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Design of portable purchase display for small to medium enterprise Case study of fish cracker village in Surabaya Grace Mulyono Interior Design Department Petra Christian University Surabaya, Indonesia gracem@petra.ac.id Diana Thamrin Interior Design Department Petra Christian University Surabaya, Indonesia dianath@petra.ac.id Abstract—Abstract. As an effort to increase the regional economy and touristic attraction of Surabaya city, the local government has issued a program to support and expand existing small to medium enterprises (SMEs). One of them is Kampung Krupuk, a village of traditional cracker makers. Despite its potentials, there is a need to develop its business promotion and sales through exhibition or local bazaars frequently held in Surabaya. The location of the Kampung Krupuk village in narrow alleys and far from urban roads result in problems of transporting the commodities to the exhibition areas. These problems became a challenge in the learning studio of Interior Product Design 3 course taken by third year students of the Interior Design Department. Brainstorming and Prototyping methods were carried out in the design process to produce designs that suit the conditions in the field. Existing communities were actively involved in the process of brainstorming designs, evaluation and product prototype testing. The result of this research is a purchase display product design that has many advantages: lightweight, easily assembled, economic, and can be transported by a motorcycle. These advantages are the design solution offered to the existing problems that have previously hampered the marketing and productivity of Kampung Krupuk. The resulting design can truly be realized to support the marketing activities of Kampung Krupuk

Keywords; formatting; portable purchase display, Product design, Small enterprise I.

INTRODUCTION The Department of Industry of the Surabaya city government has been promoting several medium-sized creative businesses to improve the creative economy of the people. Several creative industrial villages has been fostered and promoted to improve the tourism sector. One of them is Kampung Krupuk, a village consisting of a community making and selling fish crackers, located in Tambak Sumur Village, Surabaya. Located close to the area of fish farms, Kampung Krupuk has a very close access to the natural resources of fish crackers. With this advantage, Kampung Krupuk has the potential to mass produce fishery products and supply crackers through every part of Surabaya and even throughout Indonesia. However, the village's potential in fish cracker production needs to be accompanied by promotional efforts in order to introduce the products to the public. One of the most popular sales opportunities is through indoor and outdoor public bazaars, which is conducted almost every week in various areas of Surabaya. Kampung Krupuk has participated in several similar activities held by Surabaya's Department of Industries. However, the problem faced by Kampung Krupuk is the lack of purchase display provided by the organizers. Most of the public bazaars provide only an empty space for the tenants and hence they need to carry or provide their own purchase display. This problem was taken as the project brief for the Product Interior Design studio course at Petra Christian University Surabaya. Students were required to find a solution to problems faced by the Surabaya fish cracker community. Determining precise problems

in the design and production processed help in solving problems accurately. However, the solution to the problem should not cause another new problem. Hence, the design must integrate various scientific fields so that it truly becomes the real solution [8]. Problem solving is basically an application of user needs that must be met. In the product design process, problem solving begins with observation of the problem, which is then followed by analysis so that the problem formulation is reached. From the formulation of the problem, improvements are made to the solution through concept making, experimentation and design development to produce novel creations and enhance creativity. Creativity is an important part of the problem solving process [3]. Design becomes an important part in the problem solving process which also involves technology [4]. The design process that involves creativity in technological development, includes the ideation process, looking for possible solutions, making mock ups and making design conclusions to find the correct solution to the problems of a product. The process should then be followed by evaluation to ensure that the final product of the design process truly answers the problems formulated. This paper describes the design process of a group of interior design students in solving the problem of the designing a portable purchase display that can be used by the Kampung Krupuk community for use in temporary public bazaars. Problem solving is an important part of a design application.

II. PROBLEM AND PURPOSE In this process, the problem solving method is used to answer the following questions: what type of portable purchase display is suitable for the community of the village of Surabaya crackers? The problem solving stage is done by approaching the user as follows: display design solution, user responses to design, goals to be achieved from portable purchase display designs, descriptions of experiences and meaning of problems that exist in the Kampung Krupuk village.

