THE CREATING OF ENRICHMENT CURRICULUM TO ENHANCE INFORMATION COMMUNICATION TECHNOLOGY (ICT) COMPETENCY BEFORE PROFESSIONAL INTERNSHIP FOR STUDENTS OF SIRINDHORN COLLEGE OF PUBLIC HEALTH, PHITSANULOK

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ABSTRACT

The main objective of this study was to develop the enrichment curriculum to enhance information communication technology (ICT) competency for students of Sirindhorn College of Public Health, Phitsanulok. The enrichment curriculum is to enhance students' knowledge, skills and attitude. This curriculum was developed through 4 stages as follows: First, literature reviews, need assessments in ICT competency for students (n=153), and in-depth interviews from ICT experts (n= 5). The deficits in ICT competency were included knowledge, skills and attitude. Second, the curriculum was drafted relevance to potential inputs consisting of 4 learning units. The contents in this curriculum were covered ICT competencies and learning activities were focused based on practical skills. The curriculum has been evaluated by ICT experts and found at high levels of 4.65 on average. Third, the curriculum has been tested with the second year students of Bachelor of Public Health in Community Health (n = 40) by One – Group Pretest – Posttest. The posttest scores in ICT competencies were significantly higher than pretest (p < 0.001). Fourth, the evaluation results of the enrichment curriculum to enhance ICT competency were determined at high levels of 4.04 on average.

Keywords : Curriculum development, information communication technology (ICT), professional internship

Introduction

Nowadays information and communication technology : ICT is significant to economic and social development including people's living. Development and application of ICT for people service will decrease unequal economic and social conditions and will create the equal opportunity of access to public health services which have been primary service required for good health life. ICT has been the tool used for developing information system which is required for people health system development according to the national health development plan version 10 (2007-2011).

ICT has been used for medical information management, medical care cost reimbursement, health insurance, the new disease analysis, anticipation of sickness in the future, the plan of public health personnel development and suitable budget, and determination of health strategy and policy. Thus the accuracy, good quality and update information have been required in order to achieve the goal.

ICT has been used in all health service places. Application software used in Ministry Of Public Health have come from developing by its offices, providing by other government departments such as GFMIS program and private company purchasing. The main application program which have collected information of executive management and public health service for people, are as follows

1) The application program for district health promotion hospitals, public health center, community health center. Such as THCIS program which has been developed by information communication technology center of office of the permanent secretary. This program records individual patient data, collects 12 files standard data set and data of reimbursement from National Health Security Office. The open source technology has been used to develop the program which is able to work in Window, Linux and Ubuntu.

2) The application program for the hospitals. From the survey of data system program of the hospitals in Thailand which had been conducted in the year of 2008 by National Health Security Office, it was found that there are 32 different application programs used in the hospitals in Thailand. The 5 popular programs are HOSxP, MIT NET, STAT, Hospital OS and HI which the information exchange among the programs cannot be conducted. ICT has been significant for all acidities development.

3) Sirindhorn College of Public Health, Phitsanulok has been the educational institute which produces the public health personals for the health service system. There are curriculums of Bachelor of Public Health (Community Public Health) Bachelor of Public Health (Dental Pubic Health) , Bachelor of Thai Traditional Medicine ,high Diploma of Pubic Health Program (Dental Public Health) high Diploma of Fublic Health (Thai Traditional Medicine) The worming places for these graduates will be the health service places or other offices which belong to Ministry of Public Health Al the curriculums consist of theory and practice learning. The professional training at public health service places such as District Health Promotion Hospitals, Community Hospitals and General Hospitals , is required. In addition to knowledge, skill and professional capability, basic ICT competency is necessary for students before going to the training places.

The researcher team know the importance of having the basic ICT competency, thus the enrichment curriculum to enhance ICT competency for students of Sirindhorn College of Public Health, Phitsanulok, has been developed in order to prepare students for the achievement of their professional training.

Study Objectives

1. To study the required ICT competency for students of Sirindhorn College of Public Health, Phitsanulok.

2. To develop the enrichment curriculum to enhance in formation communication technology (ICT) competency for students of Sirindhorn College of Public Health, Phitsanulok.

Search methodology

One –group pretest posttest design was used to study. The sample used for studying the students' ICT competency was comprised of 5 ICT experts which were selected by using purposive sampling, and 153 students of Sirindhorn College of Public Health, Phitsanulok, the academic year 2012, all students were

the sample, The sample used for the enrichment curriculum development consisted of 9 persons of ICT experts, teachers who have taught ICT subject and heads of professional training places which were selected by using snowball technique. For the sample used for the curriculum efficiency study were 40 of the second year students of Bachelor of Public Health (Community Public Health) , the academic year 2013. Simple random sampling was used.

