

THE APPLICATION OF INSTRUCTIONAL DESIGN IN THE NATIONAL OPEN UNIVERSITY OF THE REPUBLIC OF CHINA

Bosco Wen-Ruey Lee, Ph. D.

*Professor, Department of Agricultural Extension,
National Taiwan University, Taipei, R.O.C.*

Michael Shang-Ren Kwan, Ed. D.

*Associate Professor & Director,
Department of Production & Programming
National Open University,
Taipei, Taiwan, R.O.C.*

Abstract

Designing instruction through the systematic approach is a way to assure the efficiency and the effectiveness of teaching and learning. Since the institute was established in August 1986, the National Open University of R.O.C. has adapted this concept into her system. Experts in the university developed an eight-step model for the carrying out of this instructional design concept. Main tasks to be executed at each step are clearly identified and stated in this model. Each member of the course design team, which includes the subject matter experts, the instructional designer, the media specialist, and the team assistant, follows this model to perform his or her duties. In the past years, this ID model has been widely applied to all NOU courses. Though, many difficulties and problems encountered, it is leading the

instructions of the National Open University up to the goal of efficiency and effectiveness.

Birth of the Nation's Largest University

The Ministry of Education in the Republic of China started the planning for an open university in 1981. A government appointed committee was formed in 1982, which consisted of 15 specialists and scholars. Its major responsibility was to plan for the establishment of the first institution that provides access to lifelong learning in higher education. A three-year pilot project was initiated in September 1983, according to the committee's recommendations. Seven courses were offered through television and radio. Printed materials and classroom instructions were provided at eleven learning centers throughout the province of Taiwan. Over 80,000 students were enrolled during this piloting period.

In August 1986, the National Open University (NOU) of the Republic of China was formally established. Over 28,000 students were enrolled for the first year, of whom, approximately 20,000 were regular students. Up to fall 1987, the total enrollment has exceeded 30,000 students. Since NOU imposes no restrictions on the number of years of studying, and since students of NOU are allowed to learn at their own paces, it is expected that the enrollment will continue to increase.

The Objectives of NOU

The National Open University is established to achieved the following objectives:

1. To provide opportunities for lifelong learning.
2. To offer equal higher education opportunities for all people who are

unable to enroll in traditional colleges and university.

3. To convey knowledge to the whole society via new communication technologies.
4. To promote the qualitative improvement of the country's human resources.

Courses and Characteristics of NOU

To accomplish her objectives and to satisfy the needs and interests of people with various backgrounds, NOU offers not only skill-oriented courses but also courses in humanity. The design of curriculum is intended to be plural as well as interdisciplinary, which is reflected in the three major programs currently offered by NOU: **Humanities, Social Sciences, and Business.**

Due to the limitations of TV broadcasting hours (7-hour maximum on an UHF channel daily), each major program is limited to offer less than 9 courses per semester. Students in this university come with different background and with different entry levels. And, technically, it is also difficult to have every student follow a certain sequence of courses as in the case of a regular university. Thus, courses in each program are so designed that they will not be over-specialized. Also, to accommodate different needs and entry levels, each major program is divided into several clusters of 4-7 related courses (see Figure 1).

The nature of NOU is an open university, the policies on admission and students' course selection are to be as open as possible. Students are not required to be affiliated with any specific program. They can take whichever courses they are interested in. In addition to the basic requirement of completing 128 credit hours, students must fulfill the following two requirements in order to graduate: 1. complete the 24-credit-hour required course work, 2. choose a major area of study from the three aforementioned programs, and complete at least 60 credit hours in that area.