III. RESEARCH METHOD The methods used were brainstorming and prototyping methods in design problem solving, and they are conducted in several design stages (Empathize, Define, Ideate, Prototype and Test). Brainstorming is a spontaneous problem solving process by several people in a group to produce unusual ideas [9]. Brainstorming in the form of a group can produce the right decisions and answer problems creatively. But in this case if creativity is the main priority groups can help determine the decisions from individual brainstorm [5]. There are three stages in brainstorming: determining the problem, limiting the problem in a narrower perspective, then brainstorming from the determined problem [1]. Brainstorming is done in the initial stages starting from empathize, define and ideate. While prototyping is done after the brainstorming process in the ideate to the test stage. Prototyping can reduce the risk of design failure by saving time and production costs [6]. Time is important in making design prototypes. The more time given, the results and the quality of the design will be better [11]. Both of these methods can be continuously executed at each design stage, from the initial process of identifying problems faced by Kampung Krupuk to the final design solution that is returned to the initial problem in the field. Whether the design really becomes a solution to boost the sales of fish crackers, or whether it creates a new problem would be considered. Beginning with the identifying problems faced by Kampung Krupuk, determining location boundaries, analyzing existing data, devising alternative design solutions, selection of best solution, application of design and evaluation of solution that truly answers existing problems formulated at the beginning.

A. Participant A group of students conducted the problem solving process related to the need for a portable purchase display for the users. The user is a community of small-scale business units supported by the Surabaya city government. The community consists of a group of home industries (6 business units) producing fish crackers in Gunung Anyar Tambak area, Surabaya. Students brainstormed design ideas and form prototypes, in groups and also individually, in order to produce portable purchase display design solutions for the cracker village community.

B. Design Task The frequency of bazaar that is routinely held every week in Surabaya has become an opportunity for small and medium industries to introduce their businesses to the public. Students were asked to design a portable purchase display that could be used by the fish cracker making community in the bazaar and non-permanent event so that their business can be better known to the public. When not used in the bazaar, the product can still be

used at home or a cracker community shop. Products must be easily moved, assembled and carried in a practical and fast manner. C. Procedure Ten students were divided into two small groups. For eight hours a day, twice a week, students conduct problem solving stages, both in the field, studio and experimental workshop. Students were gathered into small groups to perform field observations, conduct interviews with the fish cracker making community and observe their daily activities. These activities were carried out twice a week for eight hours a day, within one semester. Meetings with the business unit to collect data were carried out three times at the initial stage. Evaluation of design alternatives by the users was done once in the middle of the semester, followed by evaluation of the product prototype at the end of the semester. IV. FINDINGS AND DISCUSSION At the initial stage, a group of students directly observed the activities and field conditions of Kampung Krupuk, followed by in-depth interviews with the community in the Tambak Sumur village of Surabaya. The meeting was held three times at the community coordinator's house, and the students documented in detail the activities that were carried out in the process of making crackers. The existing data was then discussed by students in the group, to map the problems that exist in the field, including transportation problems and environmental conditions in the village. The problems that arise in the Empathize process were mapped out in the define stage according to five aspects: performance, function, form quality, producer interests, functions and production processes. With a large amount of production, the community can produce 50 kg of quality raw crackers every day. However, despite their production capability, they are not supported by transportation facilities. To distribute the products to shops and bazaar locations, the community uses motorbikes. The narrow alleys located away from the main road also causes the krupuk village area to be difficult to access by four-wheeled vehicles. This problem became a concern for students to solve in the stage of brainstorming design ideas. The furniture produced later must be able to be carried away using a motorbike, and it must also be light and easy to install. In addition, it must be able to accommodate the display of crackers that are quite heavy, because one pack of raw crackers measuring 20 x 30 cm has a weight of 500 grams. The brainstorming method in this case was used to formulate specific problems that existed in the Kampung Krupuk village. Each student in a large group of ten wrote the problems on sticky notes, with a time limit of approximately 15 minutes. After that all the sticky notes were arranged in the form of mind maps according to the aspects of performance, function, production, marketing, producer interests and quality of forms (Fig. 1). Fig. 1. Ideation Process with brainstorming method At the Ideation stage students brainstorm spontaneously at the beginning. Existing ideas were presented in groups, accompanied by spontaneous sketches. Students develop and sketch out design ideas individually and then discuss their ideas in groups. Variations in brainstorming methods were also carried out, which allowed accepting input from groups at different times to bring out better ideas [7]. Students were given the opportunity to develop their ideas individually in different places, and then return to the group to discuss ideas. Five people in a small groups perform individual brainstorms within two hours, then each sketch paper was rotated to other group members to acquire their inputs to the design. This model of criticism gives all members the opportunity to provide input according to their own unique respective concepts and views [10]. This variation made the group's brainstorming process alive and the students frequently came up with fresh ideas (Fig. 2). At the second ideation stage, in the development of design ideas, the groups were divided into two small groups. Students with similar design solutions were grouped into one to brainstorm again the design development. This process is known as one-step filler material, where in practice this effort will minimize differences of opinion so that the same design conclusions can be reached [2]. Fig. 2. Ideation Process with brainstorming method The Ideation stage for design development was also followed by the Prototyping method, in which spontaneous ideas that emerged were developed into sketches and 1:10 scale mock-up prototypes. From these prototypes the resulting design can be visually distinguished. The planned assembling and disassembling system could also be more seriously considered through Prototyping. At this stage, each individual presented his idea to members of the small group and obtained input from other

