# Instructional Design Principles in the Development of an E-Learning Graduate Course

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***Abstract***
*The paper reports the application of the science of instruction in the design and development of an e-Learning graduate course at Open University Malaysia (OUM) for the Masters of Education programme. Focus is on the principles applied to print material (content, learning outcomes, learning activities and assessment tasks) and its use in engineering face-to-face interaction, online collaboration, enhancing higher order thinking, utilisation of resources from the digital library, digital content bank, video and audio lectures. The learning and instructional theories underlying the design process of the graduate course are explicated.*

## 1 Introduction

The adoption of e-Learning is increasing not only in institutions of higher education offering distance learning but also in traditional or on-site institutions of higher learning. Especially evident are graduate programmes offered using the e-Learning alternative to reach a wider audience as well as support on-site experiences. Instructional design principles have also shifted from designing instruction for face-to-face practices to distance education and the e-Learning format. Instructional design is broadly defined as the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction. It is the entire process of analysis of learning needs and goals and the development of a delivery system to meet those needs. It includes development of instructional materials and activities; tryout and evaluation of all instruction and learner activities (Merrill, Li and Jones, 1991).

The course described in this paper is titled *HMEF5073 Principles and Theory of Curriculum Development* developed for the Masters of Education (MEd) programme at Open University Malaysia (OUM) to be taught over a period of one semester (14 weeks). The main aim of the course is to introduce students to the concepts, principles and theories of curriculum development and its application in analysing and designing real-world curriculum projects. Students taking the course are provided with a Learning Package consisting of a course guide, an assignment guide and course content. Course content is divided into 10 chapters totalling about 220 pages exploring the various definitions of curriculum, the philosophical beliefs, psychological perspectives and societal demands impacting curriculum. This is followed by an analysis of the curriculum development process focusing on curriculum planning, curriculum design, curriculum implementation and curriculum evaluation. Also addressed are current issues and future curriculum trends in a dynamic society.

