

The Effectiveness of Smart Cot Kit as a Teaching Aid for Furniture Manufacturing Basics Subject in Special Education Integration Program

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Special Needs Students (MBK) in secondary schools have little opportunity to learn vocational skills especially in the field of wooden furniture manufacturing because of the inability of students to do the work of carpentry. The purpose of this study is to develop the Kit (Smart Cot) as a Teaching Aid (ABM) for the new subject of Furniture Manufacturing Basics, which was introduced by the Ministry of Education specifically for students with special needs in the form of Special Education Integration Program (PPKI) learning problem. The design of this study uses qualitative methods including interview instruments, observations and checklist forms that were conducted throughout the Learning And Moderning process (Pdpc) by using the Kit (Smart Cot) on the syllabus of Furniture Manufacturing Basics. This study involved 9 pupils of PPKI as respondents of the study, especially students in the field of wood furniture manufacturing at a national secondary school in Selangor. Case studies are used by researchers for being able to exceed quantitative, statistical decisions and understand the nature of the various perspectives. All elements will be evaluated based on the process of interviewing, observations and review forms. Then the information is collected in written form. Researchers recommend that the ABM kit (Smart Cot) be used by

teachers in the Pdpc process for the basics of Furniture Manufacturing Basics for special needs students in order to improve the achievement performance and mastery of the craftsmanship of wooden furniture.

Key words: *Special education, wooden furniture, furniture manufacturing base and teaching aids.*

Introduction

Special needs pupils are individuals with disabilities including mental or physical disabilities. According to Rashid et al. (2011), special needs groups refer to children with intellectual, physical, emotional and social challenges. However, students with special needs are unable to learn or do something. If they are physically impaired, their intellect can still be used, and if they are impaired in learning, their physical function can still be used (Daros et al., 2012). They need to be mentored in order to function as individuals who are skilled, self-reliant, responsible, able to plan, manage their own lives, be aware of their own potential and adapt themselves to the community in line with the Philosophy of Special Education which is towards meaningful living (Ghani & Ahmad, 2011). In line with this aspiration, in 2018 the Ministry of Education has introduced three areas of skills such as carpentry, agriculture and cooking to special needs students in the national secondary school starting with grade one. The basics of furniture making for level one are a key topic that includes the introduction of the furniture industry in Malaysia, workshop management, use and maintenance of hand tools and mobile machines, produces products and wood-based products (DSKP, 2017).

Selecting appropriate teaching methods for students with special needs can help them be interested in the lesson and create a fun and engaging learning environment. Therefore, dynamic and systematic teaching and facilitating process (Pdpc) planning can develop a scientific culture, new knowledge, skills, creative ideas and innovation, more sustainable human development and more efficient teaching of information (Male, 2016).

In addition, teachers also benefit from applying the teaching and facilitating process (Pdpc) as by using effective, predictable, creative and innovative teaching aids (ABM) the creation of useful information will occur. Teachers can enhance their knowledge of more creative activities in the classroom by using the appropriate teaching aids and generating thoughtful ideas on topics to teach (Nordin, 2015).

The use of ABM in the Pdpc process makes ABM Smart Cot an easy way to pass on skills to special needs students as they need to see first-hand the example set by teachers. Then, the students will repeat what the teacher has taught with the guidance and full supervision of the teacher. This method is very effective and creates an active learning environment because



students can learn using real tools that they can see and touch. However, in order to develop an ABM, a researcher needs to have comprehensive knowledge and skills for the challenge.

Therefore, this study was conducted to see how special students are able to engage in woodworking skills. The objective of this study is to look at the effectiveness of PdPc teaching and learning using ABM Smart Cot towards the IQ assessment level for Furniture Manufacturing Basic subjects.

Literature Review

The Integrated Special Education Program (PPKI) refers to students with special needs who have learning, vision and hearing problems. The program is developed in regular, middle and vocational schools that use a separate and semi-inclusive teaching and learning approach. This means that special education programs implemented in Malaysia can now be categorised into several types such as Special Education Schools (SPK), Integrated Special Education (PPKI) programs, Inclusive Programs, Special Rehabilitation Programs and Specific Learning Disabilities Program.

