moving hands
- Bicycle with hands which can be put on the table which has to have an attached strap so they can play without having to worry about falling.
- Interlocking gears where one moves, making the others move

Continue on Interview...

- Tilting board to help balance. Can make one that's smaller and creative to motivate the children to use it. Could have an acrylic cover with moving fish inside them. Can add a pole on each side to help.

18. **What specifications would the products require?**
- Best if for more than one person's use
- Best if colorful to attract the child and make him/her willing to use the apparatus and forget the pain without being afraid.
- Have safety precautions to avoid falling
- Of suitable size
- User friendly

Thank you for your time,

Conclusion on the interview:

From this interview, I got to answer all my questions and find out more about the institution. I also got some basic information about the children such as their gender, interests...etc which would help me decide what my final product would be. I was also told about the children/supervisor's main problems so as to choose between them and find a solution for this choice, which would hopefully satisfy that need.

Research of Materials

Research

The student carried out extensive research on a variety of material including wood, plastics and metal.

The properties, uses and origin of the various material were discussed.

Conclusion:

From all this research, I got to know about the different materials I can use when creating my product. I also looked into the details of every material to be able to later make choices based on the information obtained about them. This also enabled me to know their advantages and disadvantages and find out which of the materials are the most environmentally friendly. Moreover, I looked at pictures of the materials to get to know them better. In the end, I learned about each material and how it is used/ made. I also got to know about the different types of each kind of material to differentiate and choose between them when creating my product.

Conclusion:

From all this, I got to know about the different processes and techniques and what they are used for. I additionally saw pictures of them to be able to differentiate between them and relate the information about them to their appearance. I found about what machines there are to complete different tasks and how they can be used. Moreover, I learned about the different joining techniques to later on choose between them to join parts of my product together. In summary, I learned about the different ways with which the materials can be dealt.

Case Studies

Image of mathmatical game removed for copyright reasons

This is a mathematics game created for children from age 3-8. It is basically made up of a machine shouting out math questions and a board with numbers to answer the questions through. I extremely liked this idea and found interesting since not only is it colorful and creative, it enables moving around to find the answer. This would motivate the child to move, since by stepping on the numbers, he would be solving the questions. I also found it fascinating how the question is made audible, aiding in leg-ear coordination by teaching the child to act according to what he hears. This would teach the child to follow instructions and develop his listening skills.

Image of numbers game removed for copyright reasons

This numbers toy is designed for 3-5 year olds. It is therefore remarkably eye catchy and attractive, with its bright colors and various patterns. In addition, all the pieces are stored in a wooden box. This can be useful in helping children learn how to add, subtract, divide and multiply numbers. Each number can be used more than once to create different equations. Moreover, each number has a specific color and pattern, making it easier to differentiate between the pieces. Nevertheless, this product does have a disadvantage. Since it is aimed for young children, the small pieces would be easy to lose and misplace. It therefore does not suit its target users and does not provide safety precautions.

Image of a game that will help student learn how to multiply removed for copyright reasons.

This educational game helps
ages 6+ learn their timetable
provides cards revealing num
can be attached to the white
solve the given equations. It
has pockets at the bottom w
good storage for the cards tc
misplacing and losing them.
also improve math skills, me
as well as problem solving sk
would be a wonderful way tc
children their multiplication t
Despite this, this product lac
and would look better with n
and attractive images.

- Questions -

Questionnaire- Product test (1)

1. **Do you think this product is built in a reasonable way in order to carry out its function and be a good solution for the children's need?**

   Yes ☐ No ☐

2. **Do you think my product is colorful enough?**

   Yes ☐ No ☐

3. **Is my product creative and attractive?**

   Yes ☐ No ☐

4. **Does my product seem environmentally friendly?**

   Yes ☐ No ☐

5. **Does it seem suitable for its end-user?**

   Yes ☐ No ☐

6. **Is the size of my product suitable?**

   Yes ☐ No ☐

7. **Is the theme of the product clear?**

   Yes ☐ No ☐

8. **Is my product simple and to the point?**

   Yes ☐ No ☐

9. **Can this product be aimed for both genders or does it seem to only suit boys/girls? (According to the designs and use)**

   Both Genders ☐ Only girls ☐ only boys ☐

10. **Feel free to write any suggestions that would aid me in creating a better product in the future.**

Thank you for your time,

Conclusion:

My questions in this questionnaire are basically ways in which I can ensure I know how others will feel about my product. It would also be good feedback to help me improve my product and realize my strengths and weaknesses. This way, I can assure myself that I am sticking to my design specifications and am achieving my aim. I also provided the opportunity and freedom to add any comments or leave any suggestions which might help me in developing my product.

