Designing a Preliminary E-Textbook with the Information Model

Zhe XU, Haibo LI & Xiaoqing GU

Shool of Education Science, East China Normal University,   China
xuzhe_xz@163.com

Abstract: Recently, ISO/JTC1 SC36 has initiated a new standard project on e-Textbook, which was proposed by the authors' team. In this project, the information model of e-Textbook is the most fundamental part and further studies all will be based on it. The purpose of this paper is to manifest the information model of the e-Textbook by describing a practical case in our ongoing work. The process of designing an English e-Textbook for grade 6 is presented to explain the main steps of element structure design and function structure design. The information model and its practice reflect what kind of e-Textbook we need and how to design a standard e-Textbook for discussing the disorder of e-Textbook's development.

Keywords: e-Textbook, information model, element structure, function structure, case

Introduction

Recent several years witness the fast adoption of e-Textbook around the world. In China, Shanghai, Beijing,Guangzhou,Shenzhen, and many other cities start e-Textbook programs and practice in middle and primary schools. The similar actions have been taken in other countries. However, as a new research area, the development of e-Textbook seems a bit disorder in technical aspect and educational aspect (Gu & Fu, 2012).So in previous work, we have worked on the e-Textbook information model in order to provide solution. In this paper, we introduce the on-going standard project of e-Textbook informational model by presenting a case that is being developed based on this model.

1.   Textbook design based on e-Textbook information model

1.1 Description of e-Textbook information model

The information model defines content structure and function structure of an e-Textbook. The content structure defines content elements which constitute content of an e-Textbook. Content categories are units and aggregations; units and aggregations can be assembled into learning content according to specific learning needs (Figure 1).The function structure defines the operation and its corresponding results thus cause. There are three kinds of

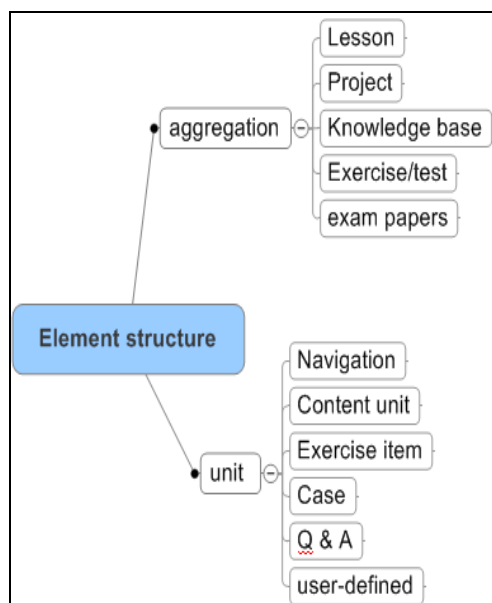operations: basic operations, connecting operations, and comprehensive operations (Figure 2).
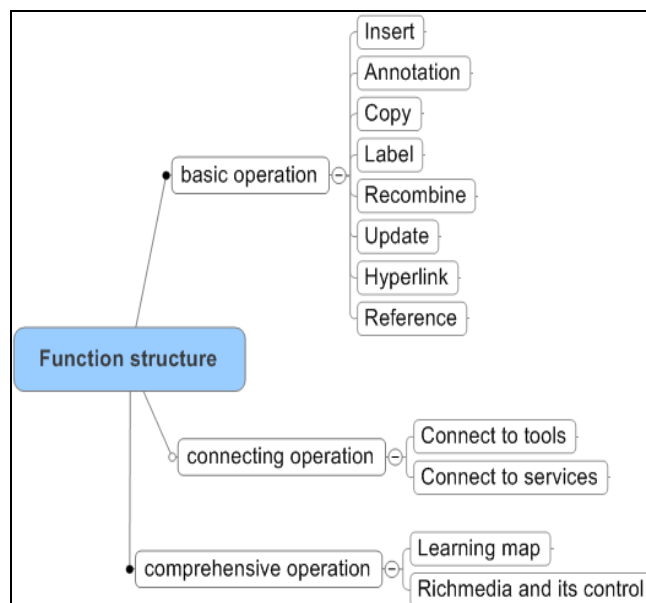

Figure1 element structure

Figure2 function structure

1.2 A preliminary e-Textbook case

In this part, the process of developing a preliminary e-Textbook was introduced by a case undergoing. The case e-Textbook is Oxford English 6A published by Shanghai Education Press for 6 grades.

