

**Bilingual Multimedia Software Development Concept  
(IM-Smart Safety) as an Alternative Media for Presenting Information to Foreign Workers  
during Safety Course in the Malaysian Construction Industry**

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**Abstract**

*The language problem issue among the foreign workers is not new to the construction industry in Malaysia to contribute to the risk of accidents. This issue also happening during the compulsory courses for foreign workers that is the Safety and Health Induction Course (SHIC) as incorporated in the Occupational Safety and Health Act 1994 (OSHA) as the safety implementation before they start work at the construction site. Therefore, this paper is to discuss the study concept about developing a bilingual multimedia mechanism as an alternative media to present information effectively to the foreign workers. This software is fully operated by the course instructors which functions as an information presentation medium and teaching aid material for teaching purposes as well as help increase understanding and interest of foreign workers during SHIC.*

**Key words:** foreign worker, construction industry, Malaysia, bilingual multimedia, safety course

**1. Introduction**

According to the Construction Industry Development Board of Malaysia Act 1994 (Act 520), the construction industry is an industry related to construction works. The construction industry is listed as a major contributor towards enhanced growth of the country's economy by playing an important role in realising the global community's desire for physical development such as infrastructures, residences, businesses, education centres in addition to becoming the economic development motion engine to the country (Nurul Azita & Abdul Aziz, 2007). The enhanced growth of this industry will of course ensure the country's development which is supported by the excellent economic performance. According to the Malaysian Statistics Department's Report 2005, the construction industry has contributed 3.03 percent, that is RM247.8 million, towards the Gross Domestic Product (GDP) in 2004.

However, the speed of the construction activities carried out is dependent on the work force owned. In line with the rapid development, demand for work force is very high. Abdul Aziz (2002) stated that the worker at the construction site is one of the most important components where his presence itself is noted as an asset in helping to develop the construction industry.

## **2. Background of Study**

For certain, the construction industry is among the industries that are able to provide positive economy growth for the country. At the same time, the need for local or foreign labour source is very high. However, the labour force deficiency phenomenon have resulted in Malaysia being dependent on foreign labour force where recruitment of foreign workers in Malaysian construction sector is not a new issue (Haryati et al., 2009). Influx of foreign immigrants into this country since end of 1980ies is seen as job opening opportunities for them to be workforce in the various sectors including as workers or construction labourers. The scenario on the influx of foreign workers into various sectors, including the construction sector, has created language diversity. These situations cause difficulty when work order is presented by the employer because it was not understood by the employee. In fact, safety instructions are also difficult to be carried out. This matter has been stated by Abdul Rashid and Abdul Aziz (2003) where communication problem (language) have caused difficulty for the foreign workers to understanding the safety work order, safety regulations and interpretation of safety signal sign until an accident happens.

Accidents that happened in the construction industry reputedly stemmed from construction failure (Cheng et al., 2004) are linked to the shortcoming or failure of safety implementation carried out at the construction site. According to Ai et al. (2005), Carter and Smith (2006), Chao and Hilaski (1978), Dongping et al. (2006), Edwards and Holt (2008), Hola (2007), Perttula et al. (2006) and Tam et al. (2004), the construction industry is a complex and dangerous industry in several countries including the United States (US) (Cattledge et al., 1996; Gillen et al., 2004; Mehta & Theodore, 2006; Weil, 1992) and United Kingdom (UK) ( Ikpe et al., 2007). Abdelhamid and Everett (2000) and Loushine et al. (2006) also supported this statement that any work activity in construction project is dangerous especially in several Middle Eastern countries (Al-Kaabi & Hadipriono, 2003) and Alberta (Auld et al., 2001) where the highest accident rate was recorded (including defects and deaths) as compared to other industries. Because construction industry is a high risk industry (Abdul Rahim et al., 2008) that involve complex and dynamic working environment that it endangers its workers (Neitzel et al., 2001), therefore, emphasis from safety aspect and occupational health as one of the human resource management activity is very important in mitigating accident rate in this industry (Ayers & Kleiner, 2002).

Hence, effective communications between employer and foreign worker is very important where according to Teo et al. (2005) effective communication (language) is one of the important factors that influenced safety implementation. A safety implementation can only be effectively carried out if the employee understands the dangers and every aspect of the safety work order on the construction site. In Malaysia, safety implementation on construction site is based on the regulations set by the Occupational Safety and Health Act 1994 and Factories and Machinery Act 1967. According to section 15 (1) Occupational Safety and Health Act 1994 (OSHA), it is the duty of every employer to ensure, where practical, safety, health and welfare of all of the employees at work. Typically, initial safety implementation for the employee is to send an employee to attend training or course which is emphasized under Section 15 (2) (c) Occupational Safety and Health Act 1994 (OSHA) where an employer is compelled to provide information, order, training and supervision as may be necessary, to ensure that, as far as practicable, the safety of the workers who are working.

