# SOPE: A Model for Developing Online Materials in Chinese Herbal Medicine Education

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## ABSTRACT

The application of online materials to support classroom teaching may increase the flexibility of students' access to course information and facilitate communication between teachers and students. Quality assurance is the key to the development of online materials. Chinese medicine degree training has recently been introduced into higher education systems of the western world. We have recently adapted a four-stage model (SOPE), including strategic planning, operational practice, product implementation, and evaluation, into the development of online materials for a Chinese medicine subject – Pharmacology of Chinese Medicine. Following this model, information on 350 individual Chinese herbs has been presented at RMIT's Distributed Learning System to facilitate learning and teaching. This paper describes the process of this development with a focus on activities and their quality criteria at the four stages. Findings from this study demonstrate the applicability of the SOPE model in the development of online materials for primary healthcare practitioner training, such as Chinese medicine. Further study is required to conduct formal evaluation of the proposed model and its effective implementation in other educational disciplines.

K E Y W O R D S  quality assurance, case study, Chinese medicine education.

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## Introduction

The application of information technology (IT) in education has had a significant impact on educational practice. Online materials are particularly important to support classroom teaching. Online materials may increase students' access to the course information and facilitate communication between teachers and students outside of class time.[1] However, issues concerning the cost-effectiveness, quality of learning, and value-adding in learning are yet to be fully addressed.[2] Such concerns have negatively impacted on the acceptance of online resources,[3] particularly for primary healthcare practitioner training such as Chinese medicine.

Chinese medicine has a long history dating back thousands of years[4] and has been introduced into higher education systems of western countries. In Australia alone, four publicly funded universities offer degree programs in acupuncture and Chinese herbal medicine.[5] However, Chinese medicine education has encountered some difficulties in accessing English resources, as the majority of Chinese medicine literature is in Chinese. There are limited high-quality online resources that can be used in these programs.

The term 'quality' has various definitions that need to be interpreted within specific contexts.[6,7] Within the context of education, quality is a multi-faceted, multi-level, and dynamic description that reflects the specific objectives of a program.[7] Educational quality assurance involves a number of sequential steps that contribute to the overall learning outcome.[8] It is an ongoing and continuous process of management and evaluation to ensure consistency and to meet stated targets and anticipated outcomes by an institution.[7,9] Specifically, for the development of online materials, the steps may include determining learning objectives, understanding student needs, and developing course materials that address relevant pedagogic requirements. Much has been written about quality assurance of higher education and online learning.[10-14] The essential elements for designing online teaching materials include gathering data (e.g. learner characteristics and needs), developing materials (e.g. selecting materials), producing materials (e.g. instructional methodology combined with technology) and evaluating materials (e.g. checking and revising for the fitness of purpose).[10,11,14]

The process of planning, developing and evaluating is frequently discussed in the literature related to online material design.[10,15] The SOPE model is an improved system representing strategic planning (S), operational practice (O), product implementation (P), and evaluation (E). The accessibility of IT is essential for this process. The requirements of IT in the SOPE development include access to a knowledge base for construction, suitability of the learning context, and usability as a management tool.[16,17] This four-stage process has been used in the online material development for a Chinese medicine course – Pharmacology of Chinese Medicine. This course is designed to teach students the principles of Chinese materia medica and the characteristics of a number of individual Chinese herbs, which consist of actions, meridians entered, dosage range, processing, and contraindications/cautions. This paper attempts to provide a case study on the development of online materials for the course of Pharmacology of Chinese Medicine at RMIT University to illustrate the SOPE model.

## Methods

The implementation of the SOPE model into Pharmacology of Chinese Medicine involved the development team identifying the activities for each stage and their relevant quality criteria. The four stages of this model are shown in Figure 1 and are elaborated below.