1.2.1 The design of element structure

Based on the information model, the first step in designing an e-Textbook is to structure the content of traditional textbook, into units and aggregations, which can be reused and shared across the curriculum. The case of structured content can be manifested from Unit4 of the said textbook (Figure 3).
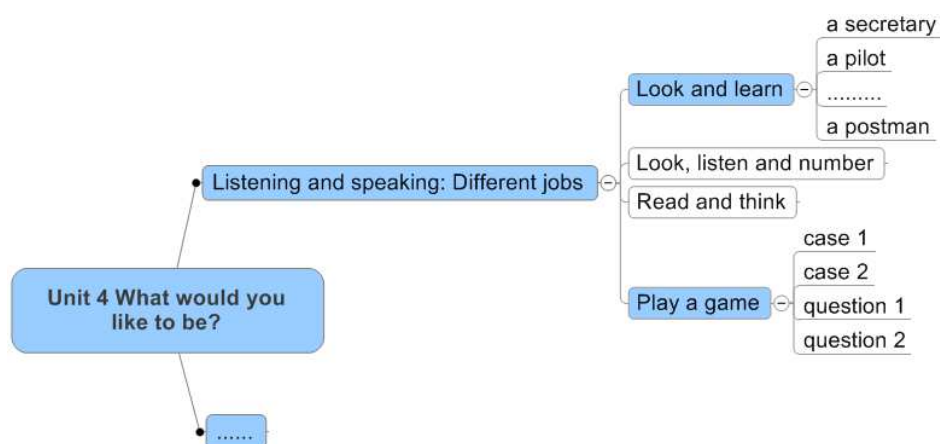

Figure 3 content design

These units and content aggregations can be assembled just like building blocks. Based on content design, the corresponding content structure is presented (Figure 4).
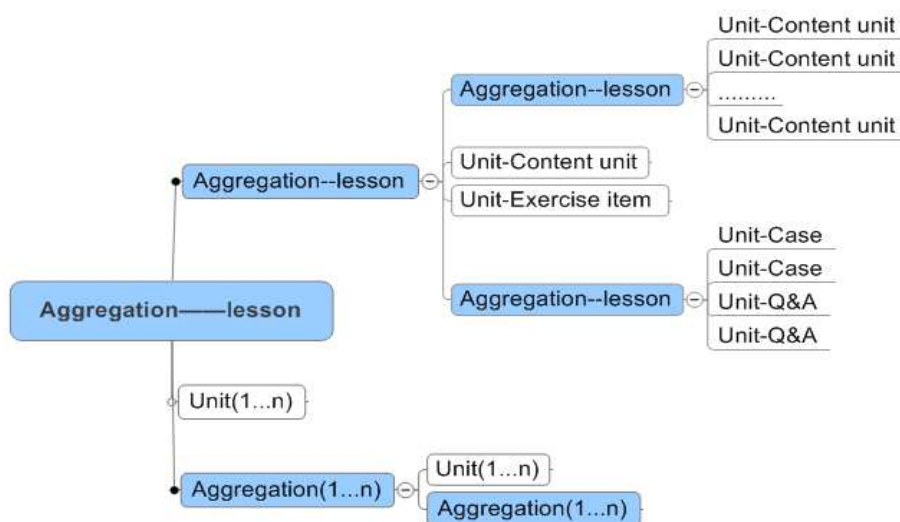

Figure 4 content structure

1.2.2 *The design of function structure*

Based on the function structure (Figure 2) of the information model, the functions of the preliminary e-Textbook have been designed as listed in Table 1.

