



CHAPTER II

LITERATURE REVIEW

Introduction.

This study focuses on the quality of the graduates in performing health care function. The quality is in itself meaningless even if its definition is not clearly stated. In this chapter the difference of definition of two words which are selected to represent the quality of graduates will be discussed.

There is no written standard for basic physical therapy in Thailand, many sources of information about Thai physical therapy competence will be reviewed later in this chapter. And also the American Standard will be demonstrated as a comparative data in guiding delineation of the competence used in this study.

The last part in this chapter will investigate the past research on the quality of the graduates in physical therapy profession and other health professions that are applicable in determination of study methods. The outline of this chapter is like this;

1. Definition of competence and performance.
2. Physical therapy competence.
3. Related literature about follow-up study of graduates' quality.

Definition of Competence and Performance.

In the broad term, the competence or competency was defined as "the quality of being functionally adequate or having sufficient skill for a particular function; competence is a potential which is realized at the moment of performance". Performance was "The carrying out of a task; the doing of any action or work; the execution of an action" (Guilbert, 1987).

In the above mentioned definitions, competence is the potentiality or capability of the person and may be likened to the potential energy or voltage. But the performance is represented as watts, the electrical energy that is applicable or produces action (Sackett, Haynes, and Tugwell, 1985).

Another distinction of these two words was exemplified as separation between efficacy and effectiveness of the drug. The competence is the performance of the drug in ideal circumstances (carefully chosen patients, perfect compliance, etc.). The performance refers to the performance under actual situation (complex, less ideal) (Norman, 1985).

In more detail, Klemp (1979, quoted in Moncur, 1985) classified competence into various areas as a "generic knowledge, skill, trait, self schema or motive of a person that is causally related to effective

behavior reference to external performance criteria". In this meaning the competence is broad range of personal potentiality and should be compared with criteria. Klemp also gave the definition of those potentiality as follow;

Knowledge - a set of usable pieces of information organized around a specific content area (e.g. knowledge of mathematics).

Skill -the ability to demonstrate a set of related behaviors or processes (e.g. logical thinking).

Trait - a disposition or characteristics way of responding to an equivalent set of stimuli (e.g. initiative).

Self schema -a person's image of himself or herself and his or her evaluation of the image (e.g. self-image as a professional).

Motive - a recurrent concern for a goal, state, or condition that drives, select, or directs behavior of the individual (e.g. the need for efficacy).

As "criteria" in the meaning of Klemp and "ideal situation", the competence was clarified not only the art of being capable but was extended beyond the performance in a specific setting and, according to some specified standards (Carol, Anderson , and Jagger, 1979).

Sackett, Haynes, and Tugwell (1985) on their literature of performance review, they demonstrated clinical competence as one determinants of clinical performance. Clinical competence is a necessary precondition for correct clinical performance but is insufficient. The evidences showed that the disparity between competence and performance always occurred as exhibiting suboptimal clinical performance. Others determinants were concluded as the causation of this disparity such as motivation and barriers. Motivation is

defined as the extent to which clinicians are positively inclined to put whatever clinical competence they have into practice. Barriers are circumstances or conditions which obstruct transforming clinical competence into clinical performance. They are such barriers originated from health system, patients themselves, or clinicians as subconscious or conscious behaviors. Sackett and his colleagues also concluded clinical performance by an equation as follow;

$$\text{CLINICAL PERFORMANCE} = \text{CLINICAL COMPETENCE} + \text{MOTIVATION} \\ - \text{BARRIERS}$$

Performance also comprises of many components. McGuire (1983) stated performance as overall clinical competence and competence in performing certain complex tasks. Clinical performance often refers to general and more elusive characteristics (eg. traits, achievements). It seem to combine elements of both cognitive and noncognitive skills and attitudes. In performance appraisal, traits and characteristics, and contributions of person are two main aspects of assessment (Choosak Tiengtrong, n.d.).

It is difficult to select the appropriate wording for the abilities of graduates in this study. Since these two words, performance and competence, were actually used interchangeably regardless of the meaning.

So it is confused in apply the concept of each definition from one study to other studies. In this study, the abilities of the graduates derived from perceptions and impressions because of the limitation of measuring methods, so in practice competence is determined. Since these abilities are the requirement of the physical therapy profession, the term professional competence is used.

Physical Therapy Competence.

1. American physical therapy standards.

Because there is no setting of a Thai physical therapy standard, all physical therapists in Thailand are controlled by the "Health Practice Control" Act, which states only a model definition and ethical principles. In order to demonstrate the full range of roles and responsibility of physical therapists, searching for other countries standard was done. American Physical Therapy Standard was used as an example because of its easy availability in journals.

