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Innovative Teaching Aids Silk Screen Printing for Cylindrical Product

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ABSTRACT

This paper is about silk screen printing for product cylinder capable of changing concepts of silk-screen printing in which the product during limited to printing on flat surfaces only. The equipment is also designed to reduce the cost of printing in which existing products before the cylinder can only be printed using a heat press which is the price that has reached thousands of Ringgit. Before the equipment was created, students have a problem to understand the lessons and no simulation activities to enhance students' understanding. Learning in the classroom only involve the showing of the video. The impact of this equipment is built and made some improvements to the existing equipment to facilitate the course lecturers can use it. As a result, this equipment can be used anywhere and it is portable. Students can apply their knowledge and involve psychomotor activity by using this equipment because it does not use professional expertise.

KEYWORDS: Teaching Aids, Cylindrical Silk Screen Printing Product, Decoration Process, Printing Mug.

INTRODUCTION

Silk screen printing for cylindrical product is a printing device to print on cylindrical surfaces such as mugs. The project was designed and produced by 5 students Diploma in Mechanical Engineering Plastics (DMK) in the Session on June 2011 to meet the requirements of their final project. They have modified the use of special silk screen only for fabrics to tools that can be applied for the purpose of printing on cylindrical surfaces such as mugs. Consequently, their project is a major project and then our group took the initiative to modify the project as an enhancement. This innovative project will serve as a teaching tool that can be used in class for courses in JC502-Plastic Production Process 2, where topics in the syllabus decoration process that requires lecturers to teach sub-screen printing process to students. In conclusion, the printing device not only be shown in concept to the students, but it is also can be used to produce printing on the surface of the mug. It is also provides an opportunity for students to apply themselves in the classroom.

SITUATION AND PROBLEMS BEFORE INTRODUCED INNOVATION

Before silk screen printing for cylindrical product designed by the students, the topic of the silkscreen was on the theoretical teaching in the classroom. This limits the effectiveness of teaching in which students are exposed in the vision of one-way communication between teachers and students.

Recently, a video involving a group of students made presentations in the classroom in front of classmates are carried out but still not sufficiently effective. It is seen as less attractive to students as expected. Video impressions delivered by the students on the concepts applied silk screen on a flat surface only. Looking at the limited use of this gives an idea to the lecturer of the course for the students' final projects in June 2011 session of silk screen printing equipment to a curved or cylindrical surface as a method of teaching and learning.

However, there are some constraints on the students' final projects in which it is difficult for the lecturer of the course for use in classrooms on an ongoing basis. To that end, several improvements have been carried out on the device itself.

Among the problems faced by print media for cylindrical silk screen printing product are:

i. Not user-friendly product because it is heavy and cumbersome to carry.
ii. Block mold is a bit tight to separate during to change the mug printed.
iii. Difficult to carry anywhere as needed to be removed by using at least two-manpower due to heavy physical.
iv. There is no cover to protect the project from dust.

LITERATURE REVIEW

Teaching Aids

Teaching aids are the most important factor in determining the success of a learning program, provoking the desire of students to learn something and to make learning better and more interesting. Teaching aids is not

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something that is isolated nature of teaching and learning [1]. The use of teaching aids tremendous contribution in improving the quality of teaching and learning among teachers and students. Teaching aids can also solve many problems in the method teaching that is always changing with the times [2]. According to the research made by experts-visual equipment, understanding the concepts and knowledge acquired by humans, 75% is obtained through the senses of sight, 13% the senses of hearing,6% the senses of touch, 3% the sense of taste and 3% the sense of smell as shown in the pie chart in Figure 1 [3]. Sense of sight contribute a big part to the effectiveness of the learning session. Therefore, indispensable teaching tool and it is not just to be seen even students can use teaching aids to produce a practical output based on the theory learned.

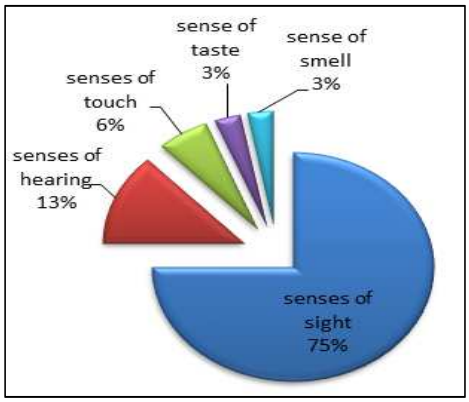

Figure 1: Percentage of human senses effective in teaching process

Silk Screen Printing

Screen printing is arguably the most versatile of all printing processes. It can be used to print on a wide variety of substrates, including paper, paperboard, plastics, glass, metals, fabrics and many other materials such as paper, plastics, glass, metals, nylon and cotton. Some common products from the screen printing industry include posters, labels, decals, signage and all types of textiles and electronic circuit boards. The advantage of screen-printing over other print processes is that the press can print on substrates of any shape, thickness and size[4].Figure 2 shows a part of silk screen printing block.