Special education plays an important role in helping special needs students learn learning until they enter the work environment (Nasri et al., 2010). A total of 738 mainstream high schools are implementing PPKI (KPM, 2013). KPM (2012) stated that they are aware of the importance of providing an appropriate education for students with special needs as these groups may be more likely to use vocational curriculum because of life skills taught, than the existing academic curriculum. Generally, people with learning disabilities have physical abilities that can be trained through vocational education or skills to be used in certain occupations (Daros et al., 2012).

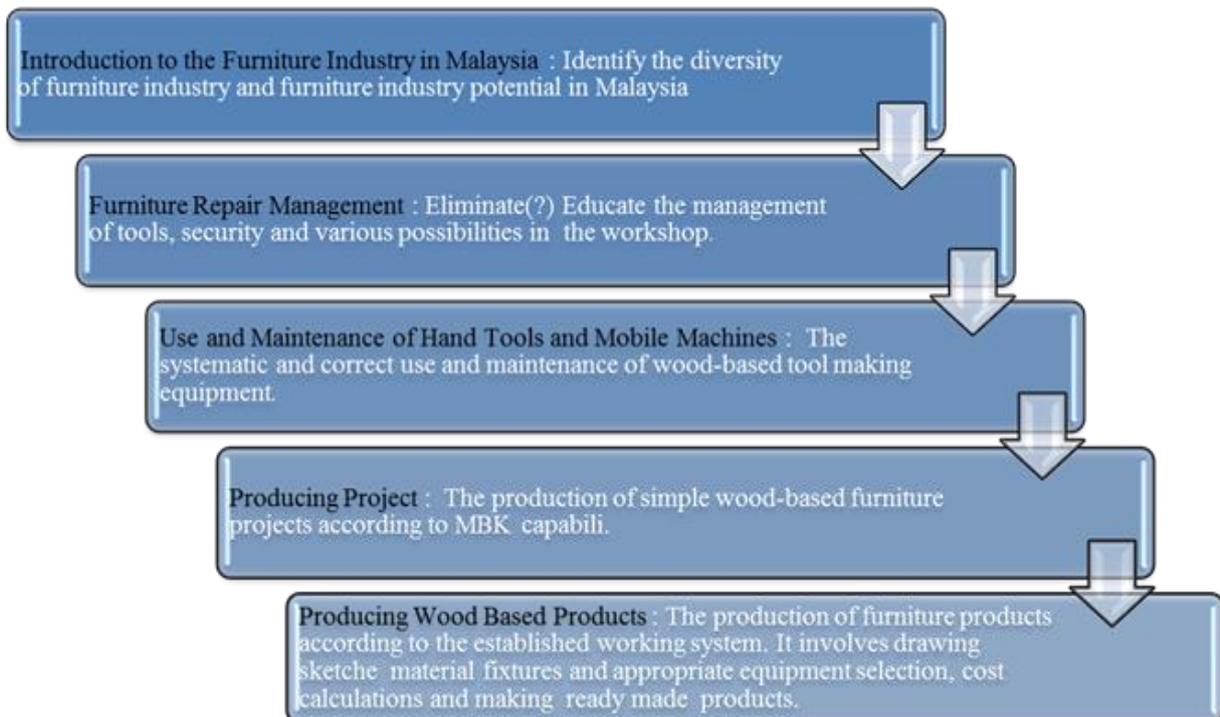
The special education program, in fact, provides teaching and learning to students with special needs to overcome learning difficulties in mastering their skills through motivational approaches, lesson materials and alternative activities. Special needs teachers need to ensure that students have the knowledge and skills in certain areas. This is to ensure that special needs students are able to safely attend practical classes in the workshop and to make the teaching and learning process more effective. Therefore, teachers should have sufficient knowledge, skills, teaching strategies and abilities to cope with the various challenges and types of special needs students (Junaida & Nik Rosila, 2013).

Starting in 2013, the education system changed to the Primary School Curriculum (KSSR) and the Secondary School Curriculum (KSSM). The Special Education Secondary Curriculum (KSSM) beginning in 2017 and implemented in stages will replace the Secondary Integrated Curriculum that was implemented in 1988. The Special Education KSSM was

formulated to meet the new policy requirements under the Malaysian Education Development Plan (PPPM) 2013 - 2025 which seeks to improve the content standards and learning standards to be in line with international standards, and to ensure that appropriate and relevant curriculum is provided for Special Needs Students (MBK). KSSM Special Education is specifically for the Furniture Manufacturing Basics syllabus. Form One introduces students to the furniture manufacturing industry, furniture workshop management and safety aspects, use and maintenance of hand tools and mobile machines. The curriculum focuses on the integration of knowledge domains, technical skills with the application of security, green technology and entrepreneurship to produce special needs students who are knowledgeable and independent in the field of furniture making.