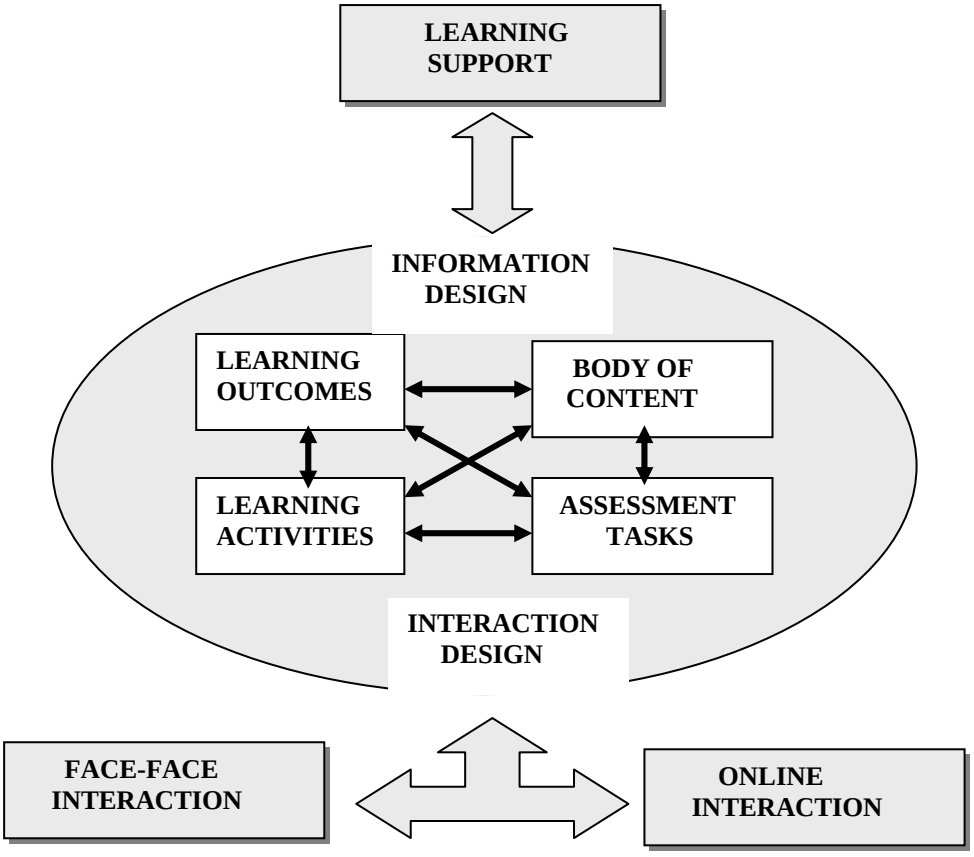


**Figure 1: Alignment of Course Development with the Blended Learning Approach**

Students taking the course are mostly secondary school teachers while some are trainers in industry. They may have had extensive experience in teaching and training but exposure to educational theory is necessarily confined to their undergraduate degrees and for some only a postgraduate diploma in education.

## 2 Alignment with The Blended Learning Approach

The design and development of the course was closely aligned with the Blended Approach (see Figure 1). The alignment is based on the models proposed by Fink (2003), Biggs (1992), and Morrison & Kemp (2001), which provides a structure and foundation for the learning process while nurturing student participation, expression and reflection. Also, emphasised in the approach is interactivity, authentic problem solving activities, multiple perspectives and representations. In short, the whole teaching-learning experience is engineered or initiated through alignment of the 4 components; namely learning outcomes, content, learning activities and assessment tasks. The approach provides a useful and simple enough guide for course development efforts especially, among uninitiated academics in institutions of higher education who traditionally are

not accustomed to designing their courses in such detail.

**2.1 The Content**

The first component relates to 'What to teach?' and decisions to be made in connection with the breadth and depth of content and expectations of students. Available material on the topic tended to be biased towards American and British education experiences. Considering that the course addresses not only Malaysian students but also an international audience, it was decided to concentrate on the basic concepts, principles and theories of curriculum development. Examples, illustrations and analogies from different education systems were incorporated to explain the ideas. The content forming the 'meat' of the course was identified, structured and organised according to the learning outcomes identified.

The sequencing of the content followed the 'classic tutorial-in-print' (Horton, 2000) in which learners start with an introduction to the chapter and proceed through a series of pages towards more advanced concepts and principles. At appropriate points in the sequence of content, learners encounter various kinds of Learning Activities to reinforce accomplishment of objectives of the chapter. Though there are other options in sequencing the chapter such as the activity-centred format, knowledge-paced and exploratory tutorials, the classic tutorial was preferred because it is more familiar to learners and since the contents of the course may be new to the majority of students, it reduces the possibility of learners getting lost. Another reason being that the course is written in English and for some students who are less proficient in the language the classic tutorial format may be less intimidating.

**2.2 The Learning Outcomes**

The second component consists of statements indicating what students are expected to know, to do and attitudes inculcated at the end of each of the 10 chapters. The learning outcomes stipulate what changes students taking the course will experience, inform students what is expected of them as well as indicate what will be important in assessing the course. The Taxonomy of Significant Learning proposed by Fink (2003) was used to guide the selection of learning outcomes which identified six significant kinds of learning:

- foundational knowledge (facts, concepts, principles),
- application (problem solving and decision making in real-world situations),
- integration (making connections among ideas),
- human dimensions (learning about oneself and interacting with others),
- caring (changing one's feelings, interests and values), and
- learning how to learn (becoming a better and self-directed learner).

An interesting feature of the taxonomy is that it combines both cognitive and affective outcomes of learning. The taxonomy is interactive which means that each kind of learning can stimulate other kinds of learning. Admittedly, it may not be possible to include all six kinds of significant learning in a chapter or lesson; the more that can be included will make learning richer (Fink, 2003).

