

Innovation Of Smart-Seam Ruler for Students with Special Needs in Ladies Garment Making Subject

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ABSTRACT

Smart Seam-Ruler is an innovation of Teaching Aids Material (TAM) for Special Needs Education (SNE) students in the form of a seam ruler designed to assist students in the subject of Specific Vocational Skills (KVS) program for Ladies Garment Making according to National Occupational Skills Standard (NOSS) TA-011-1:2012 during sewing practice sessions without the guidance of a teacher. This tool is used to replace the function of a regular ruler to facilitate marking on fabric for the sewing process. This product has been tested on a sample of students, and it was found that there is a shorter time taken by students when marking the fabric. In addition, observations have shown that this product helps students make accurate markings. It is recommended that a further study be conducted to review the use of this product in assisting SNE students in completing NOSS for Ladies Garment Making tasks requirement according to the schedule.

Keywords: Teaching Aids Material (TAM), seam-ruler innovation, Ladies garment making

Introduction of Best Practices

Special Needs Education (SNE) is a service and educational facilities provided for individuals, especially children with special needs or disabilities. According to (Mohd Najib Ghafar & Sanisah Jahaya, 2006), children with special needs are children who differ from typically developing or ordinary children in terms of internal characteristics, sensory abilities, physical behaviour, social or emotional behaviour, and various other deficiencies, to the extent that they require modified school practices or Special Needs Education services in order to enhance their capabilities to the fullest. The goal of Special Needs Education is to increase participation and provide opportunities for individuals with disabilities to join academic and non-academic programs alongside mainstream students. SNE also raises awareness in the community so that they do not deny the potential of individuals with disabilities and believe that their limitations can be minimized if given the same opportunities (Kementerian Pendidikan Malaysia, 2013).

Special Needs Student (SNS) at Tun Tuah Secondary School, Melaka (SMKTT) have participated in the Specific Vocational Skills (KVS) program for Ladies Garment Making and will follow five competency curriculums outlined in the National Occupational Skills Standard (NOSS) TA-011-1:2012. These competencies cover casual clothing, traditional clothing, evening wear, nightwear, and maternity clothing.

Qualified students can apply for the Malaysian Skills Certificate (*SKM*) Level 1, where these subjects are taught over a 4-year period, from Form 2 until Form 5 at the school.

Justification of Best Practices Implementation

The initial observation by the researcher revealed that one of the issues faced by students is marking the stitch base, which is located between the edge of the fabric and the stitching line of the clothing. Stitch bases are highly useful for altering the size of the clothing being sewn. Typically, every sewing machine has a line on the right side (or presser foot). This line serves as a guide for marking the stitch base's measurement. The purpose of marking the stitch base is to facilitate the process of joining fabric during the production of women's clothing. It also eases the fabric finishing process by sewing the edges before the joining process is carried out.

After the teaching and learning process for the first clothing item, which is the pattern for the back of a women's blouse, the researcher found that students had difficulty marking the stitch base using a regular ruler. Some students did not position the ruler correctly, and some marked the measurements incorrectly. Common mistakes included students not knowing how to mark measurements involving decimal numbers. The researcher also noticed that some students drew lines in the wrong places while connecting the marked stitch bases. This resulted in fabrics being cut in uneven sizes and made the joining process challenging.

To address this issue, an action research study was conducted with a focus on creating an innovation in the Teaching Aid Material (TAM) to assist students in marking the stitch base more effectively and saving their time with the aim of helping students achieve their learning objectives.

Objectives of Implementation

The objectives of best practice implementation are:




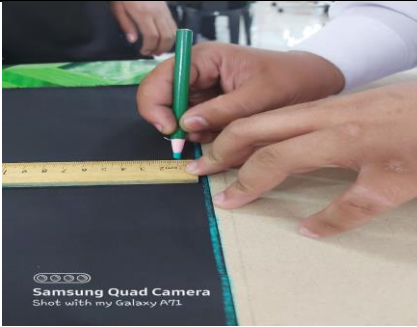
1. To overcome the issue of marking the stitch base using an innovation of specifically a centimetre-based stitch base ruler.
2. To boost students' confidence and shorten the time in completing tasks without the guidance of a teacher.
3. To enhance students' interest and performance when completing tasks.