Table 1 English e-Textbook's function structure

	functions	Specific items of functions for English e-Textbook
Basic operations	Insert, Annotation, Copy;Label;Update;Recombine;Hyperlink;Reference	Not all the unit/ aggregation must have all the kinds of basic operation. Other user-defined operations are allowed too.
Connecting operations	Connect to tools Connect to services	Notepad(a local record tool) Recorder(a local record tool) Google(for online search) LINO(an online sticker) Midomo(an online mind map) YouDao Cloud Note(an online notepad) YouDao Online Dict (an online dictionary) Online Exam Library(for online test) Other tools and services(user-configured)
Comprehensive operations	Learning map Richmedia and its control	recording users' personal and dynamic learning activities(in developing) English situational dialogues using richmedia Other operations

2. Analysis of the e-Textbook with information model

2.1 Analysis of the case's element structure

As showed in Figure 5, section of "Look and learn" is a content aggregation composed of content units. Each word in this aggregation is a content unit with independent knowledge point, consisting of word interpretation, phonetic symbol, pronunciation, example sentences and other knowledge. And a collection of words' list forms an aggregation for words learning.

Figure 5 e-textbook based on element structure and function structure

2.2 Analysis of the case's function structure

According to English e-Textbook's function structure and the characteristic of operations, four function modules (marked by numbers in Figure 5)are developed in function area, referring "1 tools set in local", "2 tools set in Cloud", "3 services package in Cloud" and "4 Other functions package". Such tools and services can be applied for all kinds of learning contents. And some basic operations are imposed on learning contents. In the learning process, learners can use these operations to meet different needs in different context. The specific tools and services are deployed in the four modules, such as Recorder, YouDao Cloud Note, etc.

Moreover, some basic operations are designed for a unit to supporting in-depth learning. In this case, six kinds of operations are designed to meet different learning needs for each word, and a Personal Learning Library is designed to support personal learning. We analyze them with function structure (Table 2).Students can mark levels of difficulty and make notes and can also remove some words to Personal Learning Library according to their learning. Each learner can have own word library.

273

Table2 operations for specific content

Operations in interface	Operations with function structure	Description
5 难度 [1▼] difficulty set		Students set the difficulty level for a word.
6 [icon] unfold /fold details of word	Copy	Click it and a new window with more information about a word will be open. Students can copy information.
7 [icon] open /close media	Richmedia and its control	Click it ,a new window with rich media will be play, and students can control it
8 展收 display/hide picture		Click it and picture corresponding to a word will be display
9 [icon] notes	Insert;Annotation;Copy; Label; Update	Click it and a new editable window will be open. Some basic operations are allowed.
10 恢复 move into Personal Learning Library /put back	Recombine	Word can be move into Personal Learning Library to construct own word list for simple recombination.

3. Conclusion and future work

The information model and its practice reflect what kind of e-Textbook we need and how to design a standard e-Textbook for discussing the disorder of e-Textbook's development. This paper focuses on how to design a standardized e-Textbook with information model and two important steps are elaborated by a practical case. We believe e-Textbook based on information model can manifest the significant features of e-Textbook, such as relevance, interactivity, openness, richmedia, content interoperability (Zhu & Yu, 2011). This is essential for the e-Textbook to play an important role in education, which has not yet at present. With the progress of ISO/JTC1 SC36 e-Textbook standard, more work needs to be done either to finish the preliminary case introduce here, or to conduct experiments with e-Textbooks in schools.

References

[1] GU xiaoqing,&Fu wei. (2012).Connecting Reading and Learning: Design the Information Model of E-Textbook. *JOURNAL OF CHINA NORMAL UNIVERSITY (NATURAL SCIENCES)*, 02: 81-90.

[2] ZHU zhiting, &YU xiaohua.(2011).E-Schoolbook System and Its Function Modeling. *E-education Research*, 4:27-34