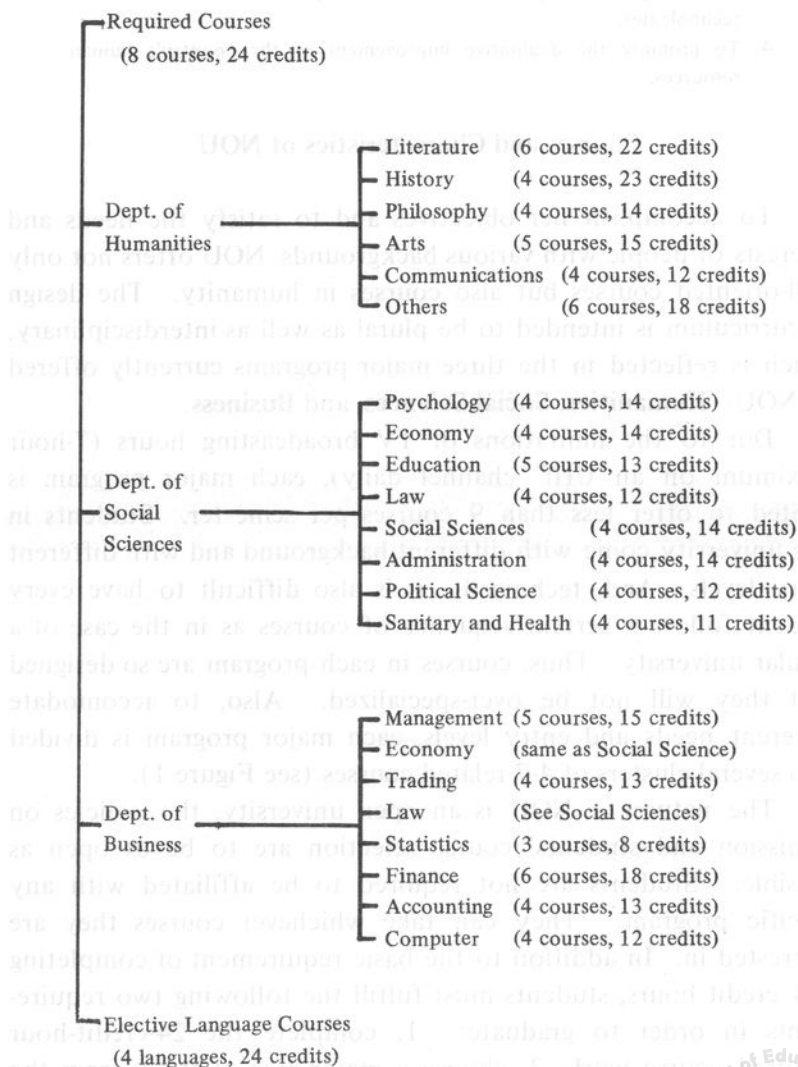


Figure 1 Course Structure of NOU

Systems Approach to Instructional Design

Systems approach to instructional design is based on the notion that any instructional activity can be deemed as a system in which every component is interacted with and affected by every other component. Five basic components can be identified in an instructional system: 1. learner analysis, 2. defining objectives, 3. designing instruction, 4. implementing instruction, and 5. evaluating instruction.

Specifically, systems approach to instructional design has the following characteristics:

1. Performance objectives are clearly stated for students before learning takes place.
2. Learner characteristics are carefully analyzed with respect to cognitive style and entry behavior.
3. Instruction is designed according to predefined objectives and learner characteristics.
4. Instructional activities are implemented based on learning and communication principles with the help of appropriate media.
5. Modifications and improvements of instruction heavily rely on the feedback obtained through constant evaluations of each step in the process.

Why Systems Approach in NOU?

As mentioned prior, the purpose of systems approach to instructional design is to ensure that methods of instruction are best applied and that resources of instruction are best allocated in an given instructional activity. In other words, it is to make instruction more effective as well as efficient. The systems approach is particularly important to instructional design of an open university whose students are heterogeneous in **age, educational level, socio-economic status, occupation and personal interest**. The traditional face-to-face classroom instruction is not

the common mode of instruction in an institution provides distance education and communicates via media as NOU. Such facts makes systems approach to instructional design extremely important. It will provide a good match between students' interests and course content, and between student abilities and instructional methods.

Furthermore, since a majority of NOU's faculty members are part-time professors and are not familiar with the new instructional environment, systems approach helps assure that professional knowledge of subject matter experts, instructional designers, and media specialists are best combined and utilized in scoping, sequencing and presenting instruction.

Teamwork on Course Design

Given that systems approach is not only a way of designing instruction, but an important measure for quality control. It is employed in the design of every course offered by NOU. However, it should be noted that the notion of systems approach is new to many instructors in Taiwan. As a matter of fact, this is the first time such approach is implemented in a large scale. Hence, the unfamiliarity and the complexity of its process made the curriculum design and course planning a learning process itself for all the people involved.

