# *Development of Online Video Learning Media on Paper Box Packaging Production Process*

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**Abstract**
Nowadays, many products require box packaging to protect them during transportation, handling, and storage, making mass production for many industries. To provide important knowledge for paper box production, online learning using VDO media should be created to enhance understanding for the relevant persons. The objective of this project was to develop video learning media, especially for staffs and customers on the paper box packaging production process as the requirement of a manufacturer. The video materials of five learning modules were created using the InShot program and the qualities of online video learning material were then evaluated. The learning effectiveness and satisfaction of the sample group were assessed using 25 learner participants, including new staffs of the manufacturer, undergraduate students of a packaging program, and interested persons. The tools included a quality assessment form, a pre-test and post-test consisting of 20 multiple-choice questions, and satisfaction evaluation form using 5-score rating. The results indicated that the overall content quality was good (mean=3.96) and the media quality was good (mean=4.37). The learning effectiveness determined from the test scores showed that the post-test was 44.2% higher than the pre-test, statistically significant at the .05 level. The average normalized gain (N-gain) was 0.64, indicating as a medium level of learning effectiveness. The sample group expressed a high satisfaction with the learning materials (mean=4.12). Therefore, this learning material can effectively be applied to provide an online learning platform for the manufacturer to improve the packaging production process and company marketing.

Keywords: Online, Offset Printing, Paper Box Packaging, Video Learning Media

## Introduction

Many products require packaging to protect them during transportation, handling, and storage, making mass production for many industries. The demand for sustainable and Eco-friendly packaging solutions has surged, leading to a significant rise in the popularity of paper box packaging. The paper boxes are biodegradable, recyclable, and made from renewable resources, making them an excellent choice for businesses aiming to reduce their carbon footprint. The production of a paper packaging box is a meticulous process that requires careful attention to detail at every step. From initial design considerations to the final quality check, each stage plays a crucial role in creating a packaging solution that meets industry standards and customer expectations. To control the qualities of products, the manufacturer must provide the learning media for upskilling or training process that helps employees develop new or higher-level skills to improve their work performance. It can also help employees prepare for new opportunities within their company.

The advancing technology and improved internet access increased use of online learning which significantly enhance learning engagement and motivation. Since the digital devices such as computers, tablets or smartphones allow easy access to resources for self-learning, online learning becomes flexible and enable learning in anytime and anywhere. To provide important knowledge for paper box packaging production, online learning using VDO media should be created to enhance understanding for the relevant persons. The objective of this project was to develop video learning media, especially for staffs and customers on the paper box packaging production process as the requirement of a manufacturer (UL Printing and Packaging Co., Ltd.).

## Methodology

The online video learning media on the paper box packaging production process were created as the requirement of UL Printing and Packaging Co., Ltd. as an offset printing house using the InShot program. The online learning unit in the model of VDO included of 5 units was applied to provide knowledge especially for staffs and customers of the company.

The qualities of learning media on contents and design were evaluated by 6 experts, 3 experts in contents and 3 experts in media. The learning achievement and satisfaction of the sample group were assessed by new staffs of the manufacturer, undergraduate students of a packaging program, and interested persons. The tools of a quality assessment form was 5-point rating scale using the Google Form. The learning achievement of the learners was determined from a difference of pre-test scores and post-test scores and normalized gain with 20 multiple-choice questions. The satisfaction evaluation form was also used with 5- point rating scale created in the Google Form. The Criteria of 5-point rating scale for evaluation are shown in Table 1.