Best Practices Implemented

Phase 1: Pre-innovation Observation

The researcher conducted further observations with 7 students from the Purple Silk Class by assigning them the task of marking the stitch base using a regular ruler. The observations revealed that most of the students either made incorrect markings or took too long to complete the marking on the fabric.

Table 1
The initial observation involved using a regular ruler.

Student	Observation	Remark
Student 1		Student marks at the wrong measurements
Student 2		Student takes a long time to mark sewing baselines because they need to make small and numerous marks on the fabric.
Student 3		Incorrect handling of ruler
Student 4		The position of the ruler is far from the pattern when producing sewing baselines.

Student	Observation	Remark
Student 5		Incorrect handling of ruler
Student 6		Students are confused about how to position the ruler when drawing sewing baselines.
Student 7		The ruler can be handled well, but it takes time to mark the sewing baselines.

Based on these observations, the researcher used the ADDIE model to design a ruler that would be suitable for the students' use (McGriff, 2000). The initial analysis stage, considering two key factors, was based on the observation during the class, which considered the method of marking the stitch base and the time taken by the students to complete the marking.

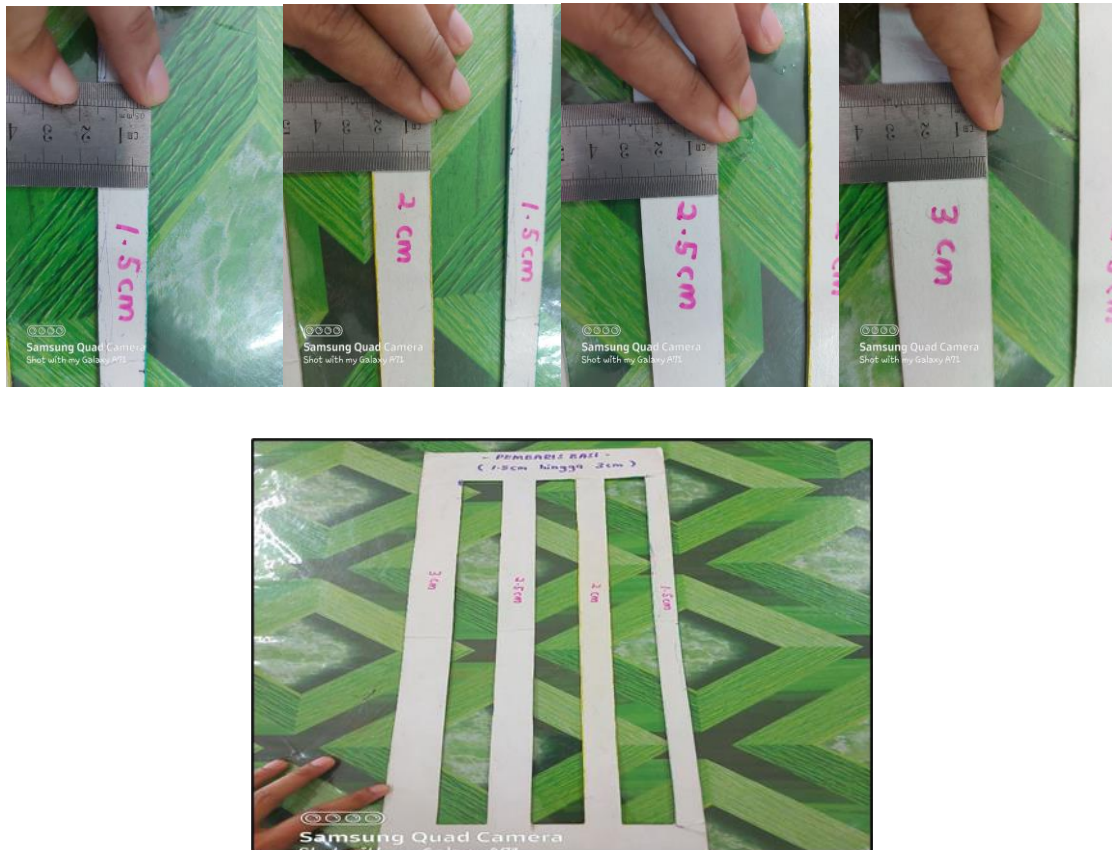
During the design phase, the researcher focused on determining the design features of this stitch base ruler, emphasizing the following:

- i. Easy to handle by students.
- ii. Easy to store.
- iii. Moderate in size and lightweight.
- iv. Suitable for use by both students and teachers.
- v. Made of easily obtainable and non-sharp materials.
- vi. Affordable raw material costs.
- vii. Versatile in its applications.