### STRATEGIC PLANNING

Aspects of educational mode, teaching objectives, learner characteristics/needs, and instructional strategy (i.e. methods
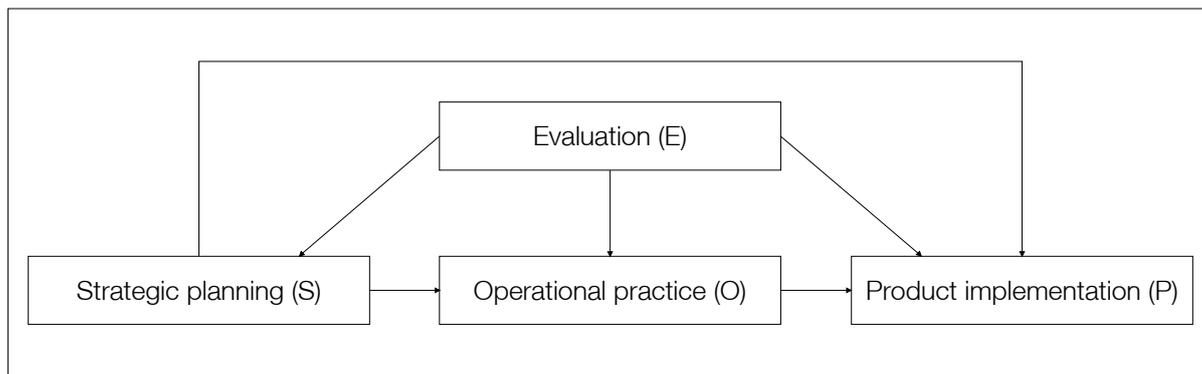


FIGURE 1        The SOPE model for the development of online materials

to support students in pursuing learning goals) should all be taken into account throughout the process. At this stage, the team developed strategies to achieve teaching objectives with consideration of students' characteristics. The quality criteria considered included capability-oriented curriculum, attainability and adaptability.

## OPERATIONAL PRACTICE

This stage involved five steps: classifying thematic topics (i.e. categorising herbs), selecting materials, producing materials (i.e. writing introductions and summaries of categorised herbs), producing media objects (i.e. taking pictures of individual herbs), and managing data. The peer review process was involved at every step. The quality criteria for each step are described below.

### TOPIC SELECTION

1. Appropriateness: does each unit (topic) contribute to the learning objectives of the subject?
2. Sequence[12]: are the topics sequenced in the order of subject knowledge development?

### MATERIAL SELECTION

1. Readability[10]: is the chosen material appropriate to the students' level?
2. Relevancy: is the material related to the core theme of the subject?
3. Reliability: is the material retrieved from a reliable source?
4. Currency: is the chosen material of interest to learners and is the information up-to-date?

### SCRIPT PRODUCTION

1. Accuracy: is the information accurately presented and is the language error-free?
2. Clarity: is the material logically sequenced and presented in an organised manner?
3. Strategy-oriented format: is the material written in a way that embodies a target instructional strategy or a learning strategy?[10]

### MEDIA SELECTION AND PRODUCTION

1. Types of media object: are the chosen media objects most appropriate to facilitate learning?
2. Quality of the media: are the colour, size, and sound quality of the media object suitable for specific topics and intended learning activities?
3. Size of images: has quality IT access been made readily available to learners?
4. Practicality: are students able to access the online material using different IT platforms?
5. Learning support: have media objects been designed to facilitate efficient and effective learning?

### DATA MANAGEMENT

1. Structural template[10]: is the format of structure standardised to increase user satisfaction?
2. Presentation template[10]: is information to be presented in a consistent format to simplify the learning process?
3. Material formatting[10]: what font, colour and background texture are chosen for the presentation?

## PRODUCT IMPLEMENTATION

The main task at this stage is the presentation of materials. The following criteria were used to facilitate the online presentation:

1. Consistency of web/content layout: the instructional material for each unit is in the same format to improve user-friendliness.
2. Sequence of content[15]: content within each instructional topic is in logical order for learning enhancement.
3. Clarity of material presentation: all the texts, graphics and pictures are well organised and clearly presented.
4. Minimisation of human errors: particular efforts should be made to reduce human errors, such as making wrong links or typographical or other mistakes.

As RMIT University provides all the enrolled students with access to the Distributed Learning System (DLS), DLS is selected as the media for delivery of online teaching materials.