The transition to the workforce also applied in all subjects ranging from Form One to Form Five as an ongoing effort to improve MBK skills towards working life. The KSSM Special Education offers the choice of MBK according to their respective tendencies and skills in the field of skills. The MBK Group is also human capital capable of operating independently and contributing to the national development (Curriculum Development Section, 2015). KSSM Basic Special Education for Form One Furniture Making Syllabus is under the heading as presented in Table 1.

Figure 1. KSSM Basic Special Education for Form One Furniture Making Syllabus



The intervention was aimed at encouraging students with special needs to achieve self-fulfilment in academic skills or behaviour to ultimately teach them self-sufficiency. In addition, the special education is a program designed specifically to meet the diverse needs of students with special needs. It involves the use of teaching aids (ABMs), teaching kits, special equipment, techniques and methods of teaching to suit students' abilities. The use of ABM for students with special needs is highly encouraged and important in helping students with disabilities master certain skills and understanding.

According to a study done by Samsudin et al. (2018), the use of ABM is very important to ensure effective teaching for students with hearing loss. This is because the use of ABM tools can be of interest and can stimulate the students' senses. The material is presented to students in a way that makes teaching and learning interesting and effective. Particularly for the delivery of new materials, it will generate interest and encourage students to continue to learn. For example, a teacher presenting a textbook is less effective than a teacher showing a puppet that students can touch, such as a furniture model learning kit. Workshops conducted in lessons should use teaching aids that are in line with technology and industry requirements. The use of teaching aids can create students' curiosity and interest in learning and therefore giving rise to attention to the lessons. Therefore, teachers are encouraged to use teaching aids to give students a clear understanding of what is being taught.

The study was conducted to understand the effectiveness of learning using ABM Smart Cot on the topic of Furniture Manufacturing. Researchers conducted a case study at a school using ABM Smart Cot. Researchers have used qualitative methods for the purpose of collecting data and information by using interviews and observation instruments. This method is suitable as the respondents of the study are students have disabilities and are illiterate and have avlow IQ to understand a question.

Methodology

Researchers conducted a case study at a national secondary school in Selangor Darul Ehsan, of which nine special needs students were selected as respondents representing three categories of special needs pupils; high ability students, medium ability students and low ability students. The main focus of in this study is a field of woodworking especially on the subject of one Level Furniture Manufacturing. Table 1 shows that the number of respondents selected had the same characteristics such as age, health problems and involvement in the same field of expertise (Azman & Mustapha, 2014). The case study conducted by the researchers began with the transfer of ABM Smart Cot's woodworking skills to a special education teacher and three facilitators who served as instructors and workshop assistants during the woodworking workshop. Researchers evaluated each change or achievement when using the ABM Smart Cot in the Pdpc process by the respondents for three months twice a

month. The results of the observations and interviews were recorded and analysed until information received was sufficient. Data saturation occurs when something or the information being studied is scarce or new data is missing.

Table 1: ABM Smart Cot Development Test Respondents.

Student category	Number of student	Student age	Gender	skills
High-performing students	3 students	13 years old	male	Wood working
Students are capable	3 students	13 years old	female	Wood working
Low Capability Students	3 students	13 years old	1 male / 2 female	Woodworking

The ABM Smart Cot module and checklist form has been endorsed by three experts as shown in Table 2. They specialise in specific areas such as special education woodworking, human resource development and the Wood Industry Skills Development Center (WISDEC).

