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Application of Tacit Knowledge from Professional Packaging Designer for Teaching Packaging Design

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***Abstract*—**In the package design industry, there are a lot of tacit knowledge resided within each designer. The objectives are to capture them and compile it to be used as a teaching resource and to create a video clip of package design process as well as to evaluate its quality and learning effectiveness. Interview were used as a technique for capturing knowledge in brand design concept, differentiation, recognition, rank of recognition factor, consumer survey, knowledge about marketing, research, graphic design, the effect of color, and law and regulation. Video clip about package design were created. The clip consisted of both the speech and clip of actual process. The quality of the video in term of media was ranked as good while the content was ranked as excellent. The students' score on post-test was significantly greater than that of pre-test ($p>0.001$).

***Keywords*—**Tacit knowledge / interview / video / packaging / design.

I. Introduction

PACKAGING was defined as a coordinated system of preparing goods for safe, secure, efficient and effective handling, transport, distribution, storage, retailing, consumption and recovery, reuse or disposal combined with maximizing consumer value, sales and hence profit [1]. This indicates that it is a combination of several disciplines. In order to design a good package, it would require both knowledge and skills. It is also necessary to think scientifically as well as artistically. These requirements post challenges to teaching package design course, which was offered to student with either science or art/design background.

In packaging design course, two types of knowledge were required to be transferred to students, tacit and explicit. Explicit knowledge, presented in textbook and articles, is easy to capture and transfer to students. Instructors, even with little experience in package design, are keen on doing so. Unlike explicit knowledge, tacit knowledge, which resides with people's memories and minds, is rather difficult to capture and transfer. In addition, many of instructors may not possess the tacit knowledge in all discipline necessary for teaching packaging design. Therefore, the instructor will need to capture this knowledge in order to transfer to students. Tacit knowledge can be transferred to either explicit or tacit knowledge. Socialization is the process to transfer tacit to tacit knowledge while a combination of internalization and externalization is required to transfer tacit to explicit knowledge [2].

Socialization with an expert enables one to generate tacit knowledge from the tacit knowledge of the expert, for example, students learn the experts' skill. However, it has some limitations that neither the students nor the expert would gain any systematic insight into their craft knowledge. This was because the knowledge being transferred has never become explicit [2]. Also, socialization with expert may not be applicable for education both time- and financial-wise. Transforming tacit knowledge to explicit knowledge is more practical and sustainable especially for education but it is time consuming and could be problematic [3]. Very little methodology has been done to convert tacit to explicit knowledge.

Knowledge capturing technique is critical for knowledge management and sharing and it is important for converting from tacit to explicit knowledge. Kulandaisamy and ramanujam proposed the use of exchange protocols, which may substantially increase people's ability to express what they learned from the rich narrative with the note that structuring the recall may help the conversion process [3]. There was also a proposed based on case-study and survey in the governmental organization to use the storytelling system in the form of an expert interview using an interviewer, story editor, story moderator and user [4].

Our objectives are 1) to compile knowledge obtained from interviewing professional package designer and used as a resource for teaching package design, 2) to create a video clip based on the actual package design process and explicit knowledge obtained from the previous interview and 3) to evaluate the quality and learning effectiveness of the video clip.

II. Materials and Methods

A. Insight from Professional Package Designer

Professional package designers not only possess explicit knowledge, but they also have many tacit knowledge. Structured interview were used to capture those knowledge and converted to explicit knowledge. Ten professional designers/advertisers, who we deemed as an experienced packaging designer, were selected as an expert in our data

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collection process. Questions about aspects that greatly influence package design were asked. The questions include brand design concept, differentiation, recognition, consumer survey, marketing knowledge, research information, graphic design, and priority list in making the package recognized by consumers, the effect of color, and the influence of law and regulation. The data received were compiled into a basic knowledge as a result of converting from tacit to explicit knowledge.

B. Packaging Design Process

Although packaging design process is quite standard, there are many tacit knowledge within the process. We chose to illustrated through video clip with the case study of Bureau of Supporting Industry Development, Department of Industrial Promotion, Ministry of Industry, who support Small Medium Enterprise in their package development. Pre-interview was conducted to obtain preliminary information. Story board was written before actual filming take place. The production was done mainly at the Bureau of Supporting Industry Development, Department of Industrial Promotion, Ministry of Industry, Thailand. The film was then edited before the sound the picture were synchronized. The target group of the video was undergraduate students in Printing or Packaging Technology who studied packaging design course.

C. Evaluation of Package Design Video

The package design video was evaluated in term of quality and learning effectiveness. In term of quality, the video was evaluated in two aspects: content and media, by 3 experts in each category. Five Likert Scale were used for evaluation. The score of five represents excellent quality while the score of three represents medium quality and the score of 1 represents the poor quality and the need of improvement. The average quality score for each aspect were interpreted as 4.50 - 5.00 representing excellent, 3.50 – 4.49 representing good, 2.50 – 3.49 representing medium, 1.50-2.49 representing fair and 1.00-1.49 representing poor.