Study instruments

An interview guide and a set of questionnaires form were developed to collect data concerning ICT competency, ICT Competency enhancement need and required ICT competency for students of Sirindhorn College of Public Health, Phitsanulok.

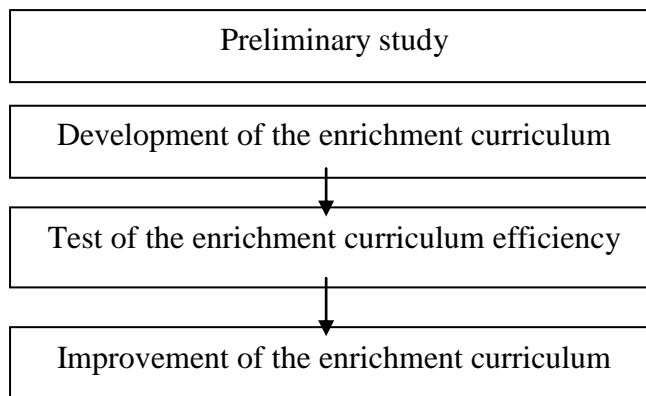Procedure of study is divided into 4 parts:

Figure 1   Procedure of study

Part 1 : Preliminary study

1. To review related literature and concepts of the experts about ICT competency and ICT competency enhancing guideline.

2. To survey need assessments in ICT competency enhancement of students

3. In-depth interview from the experts abut ICT competency of students was used.

4. To study documentary research concerning factors and model of enrichment curriculum.

Part 2 : Development of the enrichment curriculum

1.   Results of preliminary sours study was taken to create the concept frame of the enrichment curriculum draft as follows:

1) Principle and rationale

2) Basic concept for curriculum development

3) Objectives

4) Structure of enrichment curriculum consists of general ICT information, data architecture, communication technology.

Microsoft Access 2010 was used to create database program: Unit 1 Introduction (3hours) Unit 2 Data architecture (6 hours) Unit 3 communication technology (6hours) and unit 4 Development of database program by using Microsoft Access 2010 (30 hours) , total 45 hours.

2. Evaluation of the enrichment curriculum draft was conducted by 6 persons of curriculum and ICT experts.

Part3 : Test of the enrichment curriculum efficiency

The curriculum had been tested with the sample in real situation in order the evaluate the curriculum efficiency by using one group pretest posttest design

Part 4 : Improvement in the enrichment curriculum

Results of data analysis and evaluation concerning curriculum testing were considered and improved for better and appropriable enrichment curriculum.

Research results

1. Study from preliminary sources from literature review and ICT experts in-depth interview concerning ICT competency, it was found that the required ICT competency for students consisted of knowledge, skill and attitude. Enhancement of ICT competency should by focused on practice, appropriable and update contents. Student's ICT competency in theory and in practice should by evaluated.

As the need assessment in ICT competency enhancement for 153 of the first year students, the academic year 2012, it was found that 100% of students needed ICT competency enhancement.   In-depth interview with 5 ICT experts about ICT competency for students found that the enrichment curriculum the enhance ICT competency in knowledge, skill and altitude should be developed. ICT competency has bee necessary and significant for students training

Based on literature review relating factors and congests of the enrichment curriculum development, the following 4 factors of the enrichment curriculum were adopted: principle and objections , contents, learning and teaching activities, Measurement and evaluation (see table1)

Table 1 : Analysis results of ICT competency enhancement guideline for students

Comments of students (153 persons)	Experts interview (5 persons)	Documentary reviews
100 % of students needed to be Enhanced ICT competency	ICT competency has been necessary and significant for students training Create the enrichment Curriculum in order to Develop ICT Knowledge,	The enrichment curriculum consists of 4 main factors: 1. Principle and objectives 2. contents 3. learning and teaching actives

Skill and attitude.	4. measurement and evaluation

2. Details of the enrichment curriculum development

The enrichment curriculum draft consisted of 7 factors : principle and rationale, concept of curriculum development , objectives , structure, learning and teaching activities, learning and teaching media, measurement and evaluation.

Evaluation of the enrichment curriculum draft. The curriculum draft had been evaluated by ICT experts and found at high level of 4.65 on average. (Table2). Index of item objective congruence of all curriculum draft factors was at high level of 0.67-1.00

Improvement of the enrichment curriculum before using. The curriculum had been improved according to the experts' suggestion as follows : 1) The accuracy of language 2) The clarity and conciseness of objectives 3) arrangement of contents sequence including the use of suitable language 4) emphasis on action learning and continuously learning and teaching activities 5) adjustment of measurement and evaluation to be appropriate to curriculum structure and objectives.