After a great deal of discussion among different parties within the university's administration, it is finally agreed upon that a team be formed for the design of each course, which consists of:

1. 2-4 content experts – responsible for identifying learning objectives, selecting content, writing textbooks and scripts, developing materials and delivering instruction.
2. Instructional designer – responsible for planning, monitoring, controlling and evaluating instruction.
3. Media specialists – responsible for media selection, media production,

message design and coordination between the instructors and the production unit.

4. Teaching assistant – responsible for collecting materials, and assisting the above three parties during the developmental period.

NOU's Model for Instructional Design and Development

The NOU's ID model was developed after reviewing other open universities' models and experiences and after taking into consideration the characteristics of the NOU (See Figure 2). It consists of 7 major steps. Each is described below:

1. Identify course objectives

- 1) Define the context for the course – How is it related to other courses in the curriculum of a particular program?
- 2) Identify terminal objectives – What are students expected to do at the end of the course?
- 3) Calculate required instructional time and scheduling – Currently, each credit equals to approximately 18 weeks' instruction. The number of class periods each week is identical to the credit number. Each period is 30-minute long. The instructional designer works with the content experts in figuring out the total number of classes available, conducting content analyses for courseware development, arranging TV/Radio production procedures, and making a management plan.

2. Learner analysis

- 1) Basic data collection
Statistics on students enrolled for the 1986-87 academic year indicate that:

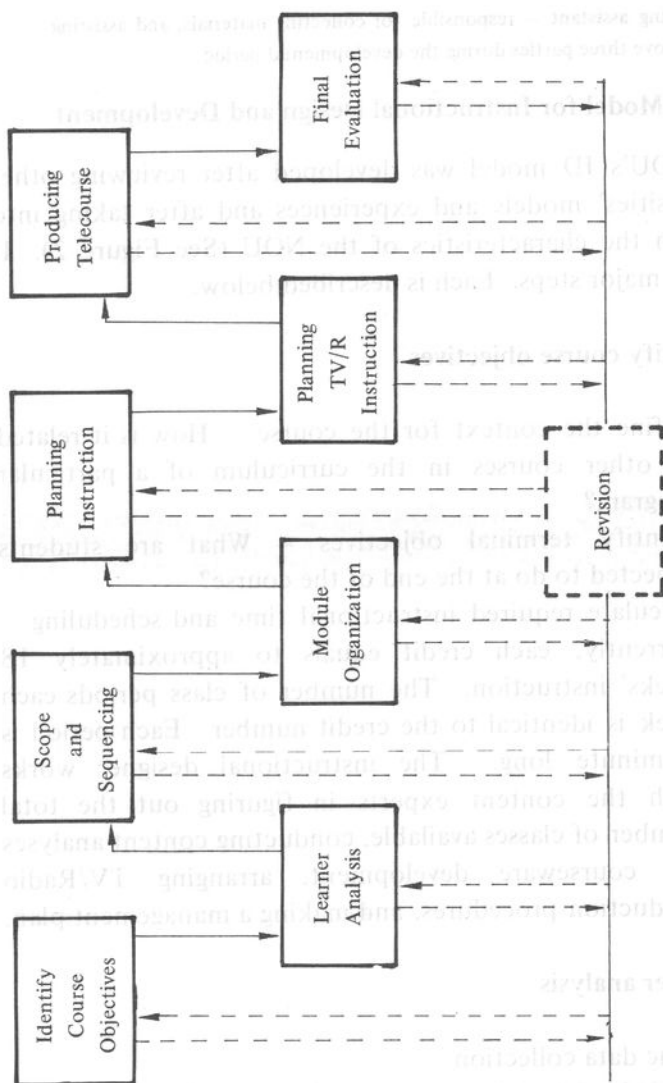


Figure 2 Instructional Design Model of NOU

a. Type of students:	Diploma students	19,542	(68.0%)
	Non-diploma students	9,207	(32.0%)
b. Educational level:	4-year college	138	(0.5%)
	Junior college	6,886	(24.0%)
	High school	20,492	(71.3%)
	elementary & junior high school	621	(2.1%)
c. Age:	Over 50	821	(2.8%)
	40-49	2,205	(7.7%)
	30-39	9,338	(32.9%)
	25-29	8,871	(30.9%)
	Under 24	7,514	(26.1%)
d. Occupation:	Public official	8,590	(29.9%)
	Businessman	7,777	(27.1%)
	Laborer	3,954	(13.7%)
	Teacher	1,277	(4.4%)
	Self-employed	1,024	(3.6%)
	Housewife	1,097	(3.8%)
	Unemployed	2,962	(10.3%)
e. Gender:	Others	2,962	(10.3%)
	Male	11,346	(39.5%)
	Female	17,403	(60.5%)

2) Student profile

For each course, a student profile is provided to the team members for their references in designing course content, developing textbooks and choosing instructional methods.