Learning effectiveness was investigated by a group of 20 freshmen from the Department of Printing and Packaging Technology. The sample group was given a pre-test before watching the video and a post-test after watching the video. Pre-test and post-test were drawn from the same pool of question. Each evaluator received different questions and the pre-test and post-test questions were different. The result from the pre- and the post-test were compared. Paired T-test was used to determine if the score were significantly difference.

III. Results and Discussion

A. Insight from professional package designer

From the interview, the conclusion of each topic being asked was summarized as an explicit knowledge from professional package designer as followed:

1) Brand design concept

Brand should be easy to remember and should be a good representative of the product. It should stand out from other competitor. Some also suggested that the brand should be simple with little detail. Not all packaging designer do the brand design as it was found that designers who work for large packaging manufacturer company do not do the brand design.

2) Differentiation issues

Packaging can contribute to make the product different from the competitors'. In order to do this, designer must do the survey of the target group and analyze consumer behavior in order to gain an idea on how to make the package differentiate. The technique for differentiation mentioned by experts include shelf placement, strong brand identity, layout, color, drawing, and photograph, distinguished shape, slogan, additional features, and cost reduction while maintaining the shape and strength of the original package.

3) Recognition

Packaging can help consumer recognize the product by using clear and meaningful graphic, use photograph to convey message, slogan, use identity or memory of the product or the place you bought (such as in the case of souvenir or product for tourist). Two testing of the package recognition were recommended. One was to test the structure by removing all graphics and see if the package can still be recognizable. The second was to place on the shelf and look from afar to see whether the package can still be recognizable.

4) Rank of recognition factor

The word that came up in the list when the professional packaging designer were asked about what factors influence the recognition of the package included color, shape, detail, brand, properties, usage, and text. The two words that come up most frequently were color and shape/structure.

5) Consumer survey

Consumer survey received a positive response of being important to the package design process but the way it was conducted was different for each designer. Some of the examples include interview and questionnaire, observation, review of previous research or article and experience. Experience can only be used with those who work repeatedly on the same or similar product category or target group. Many designers do not do their consumer survey by themselves but use information provided by marketing department or marketing firm. Consumer survey should be done both before and after designing the package. Prior to design, it is conducted to collect information about the users of the product. The point in the survey may be differed for different market. For example in Thai market, it needs to be focus on price while in some developed country the focus of the survey is at usage, safety, and environmental issues. Consumer survey maybe conducted also for the selection of preliminary design. Consumer survey must be done again when prototype is available. The focus of the latter is to evaluate the ease of use, the ability of the package to communicate clear message about the product and the price as well as to compare with the previous packages or the competitors' packages.

6) Knowledge about marketing

Marketing knowledge is an essential part of package design. Although many designers deemed that they do not do their own market survey, it is still important to understand concept of marketing because it helps in communication with the client. Marketing is used to assess target group and how to reach them and to determine if the price of the package, which plays part to the selling price of the product is suitable.

7) Research

Many packaging designers work in collaboration with other people as packaging is a truly multidiscipline in their nature. Some research topics related to packaging design mentioned by experts are environmental aspect, easy open, tight seal, inertness of material, life cycle, food contact material, additives, printing properties, consumer behaviors. The research can be done in term of product, raw material, and client information. These can be carried out by literature searching, visiting client facility, attending exhibition or participating in packaging related competition.

8) Graphic design

It is recommended that the design brief is done and the objective is clearly reviewed before the design process start. This is to ensure that the design response to the client's demand. Graphic design depends on the product and target group and it must be known prior to starting the design step if the package needs no or only little graphic. The basic components of graphic design are text, color, graphic and layout. Within the 10 experts being interviewed, there are two non-graphic designer as they are more specialized in structural design. However, they recommended that the graphic is done by the graphic designer that knows the target market and its culture well.

9) The effect of color

All experts think that color has influence on product on various aspects such as identification, differentiation, communication of feeling, recognition, emotion and buying decision. It can also be used as consumer segmentation. However, the use of color depends a lot of the culture.

10) Law and Regulation

It is unanimous that law and regulation have influenced the design of package. The issues included in this law and regulation are symbol, warning symbol, barcode, transportation, packaging for hazardous material, copyright, safety and food contact material.