In the enthusiasm to develop these construction projects, employer or contractor need to realize the importance of the worker's safety so that accident could be avoided altogether to avoid loss of workforce that is difficult to procure especially skilled labour with experienced. Accidents that occurred also caused a part of the construction activity productivity to decline due to lack of workers. An employee who is injured, disabled or died while at work is certainly a loss to all parties as the construction activity involves insurance cost (especially compensation and consolation offering or ex-gratia), the employee's replacement cost, cost of delayed completion and others (Abdul Aziz, 2004).

## **3. Problem Statement**

The problem statement of this study is the language problem issue amongst foreign workers where it has affected personal safety due to the exposure to accidents risks in the construction industry (Abdul Rashid & Abdul Aziz, 2003; Haryati et al., 2008, 2009). The interview result with five contractors in Malaysia discovers that language problem, both verbally and written, among foreign worker who are not Indonesian, especially new arrivals to Malaysia, happens in the construction industry where they did not understand the Malay and English language.

In fact, this language problem issue is said to be among the factors which contributed to the occurrence of accident among non-Indonesian foreign worker in the Malaysian construction industry (Nurul Azita et al., 2012). To avoid any occurrence of accident, early safety implementation based on the Occupational Safety and Health Act 1994 (OSHA) was introduced by compelling employer to comply with the rules that was set to provide or send the foreign workers to attend training or course to procure safety information before starting work on construction site. Safety and Health Induction Course (SHIC) is a basic course that is important and must be attended by foreign workers before entering or starting work on the construction site. The objective of this course is obvious; that is to make the foreign workers realize the dangers on the construction site, able to reduce damage or injury to other workers, the public or properties and to comply with the safety law and regulations.

However, a preliminary study conducted by the researchers towards the Myanmar foreign workers, through interviews with a number of security officers at the Malaysian construction site found that the foreign workers find it hard to interpret the information or the safety instructions provided, correctly. In fact, 43.1% (44) from the Myanmar foreign workers are the second highest number of employment in the Malaysian Construction Industry after the Indonesian foreign workers who are also found not understand the information presented verbally in the Malay language and 55.88% (57) in writing during SHIC. With regards to the preliminary study also found that 43.75% (42) of the course instructors state that language problem do happen among non-Indonesian foreign workers verbally and 77.1% (74) in writing throughout the course implementation. The issue arises when 85.4% (82) of the course instructors use the Malay language throughout the presentation of information to foreign worker who are not Indonesian in SHIC. Although, there are also course instructors who use English language during the course, depending on the situation and participants, the preliminary study that were conducted found that 56.9% (58) of the Myanmar foreign workers do not understand the information presented verbally in English and 48.03% (49) in writing. Preliminary observations also found that the use of *PowerPoint* as a presentation media during SHIC is less interactive and most of the text are in the Malay language when presenting the information to the foreign workers.

Actually, the language problem issue among foreign workers in this country has existed for some time already in various sectors including the construction sector since the beginning of migration phenomenon in the 1980ies. This language is usually linked with communications where, according to Trajkovski and Loosemore (2006), language is the obstacle towards communication whether verbally or written during information presentation to foreign workers. There are several studies which reveal general findings about the existence of communication problems (language) among foreign workers in the nation's construction industry scenario (Haryati et al., 2009). The field studies, on the other hand, saw existence of language problem among foreign worker in construction industry in the United Kingdom (UK), Australia, United States (US) and Singapore (Bust et al., 2008; Loosemore and Andonakis, 2007; O'Connor et al., 2005; Trajkovski & Loosemore, 2006; Wah, 2000). Although Trajkovski and Loosemore's studies were more focused on the language problem issue during SHIC, the researcher saw that previous studies has less discussion on the aspects of the effectiveness using available media for information presentation from the language aspect used by the course instructors during presentation of information to foreign workers during SHIC including discussion regarding important requirements such as the use of theory and teaching and learning strategies with regards to the media used in presentation of information. Nevertheless, according to Teo et al. (2005), language plays an important role in the presentation of safety information where good effective communication between management and worker is among the factors which influenced the effort on safety implementation.