**2.3 Learning Activities**

The third component involves the design of learning activities. It is not so much a matter of getting things for students to read; it is getting together a set of things for students to

do that is important (Ellington and Race, 1993). Students learn more and retain their learning longer if they acquire it in an active rather than a passive manner. Learning activities are designed to help students monitor their own progress, check their understanding, develop specific skills, apply what they have learned to real-world situations and to reflect on what they have done (Melton, 2002). According to Merrill (2002), the most effective learning activities are those that are problem-centred and involve the student in activation of prior experience, demonstration and application of concepts to real-world settings. Based on Fink's taxonomy, three kinds of learning activities were designed and developed for each chapter throughout the course, namely; *Self-Test*, *Activity* and *Discussion Questions*.

a) Self-Test – this activity was introduced at strategic points in the text to enable learners to monitor their understanding of foundational knowledge and integration, i.e. the key information (facts, terms, concepts, principles) important for students to understand and remember in each chapter. The Self-Test questions were aimed at enhancing the mathemagenic behaviours (Rothkopf, 1970) of learners or processing behaviours that give birth to learning. Questions direct intent and search while reading a piece of text. Three types of adjunct questions were introduced (Pearson and Johnson, 1978).

- *Text-explicit questions* or factual recall questions tested key information students had to understand and remember and the answers are right there on the page. For example, '*What is the hidden curriculum?'*
- *Text-implicit questions* required learners do some sort of inferencing and 'read between the lines'. For example, '*Why do you think the Taba model is called the grass-roots model?'*
- Script-based questions required learners to use their prior knowledge or schema to answer the questions. For example, '*Give specific examples of constructivism in your classroom'*.

Text-implicit and script-based questions encouraged learners to make connections among ideas within the chapter and connections with their experiences in the workplace (i.e. integration).

b) Activity – these are learning activities in which learners:

- go beyond memorisation,
- bring in their own experience and examples,
- use the ideas in the material and apply them in their work or personal life,
- learn by doing,
- reflect on their own thoughts and feelings.

They are presented with real-world situations in the area of curriculum design and development (i.e. application of concepts). Case studies in curriculum design, curriculum implementation and curriculum evaluation are introduced at relevant sections in the text in which learners analyse and evaluate (critical thinking), suggest solutions (creative thinking), solve problems and make decisions. The aim of these learning activities is to provide opportunities for students to use the conceptual tools of the discipline in authentic situations and through collaborative interaction (face-to-face and online) socially construct knowledge. For example, '*To what extent are constructivist principles practiced in our classrooms'?*

c) Discussion Questions – this learning activity is located at the end of each

chapter to initiate discussion and sharing of ideas between learners in face-to-face and online sessions. Through interaction learners learn about themselves and learn about their fellow course mates. Adult learners approach learning as problem solving and are keen in sharing their experiences (Knowles, 1984). Keeping this in mind, issue oriented activities were designed for each chapter to engage learners in active debate similar to what they would encounter as curriculum professionals. For example, *"Would a learner-based curriculum design be easier to implement than a subject-based design?*

d) Learning Journal – students are encouraged to keep a journal in which they write reflectively about their learning experiences. Since this is a new activity for many students, the following sample questions are listed to guide their efforts. *What am I learning? Of what value is this? What difficulties did I have learning the content? What was I most comfortable with?*

**2.4 Assessment Tasks**

The fourth component is assessment which is designed not solely to give a grade but more importantly to enhance student learning. The assessment tasks used in the course consisted of *audit assessment*, *authentic assessment* and *self assessment* with criteria and standards made explicit. Audit assessment is assessment which only determines whether students 'got' the material they studied or learned correctly. Authentic assessment incorporates exercises, questions, problems that create a real-life context for a given issue, problem or decision to be addressed (Fink, 2003). The criteria and standards used to assess student work are made explicit. For example, what is meant by 'acceptable' or exceptional' work is clearly stated.