## EVALUATION

Evaluation is an essential component of every stage of the development. This is an ongoing process that includes expert review, staff appraisal within or across institutions, as well as student feedback. In the current project, informal evaluation from students and staff was used to assess the application of online materials to support classroom teaching as an outcome from the SOPE process.

# Results

## STRATEGIC PLANNING

The purpose of the development of online materials for Pharmacology of Chinese Medicine was to facilitate study in the Double Degree Program of Bachelor of Applied Science (Chinese Medicine/Human Biology) at RMIT University. The online learning process was developed to supplement face-to-face learning as opposed to replacing class learning. The development of the online material for Pharmacology of Chinese Medicine has successfully addressed the following criteria: (a) Capability-oriented curriculum by offering hyper-links to the herbs for the purpose of herb identification; (b) Attainability by providing a user-friendly learning environment; and, (c) Adaptability by giving the opportunity of self-development and catering to different learning styles.
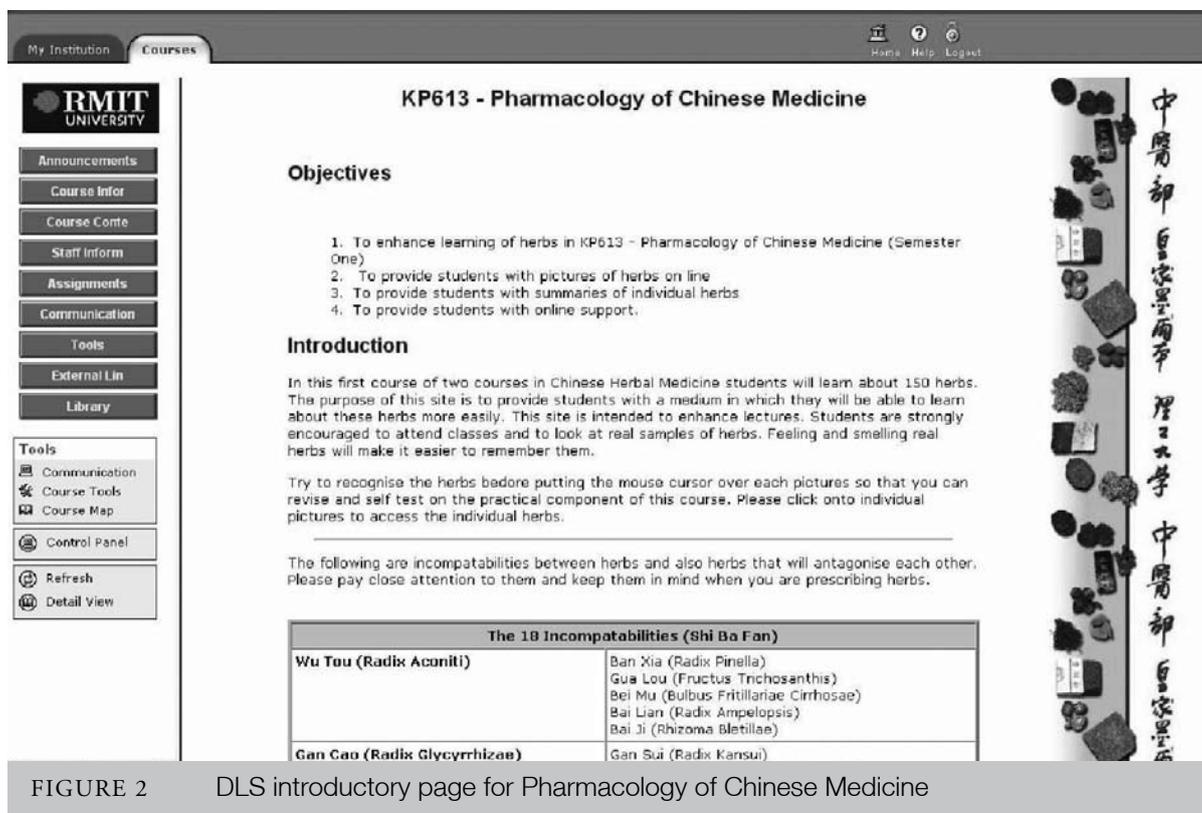
FIGURE 2    DLS introductory page for Pharmacology of Chinese Medicine

## OPERATIONAL PRACTICE

As part of the capability-driven curriculum development, online material needs to contribute to the building of graduate capabilities. Besides the provision of major course content, other subject matters such as images, graphics, and external links to additional information require deliberation to ensure that such elements are coherent with the overall design. During this stage, peer reviews[8] were conducted to ensure quality of the materials prepared. This was undertaken by peers in the program team, including two key academic staff for the course, an IT expert and the Head of Division of Chinese Medicine, who provided comments and feedback. Their comments were reflected in the revision of the relevant online materials.