Product Testing

Observation- Product test (2)

After completing the product, I will be revisiting the center to give my product to its end users to watch them use it and play with it. This will be a way to evaluate my work and test its success. By watching and observing the children as they use my product, I will be able to conclude its pros and cons. This way, I will be able to test if it is user friendly and safe. I will also find out if it has been made suitable for the handicapped with an appropriate size for their need. Moreover, I will check to see how many children can make use of it, since the more the children who benefit from it, the more successful my product is and the more useful it is to the institution.

Testing Durability- Product test (3)

After completing the product, I will be testing its durability. To do this, I can drop it on the ground (to check it breaks easily), spill water on it (to check if it's water proof, though it doesn't need to be), and put a heavy weight over it. All these will ensure my product will last for a long time, satisfying the children's needs as much as possible. Nevertheless, I should be careful to avoid damaging it, since that would make all my hard work and effort seem like a waste of time, since if broken, the product will have no good use for the end users.

Significance

Significance of Product

Environmental significance:

As for the materials I would use to produce my product, I would make sure they are environmentally friendly. I would think logically based on being sensible and not wasting money and natural resources. This being simply a school project means that there is no need to destroy the environment by cutting down trees for wood.

Instead of using natural wood such as the ones coming from evergreen trees, (which would be more expensive as it is difficult to obtain and un-environmentally friendly), I will use MDF wood, which is environmentally friendly being made out of waste bits and pieces of wood compressed together under heat and pressure to create a new piece of wood in a form of recycling. Although it would still be energy consuming, it would be far better than destroying the environment by cutting down the trees as by using MDF, we are recycling the useless wood pieces leftover after cutting instead of actually cutting down living things.

Social Significance:

The product I chose is aimed for 8-11 year old physically challenged children. It is an educational toy which should help them learn about numbers and ways of using them (through addition, subtraction, multiplications, and division. It is aimed to help them in mathematics, which is an extremely important subject to learn since it is used in everyday life. By learning about it, the children will learn to become independent adults with full education and understanding of their surrounding. This toy will be made to benefit the children in different ways. As well as educating them, it will develop their problem solving skills, hand-eye coordination, logical thinking, hand muscles, and motor skills. Therefore, this one product will provide great advantages for its end users. In addition, I will aim to make it as attractive and creative as possible, by adding different colors and shapes. This will motivate the children to play with it and make use of all its benefits.

- P.D.S -

PDS Product Design Specifications

Essentials

	Specification	Justification	Method of testing
1	Environmentally Friendly	To save energy and avoid harming the environment by recycling	By checking the end product. Also by making sure I don't use any natural resources or waste money and enegy.
2	User friendly	To be easy to handle especially by the physically challenged	By observing as the children use it to see how successful it is.
3	Done independently	To learn to be self-reliant and feel satisfied by doing my own work. To experience every part of the project and to avoid plagiarism.	By asking the workshop teacher if I have ever asked him to do my work to make sure I don't misjudge this issue.
4	Done in school	To have all the wanted materials in front of me and to be working in the right environment.	By checking my process and making sure I have not worked on the product at home. Especially since non of the required materials and machines would be found at home.
5	Durable	To avoid breaking, especially since it would be handled by physically challenged children	By testing how much it will survive if I drop it, push it...etc. Also, by observing as the children use it to see how successful it is.
6	Done within the time limit	To stick to the due dates and organize my time. To avoid losing marks.	By checking the due dates and working ahead of time to make sure I complete my tasks in time.
7	Clear theme	To be easy to understand and know how to use.	Through the questionnaire which will be given out as a product test to see the people's views on my work.
8	Uses the available materials	To avoid needing to buy materials and waste time and money. To make it easier to obtain them.	By visiting the workshop and checking if all the materials I will be using are available.
9	Safe to use	To make sure the product would not harm the end-user in any way or put him/her in danger.	By observing as the children use it to see how successful it is.
10	Suitable for the end user (handicapped/ supervisors)	Since they would be the ones using it. It should be made to fit them well and be useful.	By observing as the children use it to see how successful it is.
11	Light weight	To be easy to move around, especially by a handicapped.	By weighing it and by observing as the children use it to see how successful it is
12	Simple and to the point	To avoid confusion and over-complexity. To be straightforward with no distractions	Through the questionnaire which will be given out as a product test to see the people's views on my work.
13	Suitable size	To avoid being too heavy. To suit the end user. To be able to be build in a limitedly spaced workshop.	By observing as the children use it to see how successful it is.