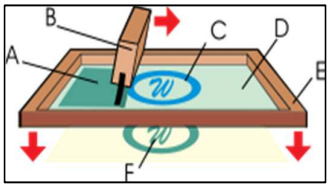

Figure 2: Silk screen printing block part
A. Ink. B. Squeegee. C. Design. D. Screen. E. Block frame. F. Printed design

Screen printing is a technique first used by the Chinese almost 2000 years ago. They used human hair stretched across a wooden frame to form the screen. To that they attached a stencil made from leaves together into different shapes. Subsequently, the Japanese adopted the screen printing process and used woven silk to make the mesh and lacquers to make stencils. The use of silk is where screen printing got its alternative name-silk screening or silk screen printing. Silkscreen printing consists of three elements-the screen which carries the image to be printed, the squeegee and the inks. It can be used to print on most surfaces including paper, plastic, fabric and wood[5].

The design is made in small unit on paper; the next stage is to transfer the design onto a fabric. The small unit paper design will have to be repeated several times to produce an appreciable length of printed fabric. The design is transferred to the screen, often by a 2 photochemical process in which the design for each color is photographed separately. The screen is coated with photosensitive material that serves as opaque sections of the screen, preventing dye penetration through the negative areas of the screen. The screen is held in contact with a tracing paper that corresponds to the patterns to be placed on the screen. This conventional method of developing screens is the photographical method where designs are copied onto screens coated with photo-sensitive chemicals, which have been exposed to light that gives an accurate representation of designs when utilized[6].

For cylindrical products such as cups, mugs and bottles, there is a slight inconvenience for printing on the surface. A tool such as jigs required to hold and fix its position while printing. In a big industry, they use

silkscreen printing machine that is sophisticated and expensive suit with large-scale production as in Figure 3. But, it is not affordable by industry or small entrepreneurs. They print silk screen manually by attaching a screen printed on the surface of the cylinder-shaped product and apply ink using brushes as shown in Figure 4 .

Figure 3: Silk screen printing machine for cylindrical product

Figure 4: Manual silk screen printing on the cup surface

METHODOLOGY

In the process of improvement of the silk screen printing for cylindrical product, a flow of methods had to be used as indicated by the following flowchart in Figure 5.

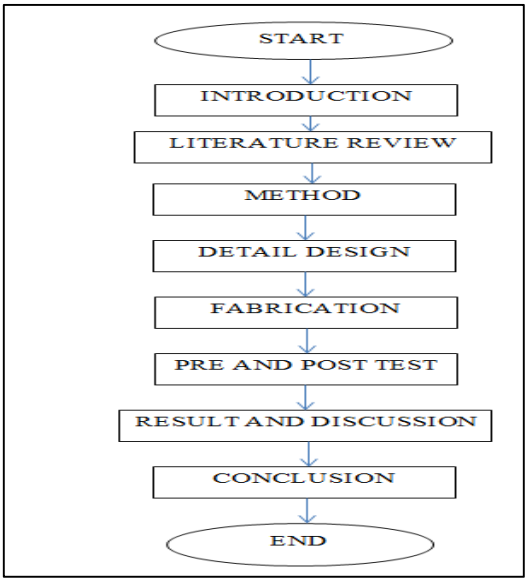

Figure 5: Flow chart of methods of innovation product

FABRICATION

i. Wheels were added at the bottom of the mold tool to facilitate movement. The wheels used were taken from the trolley that has been prevailing. Only one resource human was used to move the production of this innovation (refer to Figure 6).
ii. The mold clamp blocks were modified by replacing the locking clip that allows the mold easy to open and closed (refer to Figure 7).
iii. Other than the wheels, holder supports mold blocks also added that user are easy to carry the product by simply pulling or pushing only without having to be lifted (see Figure 8).
iv. This product is protected and guarded by closing the cover all type of leather. It is easy to clean, durable and can protect from dust and impurities (see Figure 9).