Table 2 Evaluation results of the enrichment curriculum draft by the experts

Factors	Experts (Score level)					Average
	1	2	3	4	5	
Significance of problem	4.75	4.25	4.50	4.60	5.00	4.63
Principle and rationale	4.65	4.45	4.00	5.00	5.00	4.62
Objectives	4.25	4.75	4.65	5.00	4.85	4.90
Contents	4.45	4.50	5.00	5.00	4.55	4.70
Learning and teaching activities	4.25	4.45	5.00	4.45	4.65	4.56
Teaching media	4.68	4.73	5.00	5.00	4.69	4.82
Measurement and evaluation	5.00	4.49	5.00	4.67	5.00	4.83
Evaluation of learning unit	4.00	4.20	4.44	4.30	4.12	4.20
Total	4.50	4.47	4.69	4.75	4.85	4.65

3. Test of enrichment curriculum efficiency. The improved curriculum had been tested with 40 of the second year students, the academic year 2013 of Bachelor of Public Health (Community Public Health), it was found that

1) From comparing the score average in pretest and posttest for self assessment of students in ICT knowledge, skill and attitude, the posttest scores were higher than the pretest scores, level of significance was 0.001. (Table3)

Table 3 Results of comparing the score average in pretest and posttest for self assessment of students

Self assessment	Number	$\overline{X}$	S.D	t	p-value
ICT Skill					
Pretest	40	73.27	5.85	24.21	<0.001*
Posttest	40	148.19	10.51		
ICT knowledge					
Pretest	40	26.38	5.23	26.09	<0.001*
Posttest	40	74.77	7.13		
ICT attitude					
Pretest	40	7.77	1.38	31.69	<0.001*
Posttest	40	15.27	0.97		

* < 0.001 significant

       2) From comparing the achievement of ICT knowledge and skill of students , the posttest scores were higher than the pretest scores, level of significance was 0.001 (Table 4)

Table 4 Results of comparing the score average of ICT knowledge and skill for
       students competency in pretest and posttest

Evaluation	Number	$\overline{X}$	S.D	t	p-value
Knowledge by using					
The measure form					
Pretest	40	25.69	2.87	31.69	<0.001*
Posttest	40	46.04	3.04		
Skill by observation					
Pretest	40	24.38	8.13	26.09	<0.001*
Posttest	40	75.17	6.38		

* < 0.001 significant

       For the evaluation of ICT attitude achievement, students' behavior had been evaluated during testing of using enrichment curriculum. It was found that ICT interesting, regularly operating and training in learning actives, creating works by using ICT, attempting to solve the problem of ICT, having self –confidence in ICT using during testing period, were at high level.

       3. Evaluation results of the enrichment curriculum suitability were determined at suitable level of 4.08 on average. (Table 5)

Table 5   Evaluation results of the enrichment curriculum suitability by students

List of evaluation	Average	SD	Result
Students obtained ICT competency	4.02	0.61	Suitable
Operation period	3.97	0.67	Suitable
Instructor attention	4.15	0.75	Suitable
Students participation in comment	4.29	0.76	Suitable
Pertaining document of teaching	4.11	0.72	Suitable
Learning and teaching activities	4.10	0.80	Suitable
Learning and teaching media	3.95	0.72	Suitable
Acquired knowledge	4.00	0.59	Suitable
Curriculum evaluation	4.14	0.94	Suitable
Total	4.08	0.63	Suitable

As the comments of students on the enrichment curriculum, the objectives were suitable to the students' need, the enchantment of ICT Knowledge, skill and attitude had been required for students preparing before professional training , the suitable contents enhanced ICT competency of students for applying in real situation and it also would be fundamental knowledge leading to ICT competency development in the future.

Enrichment curriculum had been improved on language, learning objectives , activities, time, learning and teaching media.

Discussion and conclusion

1. Study and analysis from preliminary sources. Based on literature review and ICT experts interview concerning ICT Competency enhancement of students , the required ICT competency for students should be consisted of knowledge, skill and attitude, Similarly, the study of ICT competency development by Jaithip Na Songkha [4] (2004) Bothams [5] (2002) and Duangrat Aabjoi (2004), it was found that ICT competency consisted of knowledge, skill and attitude. The competency enhancement had to faced on practice . As the concept about action learning of McGill & Beatty (2002) [7] and McGill&Brockbank (2004)[8]   stated that action learning would connect theory to practice appropriately which it was developed based on the relationship of thought and practice in real situation.