B. Packaging Design Process

From the initial interview with its executive and staff of Bureau of Supporting Industry Development, Department of Industrial Promotion, Ministry of Industry, we found that its design process started with inquiring related information both from the client as well as other resources such as internet, magazine, and internet survey. Once enough information is gathered, the structural design process begins. For its client, which are SME, the structure design is usually based on the existing pattern. This allows for lower production cost for the order of smaller volume. The graphic design include both the logo (unless the client has already have one) and other complimentary graphic. The material to be used for the package and sometime the package itself is tested. The testing are usually out-sourced to a more experienced organization. Once the designer is satisfied with the design, he/she will present it to the client for the feedback. This feedback is then used for correction of the design as well as the information for the next project. Once the design is finalized with the client, it is send to package manufacturer for the actual production.

The video was created based on the story of the packaging design process. The examples of packaging were given at the introduction of the video. Then, the MC introduced the packaging as an important tool for today's product and the purpose of the video and the director of Printing and Packaging Section of Bureau of Supporting Industry Development talked about the purpose of having packaging. This is followed by the steps of package design, which followed the ordered mentioned above, which illustrated with both speech and the video clip of the actual working process. It is believed that actually seeing the video will enable students to vision what happens in the package design process better. The video also uses music and graphic to help gain students' attention. Some of the pictures captured from the video were shown in Fig. 1-4.

Fig. 1 Example of Packaging shown in the video

Fig. 2 Director of Printing and Packaging Section, Bureau of Supporting Industry Development talks about the purpose of packaging

Fig. 3 Making Package Prototype

Fig. 4 Prototype package ready to present to the client

C. Evaluation of Package Design Video

The quality of the video in the aspect of media and content were evaluated. As a media, the video received the overall score of 4.33, 4.11 and 4.13 for picture, sound and technique (Table I). This indicated a good quality all three category. When look in the detail of each category, all were in good quality except the sequence of picture was rated as excellent with the score of 4.67. For sound, each individual detail received rating of good while, for technique, all were good except the length of the video were rated excellent.

The overall quality of the video content were excellent (Table II). All aspect received excellent rating except the clarity and scope of content. Both of which received the score of 4.33, which means the good quality.

The learning effectiveness was also evaluated by students. The average difference between pre- and post-test were 2.5 points out of 15 points (approximately 17%). This difference was significant ($p<0.001$).

TABLE I
SCORE OF VIDEO QUALITY IN TERM OF PICTURE, SOUND AND TECHNIQUE ON 5-LIKERT SCALE BY 3 EXPERTS IN MEDIA

Aspect	Score	Rating
Picture		
- Picture meaning	4.33 ± 0.27	Good
- Picture clarity	4.00 ± 0.00	Good
- Picture size	4.33 ± 0.27	Good
- Picture sequence	4.67 ± 0.27	Excellent
- Continuity	4.33 ± 0.27	Good
- Emphasis	4.33 ± 0.27	Good
Sound		
- Clarity	3.67 ± 0.27	Good
- Music loudness	4.00 ± 0.00	Good
- Music suitable with picture	4.33 ± 0.27	Good
- Intonation	4.33 ± 0.27	Good
- Stress	4.00 ± 0.00	Good
- Voice loudness	4.33 ± 0.27	Good
Technique		
- Length of video	4.67 ± 0.27	Excellent
- Quality of graphic	4.33 ± 0.27	Good
- Text size	4.00 ± 0.00	Good
- Graphic clarity	4.00 ± 0.00	Good
- Color of text and its background	3.67 ± 0.27	Good

TABLE II
SCORE OF CONTENT QUALITY ON 5-LIKERT SCALE BY 3 EXPERTS IN PACKAGING

Aspect	Score	Rating
- Content suitable for target group	4.67	Excellent
- Content follows objectives	5.00	Excellent
- Clarity of content	4.33	Good
- Scope of content	4.33	Good
- Sequence of content	4.67	Excellent
- Content suitable with timing	5.00	Excellent
- Conclusion	4.67	Excellent

IV. CONCLUSION

The use of tacit knowledge extracted from the designers along with staff and executives at the Bureau of Supporting Industry Development, Department of Industrial Promotion, Ministry of Industry is useful information for teaching of packaging design. The video created to show the process of packaging design were rated as good quality media and its content were excellent. Students who watched the video had significantly higher post-test score than they did for pre-test score. This video has also been used in Packaging Design Class at the Department of Printing and Packaging Technology, King Mongkut's University of Technology Thonburi.

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REFERENCES

[1] Hellstorm, D. and M. Saghir, Packaging and logistics Interactions in Retail Supply Chain. Packaging Technology and Science, 2007. 20(3): p. 197-216.
[2] Nonaka, I., Knowledge-creating Company. Harvard Business Review, 2007. July 01, 2007: p. 12.
[3] Kulandaisamy, D. and B. Ramanujam, Protocol based approach for tacit to explicit knowledge conversion. Computer Technology and Application, 2011. 2: p. 75-79.
[4] Kalid, k.S. and A.K.B. Mahmood, The use of Storytelling in sharing tacit knowledge in government organisations. Public Sector ICT Management Review, 2009. 3(1): p. 52-58.