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**UNIT PENYELIDIKAN DAN INOVASI**

**TAJUK PROJEK:**

**WRITING EQUIPMENT FOR CEREBRAL PALSY KIDS**

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## 1.0 Invention Tittle

Cerebral palsy (CP) is a group of disorders person that affect an ability to move and maintain balance and posture. The cause of Cerebral Palsy is a brain injury or brain malformation that occurs while the brain is developing before, during, or after birth. As a result of the brain damage during brain development a child's muscle control, muscle coordination, muscle tone, reflex, posture and balance can be affected. It can also impact a child's fine motor skills, gross motor skills, an oral motor functioning.

Children with CP experience restrictions on handwriting due to difficulties of motor coordination and balance due to damage to the central nervous system and involuntary movements. **(Dev Med Child Neurol, 2010).**

Ataxic CP movements are characterized by clumsiness, imprecision, or instability. Movements are not smooth and may appear disorganized or jerky. The incoordination seen with ataxia occurs when person attempts to perform voluntary movements such as walking or picking up objects. Ataxic causes an interruption of muscle control in the arm, resulting in a lack of balance and coordination. When ataxic affects the arms and hands it may cause a tremor or shakiness due to the over-correction of inaccurate movements-this means that when a person reaches for an object, they overshoot the target. It also results in difficulty performing tasks requiring precise finger movements such as handwriting or using cutlery, or movements that require regular repetition such as clapping. **( Pakula, A. T., Van Naarden Braun, K., & Yeargin-Allsopp, M. 2009)**

This project presents the product to allow cerebral palsy kids to be able in writing. The aim is to create a positive experience for the CP kids. Therefore, this project would provide stability, resistance, adjustability and flexible movement. This project design a product writing tool "Writing Equipment for Cerebral Palsy kids" for children with cerebral palsy, especially those with poor motor control.