## PRODUCT IMPLEMENTATION

The third stage is to focus on uploading the developed materials to the RMIT intranet via a File Transfer Protocol (FTP). The online materials have been presented with a user-friendly interface. Students and staff are able to obtain easy access to the desired information. Online tutorials (i.e. user's guide) and technical support are available. Provisions have been made to ensure two-way teacher–student communication via e-mail, forum or other forms of communication. A specific staff member has been appointed to update and maintain the currency of the materials, to provide technical support for staff and students as well as to maintain technology stability.

Currently, essential information, including high quality digital images of 350 commonly used Chinese herbs, has been constructed as online materials. Figure 2 and Figure 3 illustrate how the design of lecture notes was integrated with computer technology to provide students the maximum learning outcome through a more flexible and self-paced learning process. All students enrolled in the Pharmacology of Chinese Medicine course are provided with access to the course materials through the DLS at RMIT University. All the online information has been presented at the DLS Learning Hub website: https://dls. rmit.edu.au/learninghub/hub.asp (login required).

## EVALUATION

Informal feedback on the online materials has been gathered from students and staff, and it was indicated that such online materials are effective complements to classroom learning and teaching, particularly to enhance the learning of herbal identification at students' own pace and in their own time. Students and staff also made a number of suggestions for further improvements, which have been taken into consideration for more effective use of the online materials in both classroom and outside scheduled teaching time. A formal and systematic evaluation will be undertaken to determine student and staff views on the value and effectiveness of using these online materials in Chinese medicine learning and teaching.
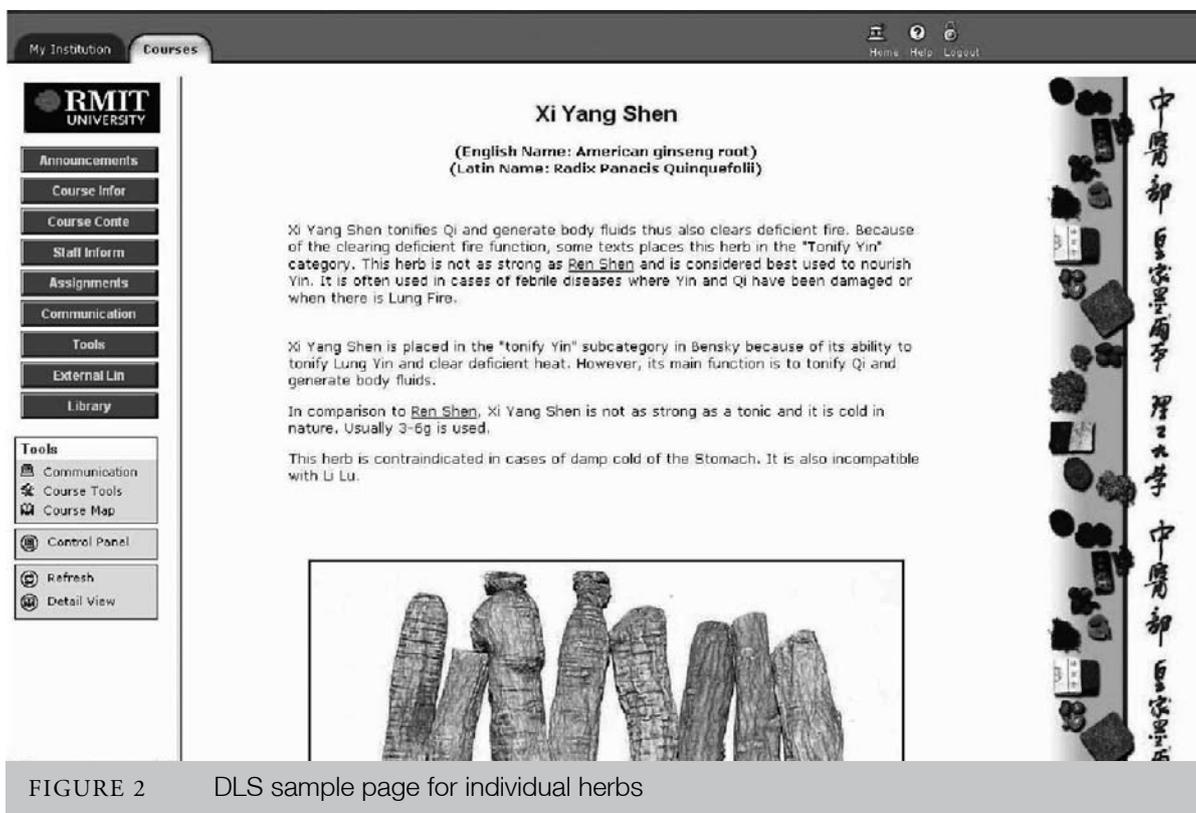
FIGURE 2    DLS sample page for individual herbs

