

*A Study on the Design of Teaching Materials for the Mobile Learning Apps in  
Printing Professional Courses*

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**Abstract**

This study aims to explore the design of teaching materials for the Mobile Learning Apps in printing professional courses. This study firstly conducts literature review to understand the development status of the content for the Mobile Learning Apps, the production process and the teaching materials that conform to the requirements of the printing professional courses. Then, this study will conduct in-depth interviews, use relevant literature and refer to the subject matter in printing professional courses as well as the current printing education materials to design a systematic printing professional course. Then, experts or scholars with work or teaching experience will assist in confirmation of the course content. The results obtained for this study show that students can obtain a complete curriculum content from the printing professional courses, but only the undergraduate students that major in relevant studies may enjoy improvement to their knowledge and practical abilities based on the current course content.

Keywords: mobile learning app, printing professional courses, teaching material content

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# **I. Introduction**

## **Research Background and Motivation**

According to the “Policy Guidelines for Mobile Learning” promulgated by the United Nations Educational, Scientific and Cultural Organization (UNESCO), Mobile Learning means learning with mobile technologies or other Information and Communication Technologies (ICTs). Chi-Yu Chen and Hung-Chang Lin (2007) thought that learners could more quickly have access to the information required through the mobile devices, and they could select their own ways to conduct mobile learning. Learners could take active action and obtain instant feedback, thus experiencing more convenience in mobile learning without limitations of time and space.

Mobile Learning has specific benefits like “Expanding the Scope of Education and Fairness,” “Helping the Disabled to Learn,” “Promoting Personalized Learning,” “Providing Immediate Feedback and Measurement,” “Supporting Situational Learning” and “Improving Communication and Management” (UNESCO, 2013). But as most teaching materials for mobile learning are rarely designed for specified subjects, and the teaching materials contain inconsistent messages, information acquisition, memorization and learning are pretty difficult as a whole (Chi-Yu Chen and Hung-Chang Lin, 2007). Hence, how to design mobile learning materials for certain subjects is indeed a topic worth studying and further investigation.

Via literature review and in-depth interviewing, this study analyzes the findings to reach conclusions on the apps for printing professional courses, which may be referenced during the design of teaching materials for mobile learning apps in printing professional courses.

## **Research Purposes**

This study aims to investigate the design of teaching materials for mobile learning apps in printing professional courses, or more specifically, to understand the Development Status of Teaching Materials in Mobile Learning Apps, the Work-flow of Making Teaching Materials in Mobile Learning Apps and the Mobile Learning Apps that contain Teaching Materials for Printing Professional Courses.

## **Research Questions**

Based on the above-mentioned Research Purposes, the research questions in this study are:

- (1) What is the Development Status of Teaching Materials in Mobile Learning Apps?
- (2) What is the Work-flow of Making Teaching Materials in Mobile Learning Apps?
- (3) What are the mobile learning apps that contain teaching materials for printing professional courses?

## **Research Scope and Limitations**

This study mainly aims to investigate the design of teaching materials for mobile learning apps, and thus, this study must investigate the two major aspects in the teaching materials in mobile learning apps, which include the “Development Status” and the “Work-flow of Making Teaching Materials in Mobile Learning Apps.” However, development of mobile learning apps is not within the Research Scope in this study.

The limitations faced by this study include the rarity of printing professional courses and most attendees of the printing professional courses are majoring in Art and Design. Thus, the findings in this study may not be applicable to courses of other subjects.

## **II. Literature Review**

### **Development Status of Teaching Materials in Mobile Learning Apps**

As e-Learning has changed with the changing times, teaching materials have also been modified and adjusted accordingly, from discs that contain the electronic learning content, to the learning content presented by web browsers, and further to the digital learning content provided for the learners through the multimedia, which has officially ushered in the era of Mobile Learning (Jung-Kui He & Yen-Chen Lin, 2011; Chen-Yu Li, Hsin-Jung Wu & Hui-Chung Kuo, 2011).

IEEE (2002) defines Learning Objects (LOs) as any digital or non-digital resources that can be used for learning, education, and training. The learning content design framework is formed by the combination of Learning Objects. In terms of Mobile Learning, the content of the architecture can be divided into five types, including: films, pictures, texts, sounds and QR codes. (Paulins, Balina, & Arhipova, 2015).

According to the research data, it is found that with changes in the forms of e-Learning, the content will also be transformed and presented in a way that fits the mobile device. And the concept of Learning Objects can also be used in the development architecture to organize the teaching materials.