As can be seen, the NOU's students represent a highly heterogeneous population. This characteristic presents a major problem on course design especially when the design team is faced with a group of students that varies tremendously in educational backgrounds. Currently, a majority of the enrolled students are in high school or junior college level, the courses are designed primarily to cater to their needs.

3. Scope and sequencing

- 1) Resource collection — The content experts collect course-related reference materials in preparation for the course development.
- 2) Content selection — The instructional designers work with the content experts to identify major ideas to be taught. Each idea serves as the theme for a learning module.
- 3) Content analysis within modules — Major ideas identified in the content selection step are further analyzed in order to identify unit topics.
- 4) Supporting content — Supporting content for each unit is imbedded as appropriate in the most relevant places. This step usually follows a hierarchical analysis of the unit topic. Supporting content is any information that can facilitate or enrich learning; such as prerequisite concepts, principle or procedures, important facts or historical events, or end-of-unit review or synthesis.
- 5) Course description — To help students choose which courses to take, a brief description is developed for each course based on the course objectives and content.
- 6) Number of periods — Each unit may require more than one TV/Radio class period depending on the level of richness of the topic.
- 7) Preliminary theme for each period — To better inform students of each class content, every TV/Radio class period is assigned a theme.

4. Module organization

- 1) List expected learning outcomes—For each module, the content experts are asked to list observable behaviors

that they expect students to be able to do after completing it.

- 2) Identify domains and levels of expected outcomes — Determine which domain (cognitive, affective, or psychomotor) and the level of each expected outcomes.
- 3) Specify module objectives — Translate each learning outcome into learning objectives in behavioral terms.
- 4) Prioritize objectives — Objectives within each module are organized into a hierarchy such that each is an enabling objective for the next one.

5. Planning of instruction

- 1) Select medium — Based on the nature of each course, TV, radio, or both may be used in delivering instruction.
- 2) Write textbook — No matter how oral instruction is delivered (through TV or radio), **textbook is the fundamental material for each course**. Each module identified in the previous step can be equal to a chapter in the textbook. In addition to the text, an abstract, learning objectives, reviews, exercise and some self-diagnostic test items are included in each chapter.
- 3) Determine evaluation methods — homework, assignments, mid-term and final examinations are used to measure students' learning outcomes as well as the effectiveness of instruction.
- 4) Arrange for face-to-face tutoring — In principle, students should have opportunities to meet the instructors. The number of meetings may vary depending on the needs and the nature of the course.
- 5) Design post-instructional exercises — Practice is imbedded in the end of each chapter in the textbook, which will not be graded. Projects and homework are

assigned by instructors and will be graded.

- 6) Consider possible supplementary materials — Important information not included in the textbooks due to space limitation may be published in the *NOU Bi-monthly*. The instructors may start considering the supplementary readings while preparing textbooks. In addition, a special column for NOU can be found in *Shin-Shen Daily News* (a local newspaper) every Tuesday and Friday, where administrators, instructors and students of NOU can exchange information.

6. Planning TV/Radio instruction

- 1) Determine the theme — As mentioned before, each class period has a theme. It is determined on the basis of a content analysis of the unit topic.
- 2) Select instructional methods — Select the most appropriate method for conveying the theme of each class period, such as lecture, interview, panel discussion, demonstration, dramatization . . . etc.
- 3) Design motivational activities — To motivate students' learning, certain instructional strategies are included; such as reviews of previous lectures or summaries of upcoming topics . . . etc.
- 4) Determine the instructional content — Content of great importance for learners and appropriate for TV or radio instruction normally taken out of the textbook. Such information is then translated into the script for telecourse.
- 5) Design group activities — To compensate the lacking of interaction between teachers and students and among students themselves, group activities are arranged to increase learning motivation.