2. The development of the enrichment curriculum. The concept from related literature review and the experts' interview were adopted to define principle and rationale, and objectives of curriculum. According to curriculum development of Taba (1962) [9] , analysis of students and social condition had been conducted before defining objectives, contents, learning experiences and evaluation. Due to this curriculum has been the intensive course, thus its objectives emphasized on development of students' knowledge, skill and attitude. As the

curriculum development of Piirto (1994) [10] and Department of Curriculum and Institution Development (2003) [11] , mentioned that the objectives of the enrichment curriculum was to develop knowledge, capability, thought, synthesis , analysis in order to create academic and professional skills and experiences.

Also David & Rimm (1994)[12] said that the enrichment curriculum enhanced knowledge and skills in order to motivate students to have positive attitude to learning and self confidence in working.

As the study of Sunun Sungong (2001), it was found that the procedure of competency development should be emphasized on action learning, creating teamwork, measurement and evaluation. The measurement and evaluation had been significant for this enrichment curriculum by operating self assessment, the test and evaluation from practice and behavior observation. This hold similar method with Office of the civil Service Commission (2004) [14] and Ratchaneewan Wanittanom (2005) [15] that the assessment of personal competency was able to be conducted by using the test, behavior observation and report about self-information . As results of enrichment curriculum development, it was shown that quality and suitability of curriculum factors were determined at high level. The research was operated according to research procedure and systematic development. The researchers gained more information from the survey of students need and the experts interview which supporting this curriculum to be more effective. The action learning of the curriculum has been similar as competency based curriculum of Maccancy [16].

3. The test of the enrichment curriculum efficiency . This curriculum has been relevant to the students need due to it was developed by using potential input from related literature, the survey of students need, the interview of the experts and the persons who concerned the professional training of students. According to Piirto (1994)[10] , The significant characters of the enrichment curriculum were as follows: developing by concerning persons and experts need, working as teamwork for the curriculum development, learning all life and learning from environment. (Texas Agricultural Extension Service: Online) . In addition, the clear objectives of this curriculum is to enhance ICT Knowledge, Skill and positive attitude for students. Finch & Crunkilton (1988)[17] stated that the curriculum had to enhance the students capability from the students' comments after the curriculum test, they satisfied this curriculum and saw that the contents, learning and teaching activities, measure and evaluation enhanced ICT competency efficiently. In aspect of action learning, it was significant for the curriculum, it enhanced ICT knowledge, skill and attifitude of the students. The students could connect theory to practice appropriately. The various learning activities increased students' understanding and the students could apply all their obtaining benefits to use in the future. Besides, action learning had given an opportunity for students to work in group and to exchange knowledge each other. For the evaluation of the enrichment curriculum, the students mentioned that curriculum evaluation was reliable due to it had been conduted as the real conditions which were relevant to curriculum objectives and learning unit by using various instruments. According to the concept of Mcnergney (1998)[18] about the competency development which emphasized on practice in order to change personal behavior, personal behavior resulted from interaction between human and environment. The practice created knowledge, experience and interaction. Thus, learning and teaching activities of the curriculum should emphasize on action learning. For the measurement and evaluation, various methods and multi-instruments were used. Knowledge, skill and attitude were evaluated. As the concept of Maccancy[16] , skill, knowledge and applying capability should

Be considered for competency measurement. The quality of instruments were significant. All the instruments used for curriculum development had been prepared according to correct procedure by the researchers. As the study of Wichai Dissa (1992) [19], Supay Sukamonsun (1994) [20] , Ornstein & Hunkins (1993)[21] and Thamrong Buasri (1999)[22] , it was found that high standard quality of all instruments used for ICT competency evaluation had been required. The evaluation was operated several times by the researcher group working together with the instructures and teaching assistants in pretest, posttest and during the test.

    4.

    5. Improvement of the enrichment curriculum. The curriculum had been improved after testing such as adjusting time to be suitable to activities

Suggestions.

    1. Policy suggestions.

      1.1 The facilities of place, budget, learning and teaching media for enhancing ICT competency of teachers and students should be supported by the administrator.

      1.2 Personnel develop and activities arrangement for enhancing ICT positive attitude to the teachers and the students should be conducted by the administrator.

    2. Suggestions for using the research results.

      2.1 The principle and the procedure of action learning have to be studied and understood clearly. No understanding will effect unsuccessful achievement of using the enrichment curriculum.

      2.2 The primary information of each education institute should be studied and analyzed before using this enrichment curriculum. The curriculum should be adjusted based on the institute conditions.

    3. Suggestions for further research.

      3.1 The study of ICT integration should be one part of information technology subject in normal curriculum.

      3.2 The study of action learning through information communication technology should be conducted.

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