### **Work-flow of Making Teaching Materials in Mobile Learning Apps**

In most of the cases, teaching material developers already have some learning objects and resources. But, Mobile Learning can appear in many forms. Thus, it is necessary to re-design the existing content or prepare the new content (Jung-Kui He & Yen-Chen Lin, 2011; Chen-Yu Li et al., 2011; Shan-Ju Lin & Ya-Hung Hsiao, 2012; Paulins et al., 2015).

Ravi, Banoor, Jignesh and Nawfal (2016) also think that e-Learning is a fast and simple learning method, as it converts conventional teaching materials to digital teaching materials, and implements fast e-Learning courses based on different teaching goals and expected results.

According to analysis of relevant data and findings, the Work-flow of Making Teaching Materials in Mobile Learning Apps can be divided into 4 phases:

- (1) Identify the App type;
- (2) Analyze and classify teaching materials;
- (3) Develop auxiliary elements and other detailed items;
- (4) Conduct expert certification or teaching experiments.

### **Teaching Materials for Printing Professional Courses**

Professional education can be defined in different ways. If it is defined in terms of the educational goal, it will be a different level of education, that is, to qualify people for a particular occupation or profession; if it is defined by the type of educational institution, it refers to the education obtained in vocational schools, universities and colleges (Tarasova & Sarkisov, 2008).

According to the above definition, printing professional education is not only a professional qualification for printing practice, but also a type of education obtained in vocational schools, universities and colleges. Al-Radaideh (2013) pointed out that the introduction of printing technology education in graphic design learning can enable students to gain technical understanding. The printing technology education must provide professional teaching and practical courses. Not only shall the specific subject content be taught. Students must be allowed to engage in the practices of the printing process to improve their ability to handle the print quality, design, composition and media.

In the “Curriculum Guidelines of 12-Year Basic Education—Design Group (Draft)” formulated by the National Academy for Educational Research (2016), the teaching goals mentioned in the synopsis of printing and design practices (Graphic Arts and Design Practices) include:

- (1) To understand printing theories and design practices/concepts;
- (2) To apply 5 major elements of printing in the design;
- (3) To apply post-press finishing methods and materials in the design;
- (4) To become professionals with practical experience in printing and design.

The teaching content concerning printing and design practices includes:

- (1) Printing Overview;
- (2) Printing Development History;
- (3) 5 Major Elements of Printing and 3 Major Fields;
- (4) Print Layout Principles;
- (5) Scanning/Screening Principles;
- (6) Color Reproduction Techniques;
- (7) Plate-making Techniques;
- (8) Make-up (Imposition);
- (9) Post-Press Finishing;
- (10) Understanding the printing paper;
- (11) Making the final draft for printing;
- (12) Digital output.

According to the research data, printing knowledge, printing process handling and application of practical printing skills are the important parts of printing professional

courses. The combination of theories and practices allows students to become professionals with practical experience in printing and design.

### III. Research Methodology

This study aims to investigate the design of teaching materials for mobile learning apps in printing professional courses. This study conducts in-depth interviews with experts and scholars with work or teaching experience to confirm the content of the relevant course. The research framework, research objects, research tools and the content of data processing are respectively specified as follows.

#### Research Framework

According to the research purposes of this study, the Research Framework is shown in Figure 4.

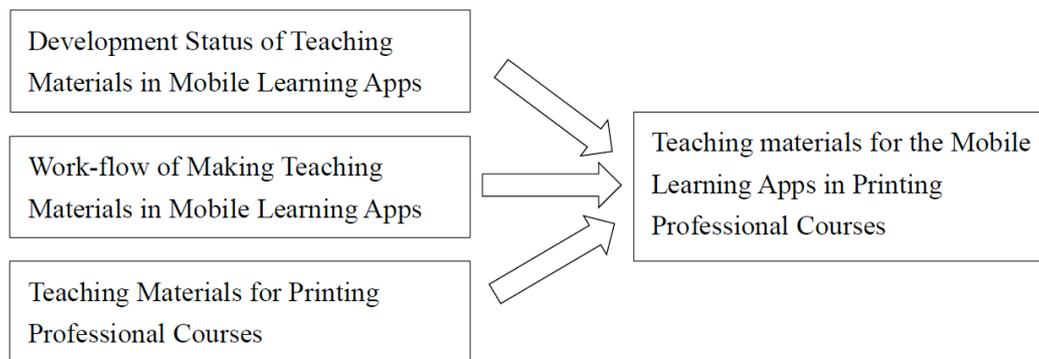


Figure 4. Research Framework

#### Research Objects

In conjunction with information gathering from relevant literature, this study also uses the in-depth interviewing method to confirm the correctness and applicability of the course content, and further clarify the information on the topics related to the course content. Through in-depth interviews with experts and scholars in the printing field, this study tries to understand their views. This study is just a preliminary study in its nature, so mainly 3 research objects are selected for the in-depth interview. The qualifications for research objects are set as follows:

- (1) Company owners or managers with work experience of 5 years or more in the printing business.
- (2) Design educators with teaching experience of 5 years or more in technical and vocational colleges.