Table 1: The Criteria of 5-Point Rating Scale for Evaluation

| Scale | Scale Interval | Opinion for Quality | Description for Satisfaction |
|---|---|---|---|
| 5 | 4.50-5.00 | Excellent | Very Satisfied |
| 4 | 3.50-4.49 | Good | Satisfied |
| 3 | 2.50-3.49 | Average | Neutral |
| 2 | 1.50-2.49 | Poor | Dissatisfied |
| 1 | 1.00-1.49 | Very Poor | Very Dissatisfied |

The quiz for pre-tests and post-tests of each unit was created with Google Forms using optimal multiple-choice questions for a module with IOC and difficulty level analysis as Eq. 1.

$$\text{Difficulty Index } (P) = R/T \quad \text{(Eq. 1)}$$

*Where R is the number of correct responses and T is the total number of responses in the sample group*

The appropriate difficulty is 0.20-0.80 because the exams that were too difficult (<0.20) or too easy (>0.80) were unable to classify the learning outcome.

The learning achievement was analyzed by comparison between the average scores of pre-tests and post-tests before and after self-learning the VDO media and using t-statistics (T-test dependent samples) with statistical significance at the 0.05 level. The normalized gain (N-gain) was also found and analyzed, as shown in Table 2.

Table 2: The Classification of Normalized Gain Values

| Gain Score | Interpretation |
|---|---|
| $g > 0.7$ | High |
| $0.3 < g \leq 0.7$ | Medium |
| $g \leq 0.3$ | Low |

**Results and Discussion**

The topic, learning objective and video clip duration of each unit are shown in Table 3.

Table 3: Lesson Modules of the Online VDO Learning

| Unit | Topic | Learning Objective | Duration (min) |
|---|---|---|---|
| 1 | Process of Producing Foldable Paperboard Packaging | To gain more knowledge for learners about special coating techniques, paper selection for boxes and graphic design. | 01:52 |
| 2 | Pre-press process | To gain more knowledge for learners about preparing work files, lay-out of the box, plates, die-cut, boxes, paper cutting for print, etc. | 01:07 |
| 3 | Press process | To gain more knowledge for learners about paper loading into the press, ink system and print quality inspection. | 0:49 |
| 4 | Post-press process | To gain more knowledge for learners about die-cutting of printed sheets, quality checking of workpieces, gluing the box and Packaging | 01:17 |
| 5 | Consideration for Producing Foldable Paperboard Packaging | To gain more knowledge for learners about design, packing products into boxes, choosing to use a different type of paper, distribution, import-export, and special color selection | 01:34 |

The examples of pictures capturing from 5 unit of the learning media which create as multimedia are shown in Fig. 1-5.