Phase 2: Development of Innovative TAM

The researcher designed the base of the stitch base ruler using cardboard (kodkod). The cardboard was cut according to the standard markings that the students would use, as illustrated in the diagram.





Figure 1
Initial Design

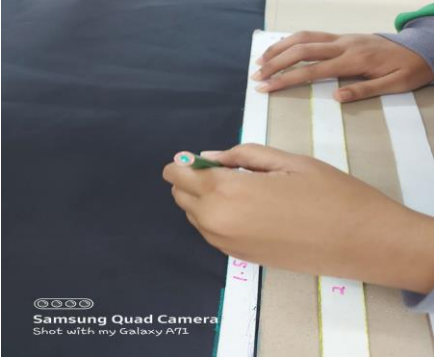




Phase 3: Implementation

After the product was developed, the implementation phase took place. Testing of the TAM was conducted initially to ensure that the product functioned properly before the pilot test was carried out on a sample of selected students. Product demonstrations were also performed in front of the sample group.

Table 2
 The Observation on Students Using Product.

Student	Observation	Remark
Student 1		Student able to mark sewing marking with proper measurements
Student 2		Sewing baselines can be drawn more quickly because longer lines are made.
Student 3		Sewing baselines can be produced more accurately and the handling of the seam ruler is also correct.
Student 4		The seam ruler can be handled correctly, and sewing baselines can also be drawn easily.

Student	Observation	Remark
Student 5		Student able to mark sewing marking with proper measurements.
Student 6		Student able to mark sewing marking with proper measurements.
Student 7		It can also be handled well, and the time taken is shorter

Next, the researcher made improvements to the ruler by reducing its size to A5 and using a laser cutter machine to produce the respective TAM.

Figure 2
Smart-Seam Ruler Design in A5 Size

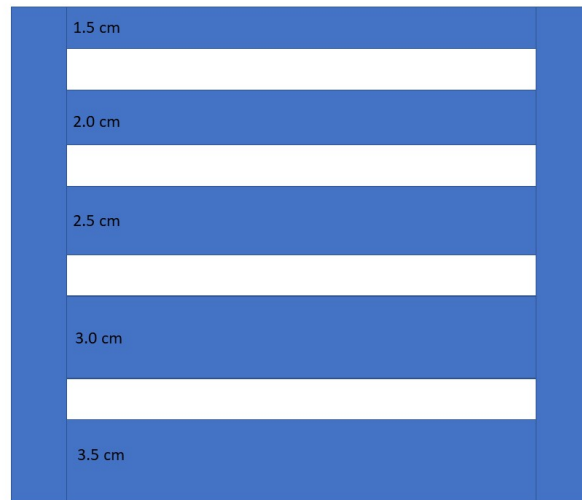


Figure 3
Setup For Laser-cutting Layout



Figure 4
 Smart-Seam Ruler 2nd Phase Prototype



This ruler was distributed to several schools to obtain feedback and suggestions for further improvements to the innovation that was created.

Table 3
Other's School Feedback

School	User's Feedback
Bandar Tasik Selatan Secondary School	Add a lever from top to bottom to make it easier to move the ruler without veering off from the marked area
Sijangkang Jaya Secondary School	Hoping that it can be beneficial for students with special needs in carrying out more precise and better sewing/cutting methods.
Pusa Secondary School	It can speed up the process of marking fabric bases compared to the usual method, and this product can be marketed for general use, especially for those with a sewing foundation

Impact of Best Practices Implemented

This Smart-Seam Ruler has been registered the copyright under the MyIPO 2.0 Fund Initiative with registration number CRLY2023W01616. The use of this ruler has been implemented with a new group of students, and based on observations, there is a noticeable difference in the time it takes for students to complete markings on the fabric. This reduction in time is extremely helpful for teachers in achieving the objectives outlined in the NOSS manual for this module.

Figure 5
Before and After Usage of Smart-Seam Ruler Time Difference for Back Body Side.