#### Research Tools

According to research purposes and methods, the interview outline is the main research tool used in this study. This study applies the topics in the current printed teaching materials to design a systematic printing professional course. And through the classification of the course content, including: (1) business cards; (2) posters; and (3) work collections, the items in the interview outline are developed sequentially, so that the interviewer will explain the interview outline item by item and ask relevant questions. The items in the expert interview outline are set out as follows:

- (1) If it is necessary to assist vocational high school students and improve their knowledge and practical abilities, do you think the course content is appropriate? (Why is it appropriate/inappropriate? What parts need to be modified?)
- (2) The course content planning mainly includes Pre-Press, Printing and Post-Press Finishing. Do you think the content can fully represent the three dimensions? (Why is it complete/incomplete? What parts need to be modified?)
- (3) At present, the course content planning is divided into three topics of business cards, posters and work collections. Do you think the contents of the three topics are complete? (Why is it complete/incomplete? What needs to be added?)
- (4) In the course content concerning the business card, what do you think are the shortcomings and mistakes?
- (5) In the course content concerning the poster, what do you think are the shortcomings and mistakes?
- (6) In the course content concerning the work collection, what do you think are the shortcomings and mistakes?
- (7) In the course content concerning the business card, do you think there is a gap as compared with the current situation of the industry? (What are the reasons for yes/no? What parts need to be modified?)
- (8) In the course content concerning the poster, do you think there is a gap as compared with the current situation in the industry? (What are the reasons for yes/no? What parts need to be modified?)
- (9) In the course content concerning the work collection, do you think there is a gap as compared with the current situation in the industry? (What are the reasons for yes/no? What parts need to be modified?)
- (10) Think about this course with your work experience and professional knowledge. Do you think the course content is complete enough? Do you have any other suggestions or supplements?

### **Data Processing and Analysis**

In this study, to process in-depth interview data, the recording files are first converted into verbatim drafts, and then the items in interview outline are sequentially tabulated as the basis for confirming the correctness and applicability of the course content. Through interviews with industry experts, this study aims to confirm the correctness of the course content and whether it has a gap with the current situation of the industry, and through interactive dialogues with the interviewees, the specific suggestions on the course content are obtained for this study.

## **IV. Findings & Analysis**

Regarding the design of teaching materials for mobile learning apps in printing professional courses, this study conducts in-depth interviews with experts and scholars in the printing field to confirm the correctness and applicability of the content of the printing professional course, and further confirm whether the course content is wrong and whether there is a gap between education and industry through analysis of the interview on the content of the printing professional course.

According to the analysis on the results of the above interviews, the content of the printing professional course in this study can provide students with a complete course content, including the three topics of: (1) business cards; (2) posters; and 3) work

collections. There is no gap between the course content and the current situation of the industry. However, only the undergraduate students that major in relevant studies may enjoy improvement to their knowledge and practical abilities based on the current course content.

## **V. C o n c l u s i o n s**

This study aims to investigate the design of teaching materials for mobile learning apps in printing professional courses, and draw relevant conclusions as follows:

- (1) Through literature review, we can understand that the Development Status of Teaching Materials in Mobile Learning Apps as follows: As the form of e-Learning changes, the content is also changing to fit mobile devices, and the Learning Objects are also used in the development architecture to organize the teaching materials.
- (2) Through literature review, it is known that the work-flow of Making Teaching Materials in Mobile Learning Apps can be divided into 4 phases: (a) Identify the App type; (b) Analyze and classify teaching materials; (c) Develop auxiliary elements and other detailed items; (d) Conduct expert certification or teaching experiments.
- (3) Through literature review, we can understand that teaching materials for printing professional courses shall contain topics about printing knowledge, printing process handling and application of practical printing skills.
- (4) As for confirming the correctness and applicability of the content of the printing professional course, according to the analysis results obtained from in-depth interviews with experts and scholars in the printing field, the printing professional courses in this study can provide students with a complete curriculum content that is congruent with the current conditions of relevant industries. But only the undergraduate students that major in relevant studies may enjoy improvement to their knowledge and practical abilities based on the current course content.

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