Table 2: List of Experts Involved in Checklist

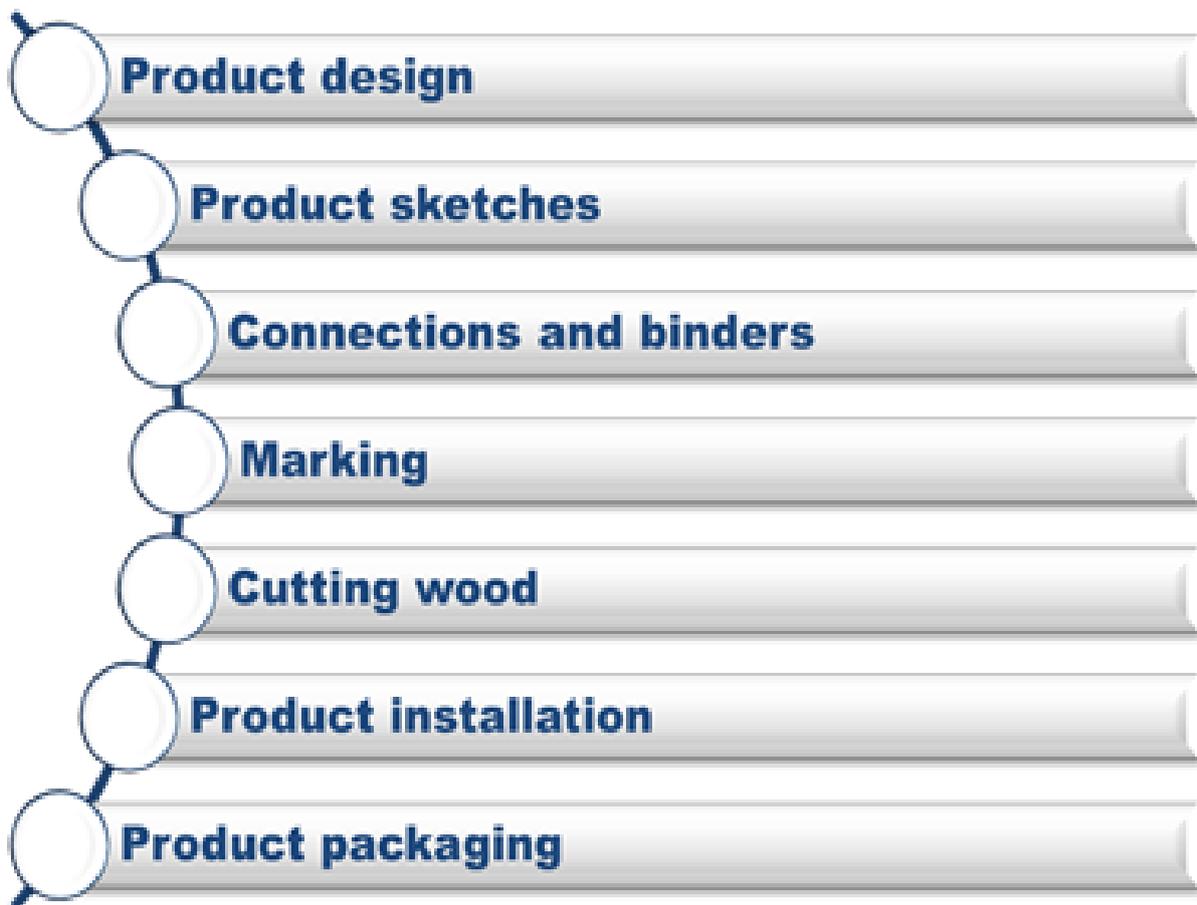
Position	Field of work	Experience
Head of the Department of Special Education Faculty of Human Development UPSI	Special Education of Disability	14 years old
Senior Assistant Special Education SMK Teluk Gadong Klang	Special education	28 years old
Wood carpentry teacher PPKI SMK Teluk Gadung Klang	Special education (teacher of carpentry wood)	10 years old

Development of Abm Smart Cot

The flow chart in Figure 2 is a description of the steps to be taken for developing the product. The flow chart demonstrates the work process of developing the Kit (Smart Cot) from the earliest step until the project is fully completed. Additionally, this chart can help researchers in demonstrating the systematic ways of producing the product. The project implementation in this study is based on work planning, sketching of product design and material preparation process. The implementation of this product started after the process of identifying and

supervising materials is implemented. The product testing process is carried out to determine product shortage and how to further improve the product. The last process is packaging the product.