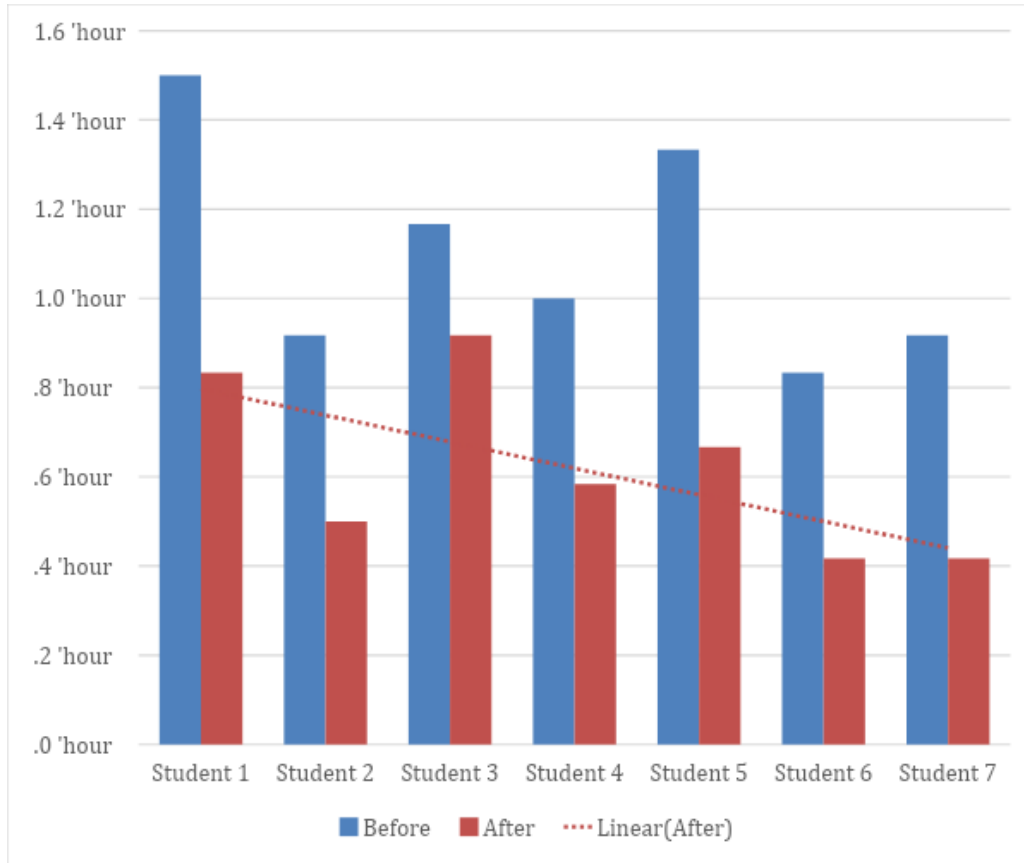


Figure 6
Before and After Usage of Smart-Seam Ruler Time Difference for Front Body Side

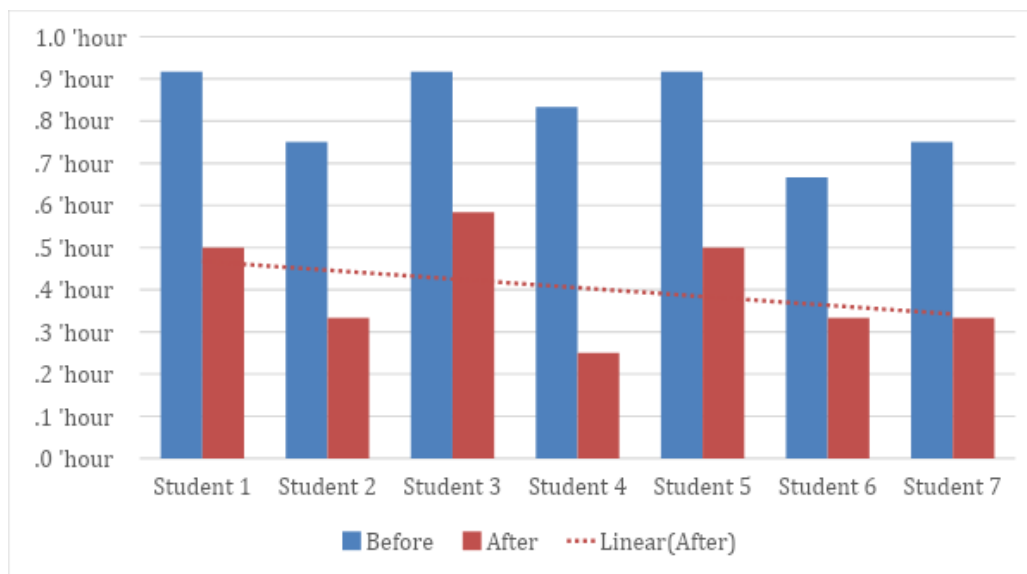


Figure 7
Before and After Usage of Smart-Seam Ruler Time Difference for Sleeve Side