Desirables

	Specification	Justification	Method of testing
1	Output: Visible/audible	To be more attractive and exciting for the children.	Test if the buzzer/LED is working by testing the circuit and making sure the current is flowing.
2	Have more than one function	To be more useful and be one product with different uses instead of different products (each having a use). This would save space and money.	By testing the success of each one and through observation as the children/supervisors use it in all possible ways.
3	For more than one end-user	To be more useful to the institution since it would benefit more than one needy person.	Through observation to see if many children can use it or if it is made for only one child or a specific group of children who need it.
4	Add instructions of use (if necessary)	To make it more user friendly with no complications.	By checking the legibility of the instructions. I would write them in both Arabic and English in a clear font.
5	Colorful	To make it more attractive and have it motivate the children to use it. This could also be a way to distract the children from any pain or problems they would be dealing with.	Through the questionnaire which will be given out as a product test to see the people's views on my work.
6	Creative		

Bibliography

Bibliography:

1. **Internet sites:**

- "Softwood". Wikipedia the free encyclopedia. 2007 [Online] 21/9/2007. <http://en.wikipedia.org/wiki/Softwood>
- Ryan, V. "Design and Technology". 2002. [Online] 21/9/2007. <http://www.technologystudent.com/designpro/natwd1.htm>
- "Wood shavings". About. 2007. [Online] 21/9/2007. <http://exoticpets.about.com/cs/guineapigs/a/woodshavings.htm>
- "Chipboard". DIY. 2007. [Online] 21/9/2007. <http://www.thediyworld.co.uk/chipboard.html>
- "Metal Spinning". PMF. 2000. [Online] 21/9/2007. <http://www.pmfind.com/process/metal-spinning.asp>
- Perry, Charles. "Interlocking Brass balls". 1997. [Online] 21/9/2007. <http://www.puzzleworld.org/PuzzleWorld/puz/brass_ball_puzzle.htm>
- Lavinsky, Robert. "Fine Minerals". Arkenstone. 1996. [Online] 21/9/2007. <http://www.tsumebfineminerals.com/nelsonCarbs.html>
- Kathleen, Malcolmson. "Mechanical Puzzles'. Cleverwood. 1994. [Online] 21/9/2007 <http://www.cleverwood.com/articles.htm#what%20are%20puzzles>
- A. Tony. "Importance of Mathematics". 2007 [Online] 21/9/2007 <http://mywavesoflife.blogspot.com/2007/09/importance-of-mathematics.html>

2. **Books:**

- *Dunn, Stewart.* "Craft, Design, and Technology". London. Collins Educational. 1991.

3. **Other sources:**

- Interview with
- Case studies of different available numbers puzzles
- Questionnaire to be filled by others to evaluate my product

Bibliography for the in-text citation:

- **(1)** Ryan, V. "Soft wood" 2002. [Online] 21/9/2007. <http://www.technologystudent.com/designpro/natwd1.htm>
- **(2)** "Chipboard". DIY. 2007. [Online] 21/9/2007. <http://www.thediyworld.co.uk/chipboard.html>
- **(3)** "Metal Spinning". PMF. 2000. [Online] 21/9/2007. <http://www.pmfind.com/process/metal-spinning.asp>
- **(4)** Perry, Charles. "Brass balls". 1997. [Online] 21/9/2007. <http://www.puzzleworld.org/PuzzleWorld/puz/brass_ball_puzzle.htm>
- **(5)** Lavinsky, Robert. "Fine Minerals". Arkenstone. 1996. [Online] 21/9/2007. <http://www.tsumebfineminerals.com/nelsonCarbs.html>
- **(6)** Kindersley, Dorling. 'Plants- coniferous tree'. Dkimages. 2006. [Online] 21/9/2007<http://www.dkimages.com/discover/Home/Plants/Ornamental-Groups/Trees/Conifers/Cupressaceae.html>
- **(7)** Kathleen, Malcolmson. "Mechanical Puzzles'. Cleverwood. 1994. [Online] 21/9/2007 <http://www.cleverwood.com/articles.htm#what%20are%20puzzles>
- **(8)** "Math Mat Challenge Game". Amazon. 1996. [Online] 21/9/2007. <http://www.amazon.co.uk/Learning-Resources-Maths-Challenge-Game/dp/B00009XNSP/ref=sr_1_16/203-3008933-8159939?ie=UTF8&s=kids&qid=1190408738&sr=1-16>
- **(9)** "Number game". Bright Minds. 2000. [Online] 21/9/2007. <http://www.brightminds.co.uk/create_part_page.asp?part=J2103>
- **(10)** "Learn to Multiply". SST. 2003. [Online] <http://www.smartstart-toys.co.uk/product_info.php?products_id=189>