group members. The design results, as seen in Fig. 3, consisted of two main materials namely metal and processed wood. Fig. 3. Ideation development with the Prototyping method The first design was a portable design with a metal-based knockdown system, and the second is a multiplex-based one. Both were designed to counter the problems transporting the portable purchase displays using motorbikes. This consideration had influenced the dimensions when the furniture was removed and the ease of installation. Metal and processed wood were considered strong, lightweight and durable as well as economic in terms of cost. Most of the shelves and display boards utilized light and strong materials such as canvas and rattan fabric (Fig. 4). This material was also chosen to give a natural impression and provide the opportunity to enhance the community's product brand as part of the focal point. From the stage of brainstorming prototypes 1, the conclusion reached was that with the knock down system, metal is the most suitable structural material. Metal is lighter, durable and easy to carry than processed wood. Fig. 4. Preparation and production of the second prototype 2 on a 1: 1 scale by students The two prototypes were then tested by the two groups of students at the end of the semester. Tests are carried out at bazaars held at the campus by selling community's fish cracker products. The test process also involved the community directly as users. Of the two existing designs, it can be concluded that the design using stainless steel was lighter and easier to carry. This design was then chosen to be given to the community. The design used colors like yellow and green as applied to the branding of the cracker community. The logo was placed on the top of the shelf as the point of interest and branding promotion. Racks were made of metal pipes, iron folding, and goni fabric. The height of the shelf can be adjusted according to the needs and the display rack can vary in number as needed. And most importantly, the results of the design as the answer to the problem are: the design can be summarized into parts that can be transported using a motorcycle. This problem is the most important point as a result of group brand monitoring to determine the main problems facing the community. Most importantly, the results of the design as the answer to the problems is: the product can be disassembled into parts that can be transported using a motorcycle (Fig. 5). spontaneous ideas as solutions to the need of displaying crackers attractively when selling at the bazaar. The Prototyping process also complemented the design process, so that the design could be understood, especially by the community, opening wide opportunities for design feedbacks that were useful for design development. Using materials that are lightweight, inexpensive, easy to carry and install answered the problem formulated at the start of the design process. Through the design process and product yielded, it is hoped that this research can improve and encourage the development of existing small to medium business enterprises as part of the local wisdom of Surabaya. ACKNOWLEDGMENT The authors would like to thank Mrs. Li'anah and the Kampung Krupuk Gunung Anyar Tambak community for their collaboration in this research. Special mention also goes to the design team: Regina Harijono, Pauline Christina, Dinda Geraldine, Sheilly Yuliani, Kevin Jeremia, Ryan Sidharta, Domas Abdiel and Christoper Chandra for their participation in this research. Fig. 5. Test process and product delivery to the Kampung Krupuk community This ability answered the most crucial problem pointed out as a result of group brainstorming i.e. the location of the Kampung Krupuk village in narrow alleys and far from urban roads result in problems of transporting the commodities to the exhibition areas. From the student Test process, there were many positive responses from academics and the general public. The response of the public mostly stated that the portable purchase display can be mass-produced to answer the needs of many small and medium businesses for branding promotions in bazaars which are increasingly rampant today. V. CONCLUSION From the Brainstorming and Prototyping process, a design of a portable purchase display that can answer the needs of the Kampung Krupuk community for marketing their products has been produced. The Brainstorming process brought new [1] [2] [3] [4] [5] [6] [7] [8] [9] REFERENCES Al Khatib B. Adel. 'The effect of using brainstorming strategy in developing creative problem solving skills among female students in Princess Alia University College" American International Journal of Contemporary Research, Vol. 2, No.10, October 2012 K. L. Dugosh. P.B. Paulus. E.J. Roland and H. C.

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