Figure 1: The Examples of Video Media in Unit 1

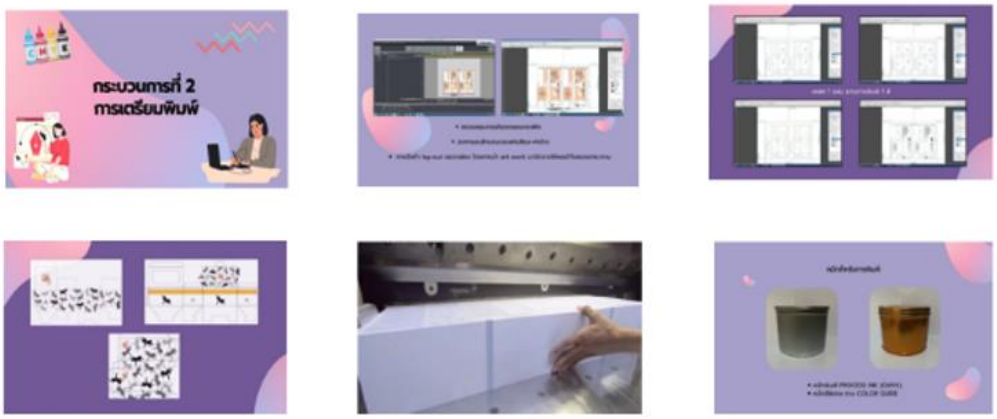


Figure 2: The Examples of Video Media in Unit 2

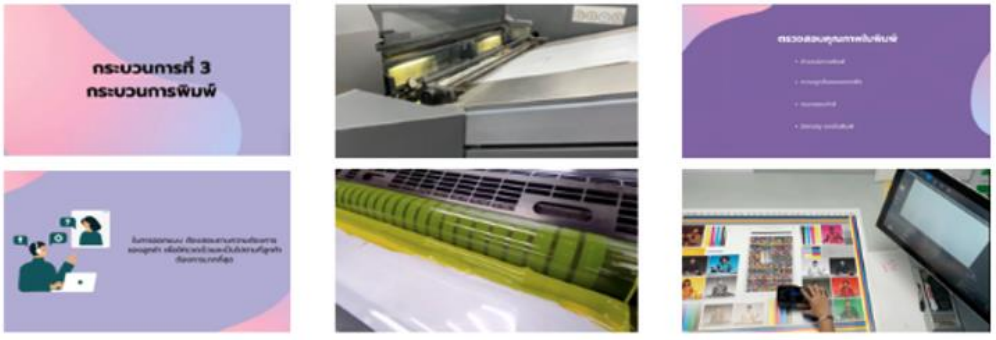


Figure 3: The Examples of Video Media in Unit 3

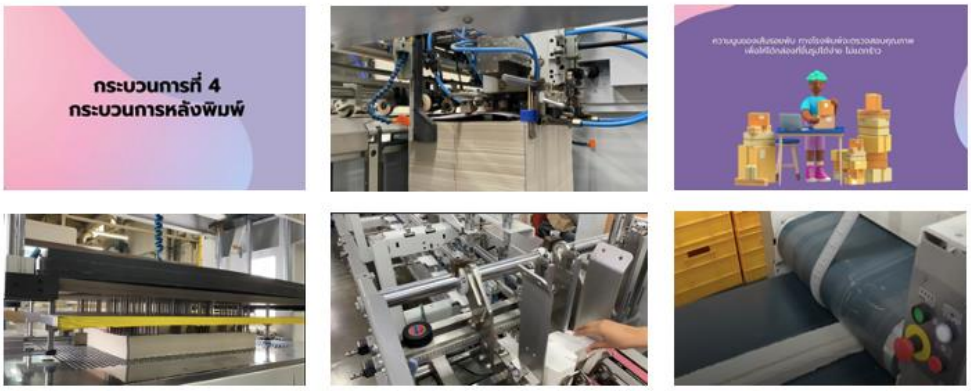


Figure 4: The Examples of Video Media in Unit 4


Figure 5: The Examples of Video Media in Unit 5

The quality of the video learning media was assessed by 6 experts, 3 experts in contents and 3 experts in media. The content quality assessment results of video production show in Table 4. The results of media quality assessment of video production show in Table 5.

Table 4: The Quality Assessment for the Content of Video Media

| **Appropriateness Evaluation** | **Evaluation Results** | | |
|---|---|---|---|
| | **Mean Score** | **S.D.** | **Level** |
| 1. Alignment with objectives | 4.00 | 1.00 | good |
| 2. Accuracy | 4.00 | 1.00 | good |
| 3. Appropriateness of arrangement | 3.67 | 0.58 | good |
| 4. Relevance and currency | 4.00 | 1.00 | good |
| 5. Categorization | 4.33 | 0.58 | good |
| 6. Appropriateness of amount | 3.67 | 0.58 | good |
| 7. Appropriateness of sentence used | 4.00 | 0.00 | good |
| 8. suitability for the target learners | 4.00 | 1.00 | good |
| 9. Matching of Illustrations or video | 4.00 | 0.00 | good |
| **Total Average Scores** | 3.96 | 0.41 | good |

The overall content quality was at good level. The standard deviation is at a level where the differences are small (M=3.96, S.D.=0.41). A total of 9 items, the content categories achieved the highest quality level. The appropriateness of content organization, the appropriateness of the content volume achieved the lowest quality level.