In the United States, educational programs for the physical therapist must be qualified by the process of accreditation. The purpose of accreditation is to assure the quality of and to improve education programs through consultation and evaluation (Plagiarulo, 1986). In the accrediting process, standards are set to be used

as criteria for achievement which are called "Accreditation Standards for Physical Therapy Education Programs". Accreditation standards have undergone revision in keeping with the changing and expanding nature of physical therapy. The standard demonstrated in the following was the last revision and was the latest draft before submitting for adoption by the House of Delegates, American Physical Therapy Association, in June 1988 [Now it should be completely revised and enacted, but it is not be found in any literature] (Proposed Accreditation Standards for Physical Therapy Education Programs, 1987).

Standard for Performance of Program Graduates was one of four sections in Accreditation Standards for Physical Therapy Education Programs. Performance of program graduates was expressed as statements of roles and responsibilities of the physical therapist in the care of patient, education of practitioners and the public, research and scholarly activity. Performances were described in three categories as; patient care, the physical therapy delivery system, and the health care system and society. The details of standards for performance of program graduates in each categories are described in the Appendix A.

Before this revision of accreditation standard, American Physical Therapy Association developed the

"Standard for the Physical Therapy Practitioner". This standard was adopted by the Board of Directors in February 1972, and publicized in the Association's Journal (Standard for the Physical Therapy Practitioner, 1972). The standards contained nine categories of practitioner's performance such as; personal qualities, ethical conduct, patient management, administrative skills, interdisciplinary relationships, professional growth and continuing competency, research, consultation, and community responsibility. The details of each performance area is demonstrated in Appendix A.

2. Thai physical therapy competence.

Seminar session on the topics of "How to produce the qualified physical therapist" on May 6, 1987 (Mahidol University, Faculty of Medicine, Department of Orthopaedics and Physiotherapy, School of Physiotherapy, 1987) summarized the required characteristics of the qualified physical therapist and classified them into three domains that; the physical therapist should be able to;

- Cognitive - have basic theoretical knowledge in science and profession
- have creative thinking
- give health related physical therapy education to others health practitioner, individual, and community
- have basic knowledge of management and professional law
- understand his professional roles
- Affective - take a good responsible manner to his position, time
- practice in an ethical manner

- be a moral person by having following moral principles; The Four Divine State (compassion, lovingkindness, sympathetic joy, even-mindedness), The Four Paths of Accomplishment (will, effort, thoughtfulness, reasoning)
- have a good behaviors in interpersonal relation in the society and in his work
- self-acquisite new knowledge and follow the changing of the world situation
- beloved in profession
- have a good personality such as; well dressed and groom, decorum, speech, cleanliness, polite
- have physical and mental well being
- Psychomotor- have skill in history taking, physical examination, assessment, treatment planning, implementing treatment
- analyze patient's problems
- document the treatment program systematically
- apply physical therapy knowledge to preventive, curative, and rehabilitative health care for community

Nongyow Kulpatana (Prathomratana Saksri et al., 1987) in discussion session, she mentioned about the desired quality of physical therapist in the employer's opinion that the graduates should;

1. have problem solving ability
2. have knowledge and understanding and problem solving skill of community health problem
3. have theoretical knowledge and be skillful in treatment or evaluative procedure
4. be an active person
5. have discipline
6. take in responsibility to his role, be punctual
7. have ethical manner
8. understand local custom and tradition
9. dress in appropriateness, fitness, cleanliness
10. be complimentary
11. demonstrate the characteristics of teacher and have teaching skill
12. have knowledge about management and administration
13. have understanding about information system
14. have ability in self-acquisition of knowledge

Boonyong Wongrakmit (1985) suggested the desired competence of the health personnel that, they should be able to;

1. realize their responsibility to the society especially rural community which occupied by more than 80% of population
2. know and understand the problem and learn how to solve problem in the community with respect to humanistic basis
3. know and understand their role and responsibility in working as health team, cooperate with other health personnel happily, and apply basic management science in working
4. know, understand, and perform preventive and promotive as well as curative and rehabilitative care; and concern for individual person, family, and community health status
5. learn and adapt themselves to manage existing facilities, materials with high benefit and economy
6. know and understand problem solving method systematically as scientific and critical approach
7. learn and develop their own knowledge, moral, and professional attitude
8. know and understand teaching and training technique in order to dissipate appropriate knowledge and skill and promote appropriate attitude to other health personnel and people
9. engage in promotion of primary health care
10. have knowledge, attitude, and skill in profession which are appropriate to job requirement in rural area, and also manage health care unit in rural area as the head of the unit

3. Details of each competence area.

The above mentioned competence are the competence as a whole body of physical therapist. There are some literature which have stated the specific competence area in details.