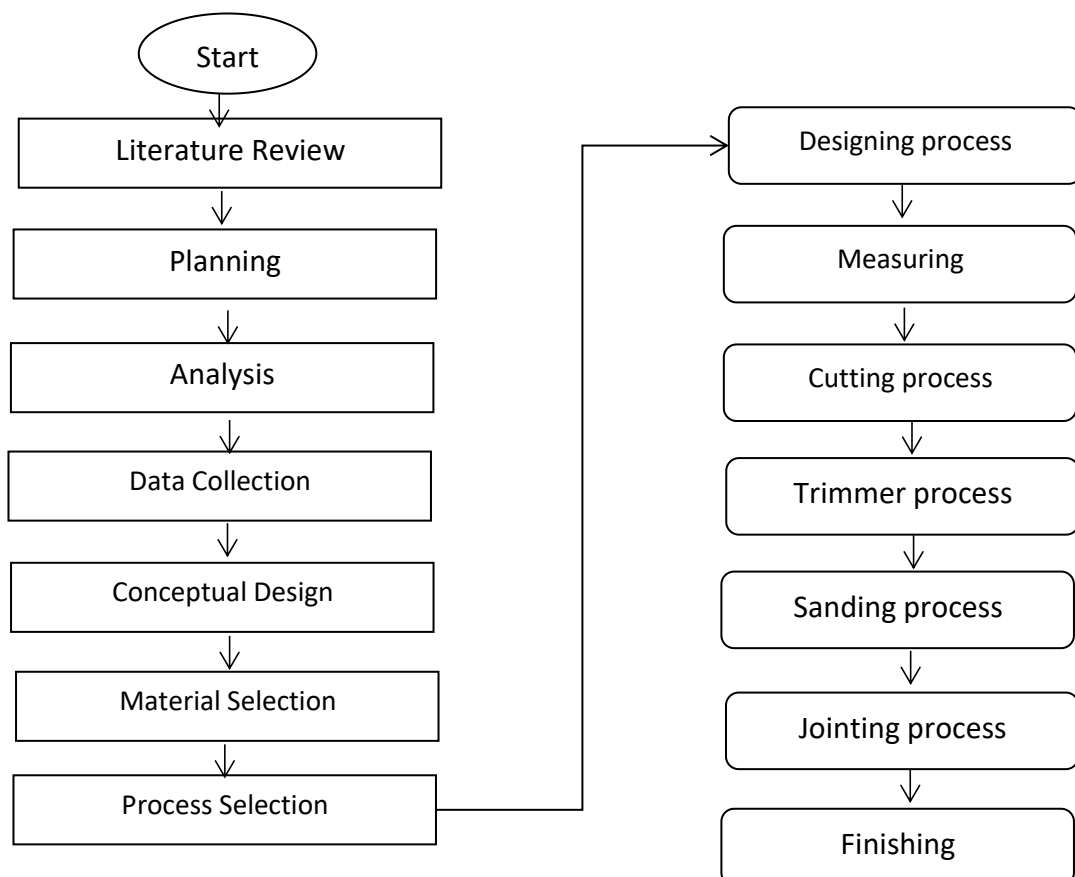
## 2.0 Problem Statement

Cerebral Palsy difficult to write due to limitations in controlling their movements. They are shaky and struggle with precise movements in writing.

Children with ataxic cerebral palsy struggle with grasping small objects and experience hand fatigue and pain when they use traditional writing utensils. This product will be develops to solve CP child problem especially in writing technique.

## 3.0 Methodology

Flowchart is very important to illustrate the sequence of operations to finish the work. It use symbol to represent of a process. Each of steps in the process is represented by different symbol and contains a short description of the process step. The top of the flowchart will begin with start. Then it followed by the literature review, planning, analysis, data collection, conceptual design, material and process selection.



Planning product is the first phase in this project, as the first step, choosing the title for the project and meet the supervisor is the most important part. Discuss with the supervisor to define the objective of this product. In this step, several tasks like finding some relevant title in any website, journal and reference book and do literature review to get all information related to this project would be and what are the tools and material used in order to complete this project.

The second phase is the analysis phase the major goal of system analysis is to determine whether information is needed to support the product. In order to get the information, interviewing and sending questionnaire among the staff and family cerebral palsy kids are done. Results are used to analyze project goals to meet the product requirements.

During the third phase which is design phase, design can be categorized in two ways which are logical design and physical design. The logical design produce during the analysis is turned into a physical design.

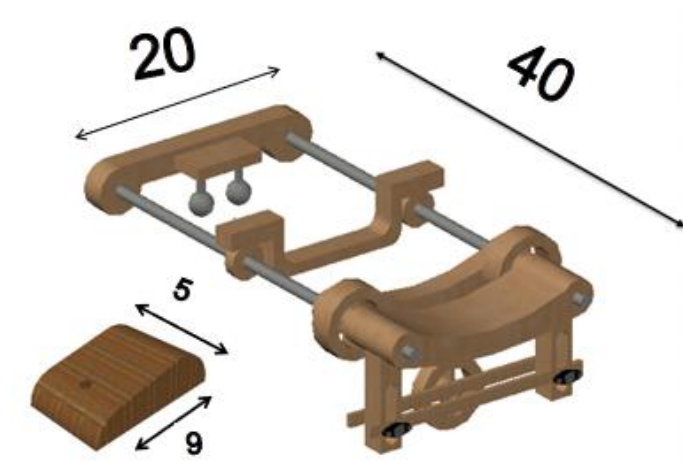


Figure : Design Auto-CAD

Finishing is the final step of the manufacturing process that gives wood surfaces desirable characteristics, including enhanced appearance and increased resistance to moisture and other environmental agents. Finishing can also make wood easier to clean and keep it sanitized, sealing pores that can be breeding grounds for bacteria.

Finishing can also influence other wood properties, for example tonal qualities of musical instruments and hardness of flooring. In addition, finishing provides a way of giving low-value woods the appearance of ones that are expensive and difficult to obtain.

In our product, we use Pine as our wood material and shellac as our finishing because shellac tends to be soft after it dries, so waxing is almost essential to protect the surface. It is best used on decorative pieces that don't have to stand up to hard wear.