Figure 2. Product Development Process

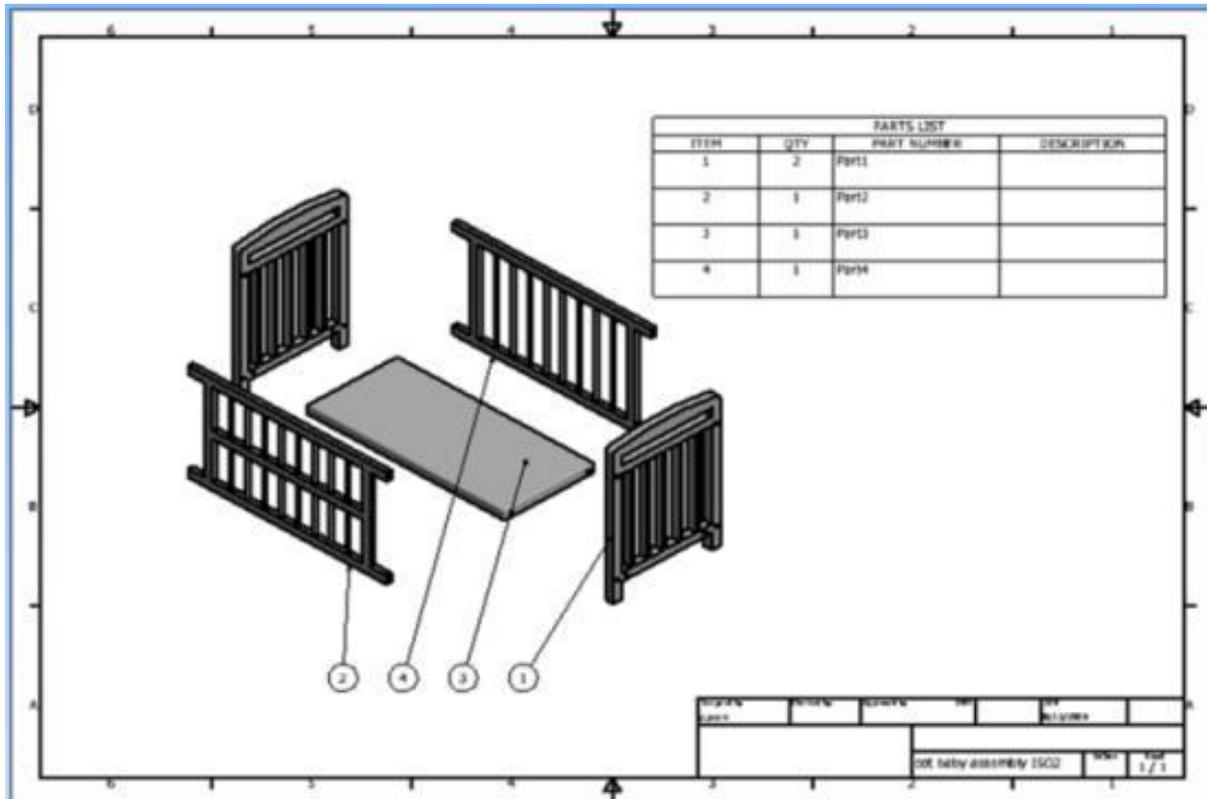


Product Sketches

The first and most important step in creating a product is to make an initial sketch to ensure that the researcher can give an early idea of the product to be produced. The product's initial sketching process can trigger ideas and make improvements in order to produce a new Smart kit that has two functions. Before producing a product that has been designed, the researchers make initial sketches to design a variety of important details such as product size, material type and equipment and product implementation steps. The initial sketches created by the researchers used the "Auto Cad" and "Inventor" apps. These apps are intended to facilitate researchers in identifying the most suitable position to place a part of the product kit (Smart