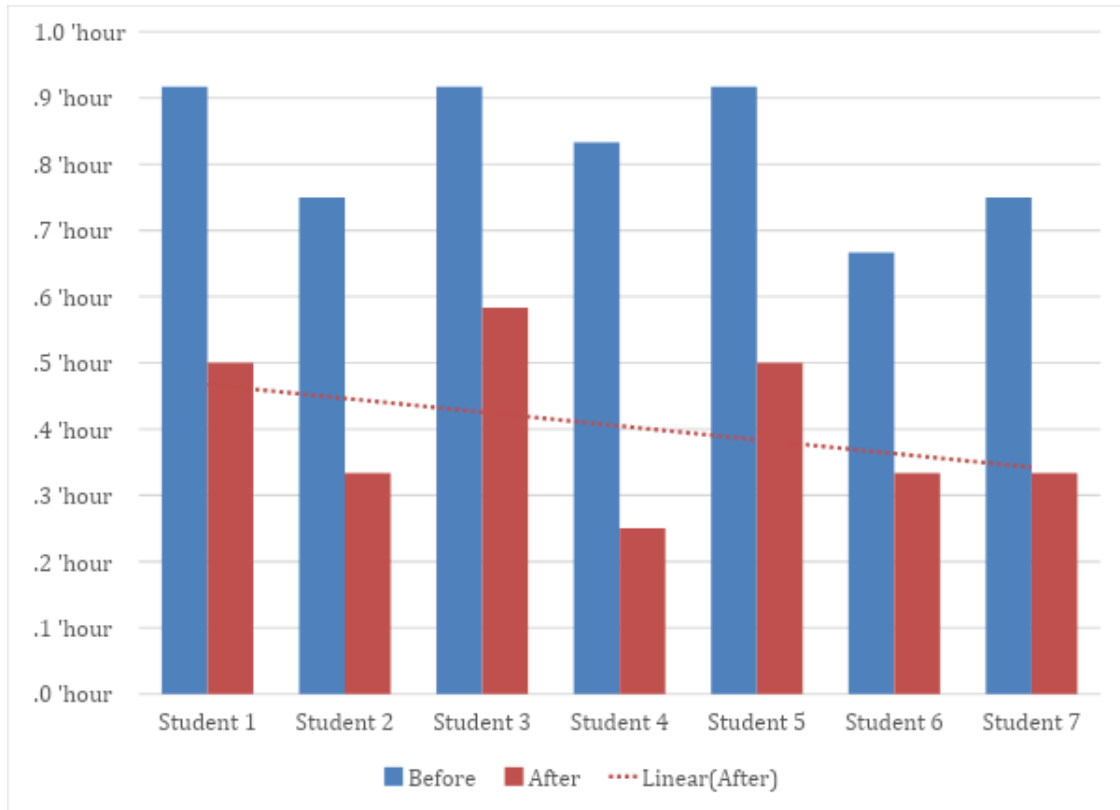


Figure 8
Certificate of Copyright Notification



Summary and recommendations

The development of the TAM innovation for SNE students in order to assist them to mark the stitch base shows that the TAM improved student's marking method and time consumptions according to NOSS requirement for Ladies Garment Making Occupational Skills (JPK Kementerian Sumber Manusia, 2021). The TAM is known as *Smart-Seam Ruler* has been registered the trademark at MyIPO with reference number CRLY2023W01616 and has been successfully designed based on the stated research objectives (Lokman et al., 2009). It has been used and tested during the practical sessions, particularly during skirt production. The shows that students reduced their time for marking correctly.

The development of this Teaching Aid Material (TAM) can also boost students' confidence in completing tasks without teacher assistance and, in turn, increase motivation among students. It is recommended that further research be conducted in other institutions using the same parameters to validate the reliability of the findings of this action research. Additionally, improvements to the design can be considered for the purpose of commercializing this product.

Acknowledgement

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