The assessment format for the course consists of a final examination (50%) and coursework (50%) which is made up of two written assignments.

- The first assignment provides an avenue for students to show their skills in analysing ideas and how they might be applied to their setting using their own words.
- The second assignment provides an opportunity for students to apply what they had learned in creating something new or a modification of an existing idea that could be used in their work It was hoped that seeing the personal relevance of such an assignment, they would take greater ownership and effort in doing their work.

**3 Adult Learning Principles**

The content design of the course was based on the works of Knowles (1984), who specified that:

- Instruction for adults needs to focus more on the process and less on the content being taught
- Use of case studies, role playing and simulations are useful
- Instruction should be task-oriented instead of memorisation
- Instructors adopt a facilitative role
- Adults are self-directed and should learn to discover things for themselves.
- Make use of their rich experiences

**4 Design of a Chapter**

The following is a description of the design of a chapter for the Learning Package based on the

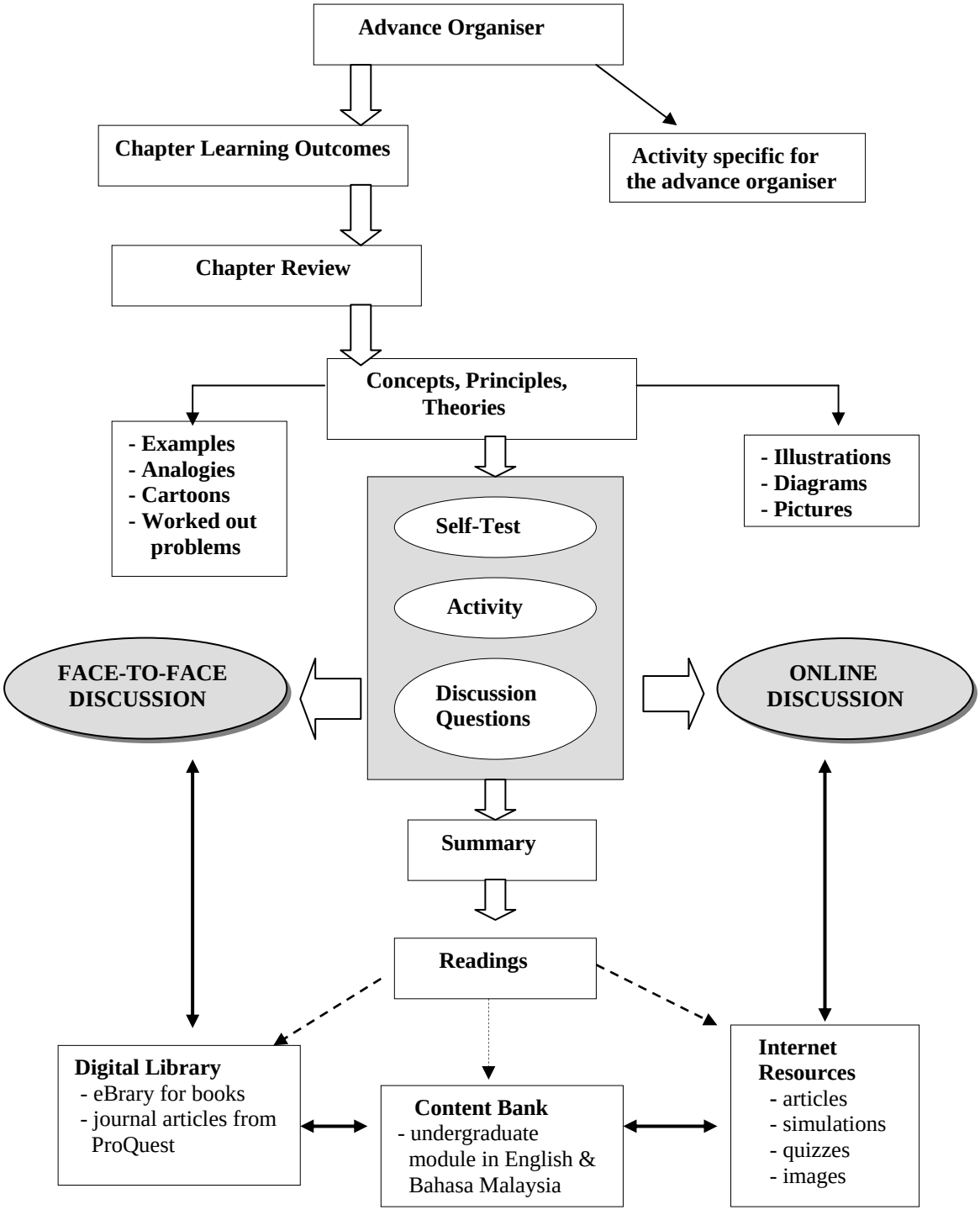


**Figure 2 Design of a Chapter in the Learning Package**

principles discussed earlier (see Figure 2). At the beginning of each chapter is a ***Course Map*** which explains how the 10 chapters are connected. The chapter the student is currently reading is highlighted to show how it is connected to the rest of the chapters. This is followed by an ***advance organiser*** (Ausubel, 1968), which was either a newspaper report, a research article, a story, a case study, a diagram, a cartoon and so forth. The purpose of an advance organiser is to encourage learners to connect the new information in the chapter with their prior experience.

Also included is a list of the ***learning outcomes*** desired of learners after having completed a chapter. In the ***introduction***, the reader is told how the present chapter is related to the previous chapters. Concepts and principles are explained based Einstein's that adage "everything should be made as simple as possible, but not simpler". Examples, illustrations, analogies, pictures were widely used to explain concepts, principles and theories. Wherever appropriate, text information was diagrammatised (*spatial learning aids*) to show relationships, processes, procedures and hierarchy. Readers were provided with multiple representations of content with the purpose of exploiting the cognitive flexibility of learners focusing on the interconnectedness of information rather than treating content as compartmentalised.