Table 5: The Quality Assessment for the Design of Video Media

| **Appropriateness Evaluation** | **Evaluation Results** | | |
|---|---|---|---|
| | **Mean Score** | **S.D.** | **Level** |
| 1. Background color | 4.33 | 0.58 | good |
| 2. Font style, color, and size | 4.00 | 1.00 | good |
| 3. Screen layout and composition | 3.67 | 0.58 | good |
| 4. Background music | 4.00 | 1.00 | good |
| 5. Illustrations align with the content | 5.00 | 0.00 | Very good |
| 6. Visibility of Illustrations and videos | 4.67 | 0.58 | good |
| 7. Loudness and clarity of Audio | 5.00 | 0.00 | Very good |
| 8. Learning engagement and promotion | 4.33 | 0.58 | good |
| 9. Suitable for distribution | 4.33 | 0.58 | good |
| **Total Average Scores** | 4.37 | 0.36 | good |

The overall media qualities were at good level. A standard deviation indicating minimal differences (S.D.=0.36). Illustrations were consistent with the content and the audio in the video was clear, achieved the highest quality level or very good. The screen layout and composition got the lowest quality level. and the total qualities were at good level.

The total sample group of learners for evaluation of learning achievement consisted of 25 persons divided into three groups, as follows:

Group 1. Company Employees for 14 persons.
Group 2. Students studying printing and packaging for 5 persons.
Group 3. General Students Interested in Packaging for 6 persons.

Table 6: Learning Achievement Outcomes of 25 Learners

| **Quiz** | **Sample number** | **Scores** | **Total scores** | **Mean** | ***X*** | **S.D.** | **t** | **Sig. (1-tailed)** |
|---|---|---|---|---|---|---|---|---|
| **Pre-test** | 25 | 20 | 141 | 5.54 | 5.64 | 1.38 | 33.95 | 0.0000 |
| **Post-test** | | | 399 | 15.96 | 15.96 | 1.79 | | |

For Pre-test, the learners have an average score of 5.64 points=28.2%. For Post-test, the learners have an average score of 15.96 points = 79.8%. It indicated that the score increased by 51.6%, with N-gain=0.72, which was at the moderate level. Results of the satisfaction evaluation of the sample group consisted of 25 persons regarding the video media are shown in Table 7.

Table 7: Results of the Evaluation of the Sample Group's Satisfaction with the Video Media

| **Appropriateness Evaluation** | **Evaluation Results** | | |
|---|---|---|---|
| | $\overline{X}$ | **S.D.** | **Level** |
| 1.The content is understandable for learning. | 4.16 | 0.75 | good |
| 2. The content is arranged in an easy-to-understand order | 4.20 | 0.65 | good |
| 3. The language used is appropriate to the content | 3.69 | 0.84 | good |
| 4.The illustrations are consistent with the content. | 4.32 | 0.69 | good |
| 5. The picture and sound in the video are clear. | 3.92 | 0.86 | good |
| 6. The video media is interesting and engaging for learning. | 4.16 | 0.75 | good |
| 7. The video media is appropriate for distribution | 4.12 | 0.83 | good |
| **Total Average Scores** | 4.12 | 0.08 | good |

It was found that viewers were highly satisfied. The standard deviation is at a level where the differences are minimal (M=4.12, S.D.=0.08). The illustrations are highly consistent with the content, The level of satisfaction is very high. The language used is appropriate for the content, The lowest level of satisfaction.

## Conclusion

The video media on paper box packaging production process of 5 units has been produced with good content qualities which can be used for online learning or training. The Illustrations were consistent with the content and the audio in the video was clear, achieved the highest quality level or very good. The learning effectiveness determined from the test scores showed that the post-test was 51.6% higher than the pre-test, statistically significant at the .05 level. The N-gain was 0.72, which was within the medium level of learning achievement. The sample group has a high level of satisfaction with the produced video media, the illustrations are consistent with the content. Therefore, this learning material can be applied to provide an online learning platform for the manufacturer to improve the packaging production process.

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