Figure 6: Used trolley

Figure 7: Locking clip

Figure 8: Wheels and holder support mold blocks

Figure 9: Coverall of product

FINDINGS AND DISCUSSION

The effectiveness of these products has been proven once it has been implemented in full. During the implementation period, it has complied with the following characteristics:

i. Saving time-Students do not need to go to the workshop to see for themselves, silk screen printing for cylindrical product can be brought into classrooms using the existing trolley.
ii. Cost savings-Renovation silk screen printing product cylindrical only low cost of RM78.00 due to it using recycled materials. As an example, extra wheels were taken from trolley unused and used for renovations.
iii. Increased productivity-Students may continue to apply the concepts they have learned to produce printing on the mug itself because it can be used (refer to Figure 10 and 11). It is not a prototype.

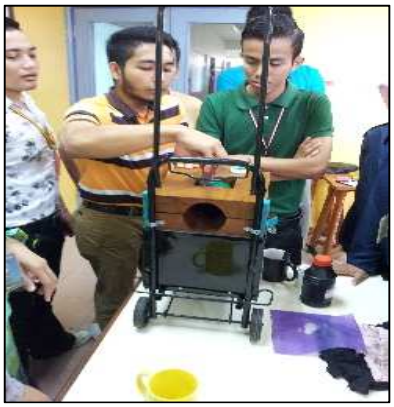

Figure10: Student produce printing on the mug itself

Figure11: Printed by the student on the mug

iv. User friendly-Easy to use. No need to have higher skills to operate it.

v. Implementation of pre and post test-Pre and post test is an assessment carried out unofficially marks the second because this assessment does not include in the Record of Assessment Coursework Marks (PKK). Pre test carried out before a new topic taught by lecturers. The goal is to get an early understanding of students about the topic basis. Once a subject completed the study, questions post test will be given to students in charge within the allotted time. Post this test questions are usually the same as the question pre test. It is intended to measure students' understanding thoroughly the topic which had been studied. The valuation has been tested on 10 students and the results of this assessment can be viewed by the graph in Figure 12.

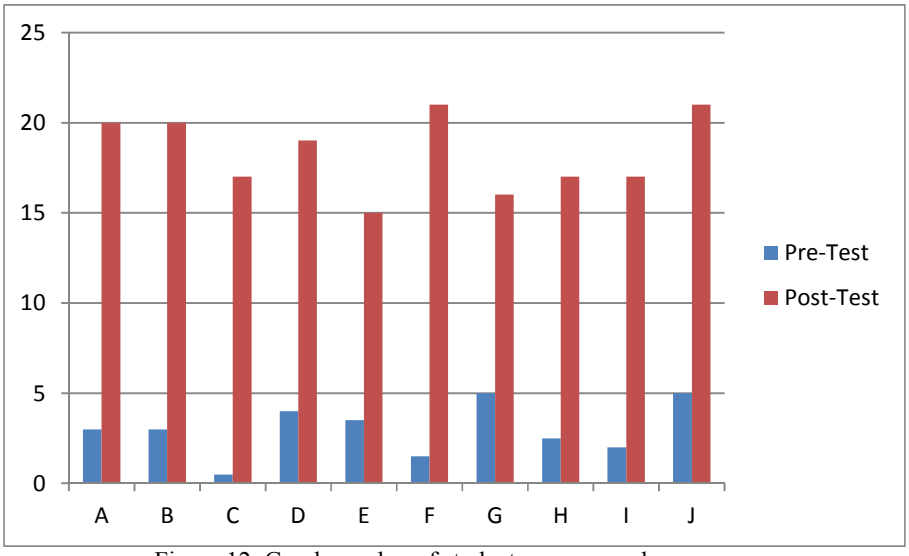

Figure 12: Graph number of students versus marks

From Figure 12, it can be concluded there is increased understanding of students on topics that are taught after the use of this innovation.

CONCLUSION AND RECOMMENDATIONS

Overall, innovation produced teaching aids can help improve students' understanding of topics taught. This is evidenced by the pre test and post test conducted in which students knowledge and understanding improved significantly after using the tool in teaching. These tools also help lecturers to deliver lessons more easily and efficiently. The situation has become even more fun teaching and students interested in trying to produce cylindrical silk screen printing product. Construction equipment for silk screen printing cylinder-shaped product not only as a tool to teach even be an innovation of printing as an alternative to existing tools or machines that are used in the market for small entrepreneurs. It is recommended that a tool like this more and more used in teaching because it really helps the learning process. It also needs to be improved and introduce this tool to small printing entrepreneurs.

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