As mentioned earlier, three types of learning activities were used throughout the chapter: Self-test, Activity and Discussion Questions. These learning activities were aimed to engage students in deep learning. According to Marton and Saljo (1976) two kinds of learning are common among students in tertiary education. Surface learning is when students reduce what is to be learned to the status of unconnected facts to be memorised and reproduced at a later date like in an examination. Deep learning is when the student attempts to make sense of what is to be learned which consists of ideas and concepts and always seeking integration between components and between tasks, and 'playing with ideas'.

The three kinds of learning activities were specifically designed to initiate face-to-face as well as online discussion. Selected activities were open-ended and issue oriented, lending to discussion in which students can take a stand.

The ***summary*** at the end of the chapter was closely aligned and in many respects a repetition of the chapter learning outcomes. If learners were unable to explain any of the statements summarised, they were prompted to re-read the relevant sections. The ***readings*** for each chapter were drawn from specific chapters and journal articles available at OUM's ***Digital Library***, *including* ***internet resources***. Rather than provide vague instructions on extended readings, distance learners need to be more focussed on what to read as they may not have the luxury of time.

For students who lacked certain pre-requisites for the material discussed or find the material in English difficult, were directed to sections of undergraduate material made available in the ***Content Bank***. The Content Bank is a digital collection of undergraduate learning modules covering over 180 courses, powerpoint slides and articles & conference papers written by faculty members.

## 5 Conclusion

It is envisaged that the proposed design principles adopted will greatly enhance the quality of

learning modules produced. In any e-Learning or distance learning effort, the learning module should be the engine that drives face-to-face interaction and online discussions. Unfortunately, the 'bells and whistles' of technology is at the forefront of some eLearning ventures. Content and more importantly its design in prompting cognitive activities among learners should be the core business of any e-Learning or distance learning organisation.

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