Therefore, the mechanism in the form of multimedia is proposed as an alternative effective media for presentation of information to foreign workers during SHIC. This issue is stressed by Bahn (2009) whereby the effort to enhance training or courses as one of the solution to overcome the accidents or sickness issue among the workers in the construction industry's especially workers who are less mature and knowledgeable, less concerned about the accident prevention measures and new employees to the construction sites. The preliminary study also showed that the use of multimedia as an alternative media for presentation of information is also agreed by 94.8% (91) of the course instructors which is expected to increase the interest and focus of participants, including foreign workers throughout the presentation of information during the SHIC.

#### **4. Purpose of Study**

The study implemented aims to develop a bilingual multimedia prototype Software for Safety and Health Induction Courses (IM-SmartSAFETY) as an alternative information presentation media to foreign workers. This software is fully operated by the course instructors which functions as an information presentation medium and teaching aid material for teaching purposes as well as help increase understanding and interest of foreign workers during SHIC. This study would also evaluate the software from the aspects of achievements and helpfulness (acquisition knowledge / information).

#### **5. Objective of Study**

- to design a bilingual Safety and Health Induction Course software (IM-SmartSAFETY).
- to develop the bilingual Safety and Health Induction Course software (IM-SmartSAFETY).
- to evaluate the bilingual Safety and Health Induction Course software (IM-SmartSAFETY) that has been developed from the aspects of achievements and helpfulness (acquisition knowledge / information) of the foreign workers.
- to compare the achievements of foreign workers who uses *IM-SmartSAFETY* with the conventional method during the Safety and Health Induction Course.

#### **6. Study Questionnaire**

This study is conducted to answer the following questions:

- How was the courseware designed?
- How was the courseware developed?
- How far the software (IM-SmartSAFETY) developed can help (helpfulness) foreign workers in term of the acquisition knowledge or information?
- What are the achievements of foreign workers after using IM-SmartSAFETY?
- Are there any difference in achievement by the foreign workers who used the *IM-SmartSAFETY* as compared to the foreign workers using the conventional method in the Safety and Health Induction Course?

#### **7. Study Methodology**

This study was carried out with embedded method using quantitative research which is supported by qualitative study with the survey design on quasi-experimental study (non-equivalent groups pre-post tests design) to evaluate software in terms of achievements and helpfulness (acquisition knowledge / information) during information presentation using the *IM-SmartSAFETY* software in the course.

#### **8. Study Sample**

Respondents for this study consist of Myanmar construction workers. In this study, 30 Myanmar construction workers who attended the SHIC will be involved throughout the implementation of pre test during the initial study and post test at the end of the study respectively.

#### **9. Conceptual Framework of Study**

Based on the objectives and research questions above, a conceptual framework of the study was developed based on the ADDIE model (as shown in figure 1) which includes five stages, namely a) analysis b) design c) development d) execution and e) evaluation.

##### **a) Analysis**

The analysis stage involves recognizing the problem and the source of problem among foreign workers during the implementation of courses and courseware requirements in terms of targeted group, learning objectives, course module, learning environment, learning theory, teaching and learning strategies, methods of presentation, hardware and software and use of language (bilingual).

##### **b) Design**

The design stage involves a few design processes for the entire requirement of the courseware which are teaching and learning structural design, content organisational structure and interface for story board production.

**c) Development**

Development stage involves the process of developing the software from courseware requirements that was developed on storyboards before using the hardware and software that has been identified.

**d) Implementation**

Implementation stage involves the process of software presentation implementation in a few centres that offers the course.

**e) Evaluation**

Evaluation stage involves assessing the effectiveness of the software developed by the target users who are IT specialists, linguists, content experts and course instructors to test the efficiency and stability of the software. Evaluation by the foreign workers on the aspects of achievements and helpfulness (acquisition knowledge / information) was done summatively to survey these workers' opinion in the final stage of the project with regards to the developed software via questionnaires, achievement tests (quiz) and interviews including observation.