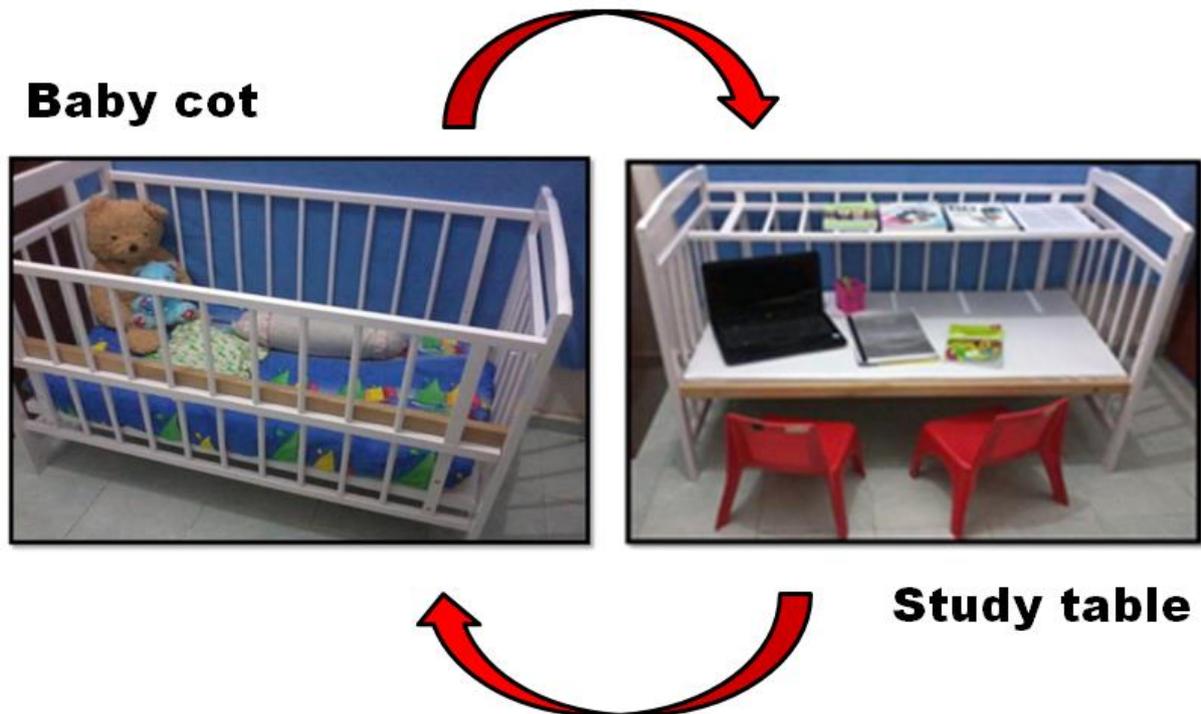
Cot). They also assist researchers in obtaining accurate measurements to ensure that the kit (Smart Cot) meets the safety aspects of the user.

Figure 3. Schematic Drawing Kit (Smart Cot)



Product Results

Products Abm Smart Cot

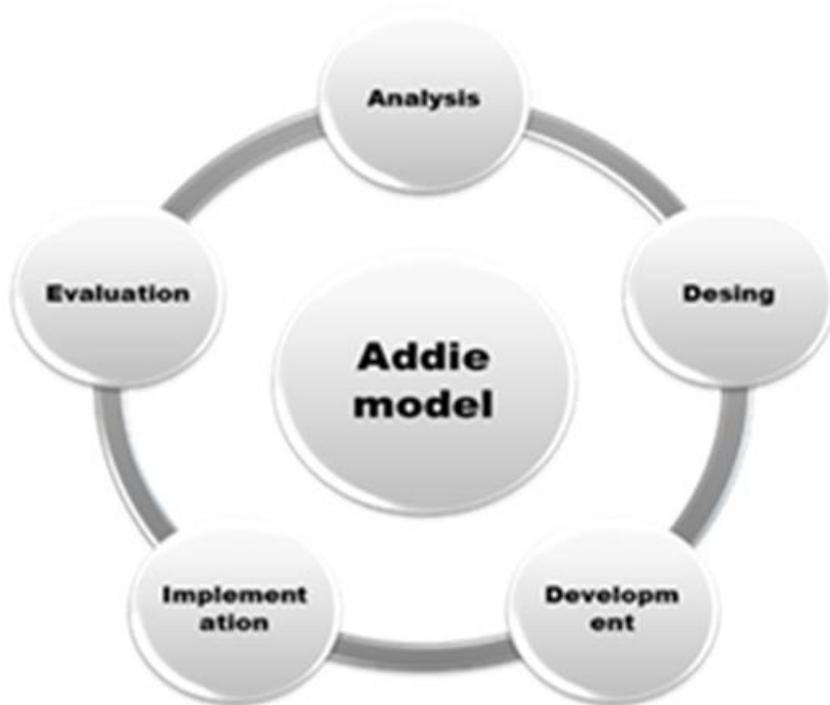


The ABM Smart Cot is a wooden bed made of wood with a combination of durable materials and semi-permanent fasteners that are the use of nuts and screws. The DIY concept ABM Smart Cot (Do It Yourself) is a baby bed that can be transformed into a children's table. This step in the production of ABM Smart Cot products is in line with the skills that special needs students must learn, as set out in the DSKP for the Basic Furniture Manufacturing topic. In addition, the ABM Smart Cot is equipped with the materials and craftsmanship needed by special needs students.