#### **4.0 Recommendation**

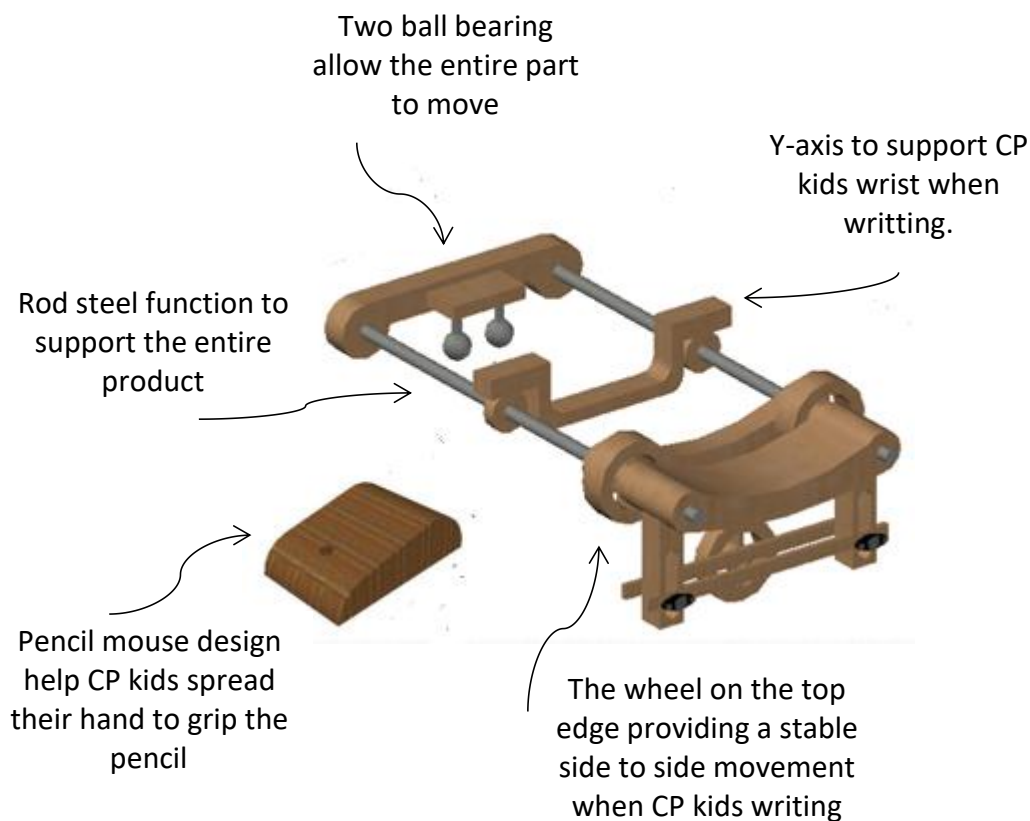
Easy writing equipment used the same concept with NuMuv Grip-Aid which is providing more graspable area of almost any object inserted into its. The increased comfort and grip surface allows the CP kids when writing. Easy writing equipment for CP kids also used concept from Wanchik Writer which is it wrapping itself around the palm. It is very simple to wear and remove. This innovative writing aid is equipped with a wood with a plastic cover, which extends up to the forearm from the wrist. Since the concept we use are same, we used as reference for Easy Writing Equipment for CP kids. For the recommendation for this project is to make improvements to the shape and can also be folded and put in a box that is easy to carry.

This is the conceptual design for writing equipment called Writing Equipment for Cerebral Palsy kids. For the product description, it looks similar to a bone aid hand with the dimension of approximately 20x40x5 cm. Since this product is for the children, it doesn't have to be too large in size. The body of this device can be fabricated easily with wood.

#### **5.0 Benefits / Benefits (Society / Country / Economy / Environment)**

Writing Equipment for CP kids can help children with hand disabilities gain control over their movements and perform tasks such as writing to ensure of that they stay on track with their ability educational program. Thus, these project is carried out to help the CP kids in writing.

## 6.0 Method of use



## 7.0 Conclusion

In conclusion, we hope that this tool is able to help CP children to write so that they feel more confident and able to go through their lives vigorously. In addition, this writing equipment is also produced to provide comfort for them in terms of writing so that they are able to write well just like other normal children.

Although this writing equipment only focuses on one part, namely the hand, but this part is very important for the use of writing for CP children. As such, we hope to create a writing aid tool made of pinewood wood to help CP children to write.



## Appendix A

### Cutting List

Part	Quantity	Description	Dimension (mm)			Material
			L	W	T	
A	1	Armrest	190	100	50	Pine wood
B	1	Y-axis bar front	190	40	50	Pine Wood
C	1	Y-axis bar middle	190	30	50	Pine Wood
D	1	Support bearing front	50	40	50	Pinewood
E	2	Clamping mechanism	200	20	10	Plywood
F	2	Adjustable mechanism	120	20	10	Plywood
G	1	Mouse wood	110	80	50	Pinewood

## Appendix B



Process cutting the material using radial arm saw



Process to make a shape using band saw



Process to make a curve shape using trimmer



Process to make a hole using drilling machine



Ball bearing installation



Progress project