**10. Conclusion**

The result of the courseware developed through bilingual multimedia in this study, on the overall, gives more advantage to the foreign workers in helping them enhance the levels of comprehension regarding information presented during the course. Understanding the information presented during the course such as dangers on construction sites is essential for these foreign workers to understand in order to perform all construction work safely and carefully. This developed software also helps stimulate and maintain the interest of foreign workers with regards to the course information presented creatively using a variety of multimedia elements such as text, graphics, animation, video and audio. The software developed in this study is also important as an information presentation media as well as teaching aid that can assist and facilitate the course instructor to effectively present course information to the foreign workers. Explanation on the topic can also be presented more clearly with the help of this bilingual software which is able to display information about the course in a foreign language that can be read and heard by the foreign workers involved. This developed software is also expected to help the Construction Industry Development Board of Malaysia (CIDB) to address the language problem occurring in Occupational Safety and Health Induction Course simultaneously achieving the course objectives and reduce the accident rate among foreign workers.

**ADDIE Model**

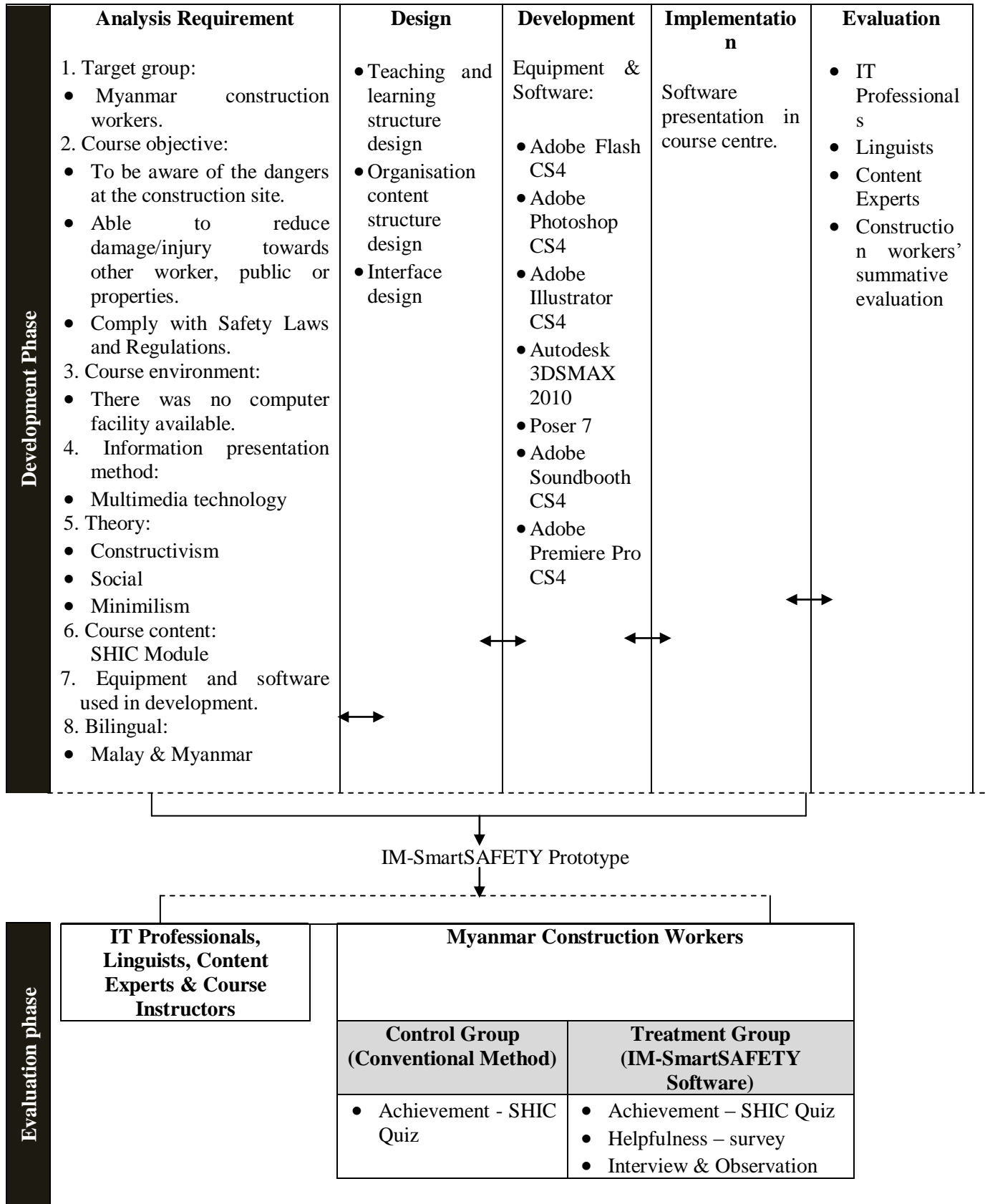


Fig. 1: Conceptual Framework

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