7. Producing of telecourses

- 1) Write script – The content experts are responsible for initial script writing which is primarily based on the previously prepared textbooks.
- 2) Revise script – The instructional designers and media specialists help revise the script to make it colloquial. They also assist with visual design on TV as well as selection/production of requested audio-visual materials.
- 3) Evaluate – A formative evaluation is conducted to assure that the script is addressing the topic and that the instructional method is appropriate for achieving the objectives.
- 4) Prepare for production – After script and visual design are completed, the content experts (TV/Radio instructors), instructional designers, media specialists and production crew (Chinese Television Services) hold production meeting to discuss and plan for the actual recording.
- 5) Produce supporting materials – Materials needed for telelectures should be prepared prior to recording. Such materials may include films, slides, models, telop cards, flip cards, and flash cards . . . etc.
- 6) Rehearse and record – Normally, each 30-minute telecourse takes two hours to record. Telecourses with complicate settings and teaching activities may take more than six hours to complete.
- 7) Assessment before broadcasting – A final assessment of consistency and accuracy among components of the produced telecourse is required prior to the actual broadcasting.
- 8) Develop supplementary material – The instructors may start creating additional materials after reviewing the

recorded TV or radio instruction, if any deficiency has been detected. These materials may be published on the *NOU Bi-monthly* at the approximate time when the most relevant class period is scheduled on the air.

8. Final evaluation

A final evaluation is conducted at the end of the academic year on the following aspects:

- 1) Learning outcomes — To what degree did students achieve the objectives?
- 2) Course content — Was the content appropriate for most of the students in terms of difficulty level? Was it what the students had expected to learn from such a course?
- 3) Instructional method — Was the method applied appropriate for the characteristics of the students? Was it cost effective?

Concluding Remarks

Although the application of a systematic instructional design model in NOU has been over one year only. At least three accomplishments can be identified.

First, thanks to the capabilities of mass communication media, higher education can be delivered to almost any corner on the island. The ideal of educational equality and lifelong learning can therefore be realized.

Second, NOU develops its own textbooks, and these books are written after taking into consideration the needs and characteristics of NOU students. Many of NOU textbooks are being used by other institutions with similar student population. In the future, it seems promising that NOU will also provide multi-media courseware

for other higher education insititutions.

Third, the instructional design model not only guides the development of course materials, but also serves as a quality control mechanism. The notion of systems approach is exemplified in NOU's instructional design process.

Nevertheless, systems approach to instructional design and open university are two new ideas in the Republic of China. Like any innovation and many other open universities, the NOU has yet many difficulties to overcome. Since the student population is enormously heterogeneous, it is almost impossible to develop course materials that can meet the diverse backgrounds of all students. Hence, the effectiveness of learning is often discounted.

From the instructors point of view, NOU, like any other distance teaching university, is a "transparent" university. Some professors may fear criticisms from outside, and therefore, cater to their colleagues when developing course materials rather than to the students.

Furthermore, since most instructors are full time faculty at other institutions and only teach part-time at NOU, they lack the commitment to the quality instruction at NOU and the patience with the complex and time-consuming process of systematic instructional design.

What has been learned from the past year's experience is that administrative involvement, faculty support and recognition of the importance of instructional designers are the key factors to the success of such an innovation in higher education. Although it is understood that innovation and diffusion is a long social process, the impact on the society is believed to be tremendous.

References

(1987) The Establishment Rules of the National Open University in the Republic of

China.

Hsu, C. C. (1985). "The development of distance teaching in Taiwan," in *Instruction at a Distance Forum I*. (pp. 26-52). Taipei, Taiwan: Distance Education Association, R.O.C.

Jung, H. I. (1986). "Distance education, instructional media, and the instructional design model of NOU," in *Instruction at a Distance Forum II*. (pp. 1-19). Taipei, Taiwan: Distance Education Association, R.O.C.

Kemp, Jerrold E. (1985). *The Instructional Design Process*. New York: Harper & Row.

National Open University. (1987). *The Handbook of Instructional Design and Course Materials Production* (NOU Publication No. 1). Taiwan, R.O.C.: Nation Open University.

National Open University. (1987). *NOU Statistics*. (Unpublished).