## Comments and conclusion

The increasing popularity of complementary and alternative medicine, including Chinese medicine, has resulted in the introduction of numerous degree programs in the tertiary education systems of western countries. Significant efforts have been made to address challenges to this development, including appropriate application of teaching technology such as IT into Chinese medicine education. This paper describes the process that has been developed and applied in the development of online Chinese herbal medicine teaching materials.

This project showed that online materials with an appropriate and user-friendly interface can be an effective supplementary learning and teaching method for the subject area of Chinese medicine pharmacology. It is clearly demonstrated that the information and standardised images of herbal medicine, with convenient student accessibility, are of great benefit to learning in this topic, either during self-directed learning hours, tutorials, attending a teaching clinic for supervised clinical practice, or preparation for the assessments. The project is a pilot to build such a platform which will have the capacity and technical capability for the development of other online teaching, such as incorporation of recent research findings on specific herbal medicine into this information portal and multi-site real-time real case studies for student training and professional development. This will be a valuable contribution to the profession as many of the practitioners have limited time to undertake professional development activities during business hours. Obviously, the information and resources in this format are not intended to be used by consumers independently, as they do not have adequate background to make appropriate clinical judgment for the use of herbal medicines.

Online materials have been successfully used as supplements to traditional learning and teaching in healthcare education, such as dental[18] and histology[19] courses. Within the blended learning context, online materials provide students with a flexible, non-linear and diverse learning environment. This emerging educational mode creates unlimited potential for access to education. However, rigorous quality assurance procedures are prerequisites for the fulfilment of these potentials. The development of the SOPE model was an attempt to address quality assurance concerns associated with online material development. A case study on the course Pharmacology of Chinese Medicine was presented to illustrate the quality assurance process that was embedded into this development by creating a set of practical criteria as check-lists throughout a four-stage process. The SOPE model may serve as a point of reference for health education online material development.

Evaluation is a critical stage of the SOPE model and requires much time and effort for ongoing improvement. To date, informal feedback on the online materials from the stakeholders, including undergraduate students and academic staff, has been addressed to advance the contents. However, formal evaluation has yet to be conducted. This may hinder the quality improvement of online materials and limit the application of the SOPE model to other courses. Therefore, further study will be extended to the following three areas. Firstly, the SOPE model needs to be further validated. Secondly, formal evaluation from students and staff will need to be conducted through a structured and systematic approach. Thirdly, the framework of the SOPE model will be applied to other subject areas of health education.

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### AUTHORS' CONTRIBUTION

QW, AY, AR and CX conceived and executed the project, participated in the interpretation of data and drafted the manuscript. SM participated in the design of the online component of the study and contributed to drafting the manuscript. AZ contributed to the conception of the study and to the revision of intellectual contents of the manuscript. All authors read and approved the final manuscript.

### COMPETING INTERESTS

The authors declare that they have no competing interests.

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