Addie Model Phase

According to a study conducted by Nawi, (2017) the ADDIE model in Figure 2, as applied in this study, made the Pdpc process more attractive and helped students to understand the topic. ADDIE is a very common model and very useful in designing a product because of its easy-to-understand nature. This ADDIE model focuses on the five main components to be used for careful and systematic product planning. As such, this is in line with the ongoing research in developing the ABM Smart Cot to help students with special needs understand the teacher especially on the topic of Furniture making.

Figure 4. Addie Model Phase



Findings of Study

According to Table 3 the researchers conducted a checklist based on three categories of special education students. Firstly high ability students which means that the physical is normal and fully usable. The students of this category can communicate well and understand the instructions given, but they cannot analyse. The last category are low-performing students who is physically or physically impaired. Furthermore, there are those who cannot communicate and have very low IQ levels. There are also students with both problems. All students in the category will be taught using ABM Smart Cot in the three-month Pdpc process with six observations. The results of this study show that there is an increase in the IQ rating level for the Furniture Manufacturing Basics subject when there is a practical implementation of the ABM Smart Cot installation process. But this is not a new concept for learning special needs pupils, as teachers who teach special needs students have stated that these students often need to be constantly updated with new knowledge or skills to ensure students remember, understand and apply them. Students will also only be able to do an assignment when directed by the teacher.

Table 3: student IQ Assessment

Number of Observations Item	1	2	3	4	5	6
	Number of student					
Wooden mallet	0	0	0	1	1	1
Sandpaper	3	3	3	3	3	3
Wood saws	3	3	3	3	3	3
Hand Drill	0	0	0	1	1	1
Screws & Nat	0	0	0	1	1	1
Tanggap	0	0	0	1	1	1
Wood	3	3	3	3	3	3
DIY	0	0	0	0	0	0
Innovation	0	0	0	0	0	0

Table 3 shows the results of the study by observing nine students with special needs. The first is a wooden bow that acts as a tool to knock down the wood without damaging the surface of the wood. At first interaction no student can pronounce the name and function of the tool, however, in the fourth to sixth observation there is a slight increase in the ability to pronounce the function.

Item two and three are sandpaper that serves to smooth the surface of the wood and saws that serve to cut the wood. The graph shows that from the first observation until the sixth observation all students can state the names and functions of the two tools.

Item four is a hand drill that works to make holes and can also be used to tighten or loosen screws. The graph shows the consistency of the first observation until the third observation where no student can specify the name and function of the tool. Then in the fourth to sixth time there was a slight increase in one in three pupils being able to pronounce the name and function of the device.

Articles five and six are temporary fastening materials, which are screws and nuts and bolts. Screws and nuts are used to fasten and tighten two pieces of wood. Meanwhile, the gum is used for the process of assembling two pieces of wood without the use of fasteners. In the first to the third observation no student can state the name and function of the installation. Following the graph, there is a slight improvement in one out of three students for this category.



Article seven is that wood is the key material in producing ABM Smart Cot. The graph shows the consistency from the first observation to the sixth observation where all students can correctly state the type of material.

Article eight and nine are words related to the world of design and technology, namely DIY and innovation. The graph shows a consistent state from the first observation to the sixth observation where all students are unable to express words or their meanings.

Conclusion

This study was conducted to look at the effectiveness of PdPc teaching and learning using ABM Smart Cot towards the IQ assessment level for Furniture Manufacturing Basic subjects for special needs students. Based on the findings of the ABM Smart Cot analysis, students are able to practice their skills in making furniture products, especially wooden furniture correctly and safely. In line with its function, the ABM Smart Cot aims to make it easier for students to understand the content in a more accessible and effective way. Overall, this ABM Smart Cot enhances student curiosity and engages students in classroom learning. The advantages of ABM Smart Cot are that it can help teachers save time in the delivery of learning content when the ABM Smart Cot is equipped with the necessary materials and equipment.



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