3.1 Ethics. The World Confederation of Physical Therapy, WCPT (World Confederation for Physical Therapy, 1988) stated ethical issue for physical

therapist as follow;

1. Health care provided by physical therapist should not regarded to race, tribe, religious, politic, social state, sex, and age; because of universal demands of physical therapy service.

2. Physical therapist must recognize not only by his responsibilities but also by professional limitation that they must provide therapeutic regimen with an ethical manner only for the patients that referred or consulted from licensed physician or dentist. Exception is made on those physical therapy service provided for the purpose of prophylactic, and health promotion by informing or advising self-care knowledge. In these instances, physical therapist can perform directly to the client.

3. Physical therapist should provide physical therapy service with honesty and skillful in order to restore, rehabilitate, or maintain physical and mental well being of the patient that licensed physician or dentist consult.

4. Physical therapist must recognize the importance of disability prevention, and health promotion in community.

5. Physical therapist should continually maintain their highest standard of knowledge and expertise.

6. Physical therapist should respect patient's and family's belief in culture and religious.

7. Physical therapist should cooperate with other physical therapists and others profession in health care with loyalty.

8. Physical therapist should not allow any person to use their name in advertisement or any form of self-aggrandizement, except those action taken as role permitted by professional code of ethics of each country.

9. Physical therapist have right to keep for service charge appropriate to treatment given and should tell this cost before giving treatment to the patient.

10. Physical therapist should abide for personal and professional ethics which effect on the credibility of profession. Physical therapist should recognize that even one companion with noncompliance with professional ethics settling by national physical therapy association, will get harmful to the patient. So all physical therapists should comply with the conduct which the national physical therapy association enacted. However, they should not report unethical practice in the place that the patient or family live.

11. Physical therapist should take responsibility to people and other health professional colleagues by participation in the meeting about health needs of the society.

Thai physical therapist should abide for the Code of Ethics which enacted in the Ministry of Interior Bye laws as follow.

Physical therapist must not behave or perform in depreciation of professional value as follow;

1. advertising, using, employing or allowing someone to advertise his own properties of health care practice, knowledge, or ability by any form of advertising,
2. to be alcoholic or drug addicted that lead to deterioration of job performance,
3. use or encourage unregistered or unlicensed person to perform physical therapy practice,
4. intentional issue testimonial with untrue content or unfaithful advice or inform about professional circumstances,
5. perform physical therapy practice in public place or condition except in emergency condition, first aid or performing government, municipal or the Thai Red Cross assigned duties,
6. release confidential information of the patient which obtain from professional practice except those obtained written consent from the patient or when he must respond legally or as a way of sharing during patient care.

3.2 Specified types of physical therapy procedure. The treatment skill competence area will be delineated according to overall ability in performing each specified physical therapy therapeutic procedures. The following data were collected from the literatures. Ministry of Public Health Legislation of Physical Therapy Equipment (Sathien Vichairak, and Suebvong Vichairak, 1988) was enacted to describe the equipment which specifically performed in physical therapy service.

These procedures were; (1) shortwave diathermy machine, (2) microwave diathermy machine, (3) ultrasonic generator, (4) galvanic current therapy unit, (5) sinusoidal current therapy unit, (6) faradic current therapy unit, (7) diadynamic current therapy unit, (8) bio-feedback unit, (9) ultraviolet lamp (only those applied directly on human body), (10) whirlpool and Hubbard tank, (11) paraffin wax bath, (12) steam bath cabinet, (13) hydrocollator unit, (14) moist air heat therapy unit, (15) compressor unit for vascular condition, (16) electrical traction machine, (17) tilt table and tilt board

The listing is of less value because of no description of other manual therapeutic procedures which are the important elements of physical therapy service. However, the additional methods were stated in the book "Direction of job performance in the general and central provincial hospital under Ministry of Public Health, 1982" (Division of Provincial Hospital, Ministry of Public Health, 1982 quoted in Viyada Saksri, 1987). The physical therapy activities consist of;

13.1.1 Superficial heat application by;

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|----------------------------|--------------------------|
| (1) Hot water bottle | (2) Hot pad |
| (3) Electrical heating pad | (4) Hydrocollator |
| (5) Paraffin bath | (6) Agitated-water baths |
| (7) Moist-air baths | (8) Hot air baths |
| (9) Infrared radiation | |

13.1.2 Deep heat application by high frequency diathermy such as;

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|-------------------------|-------------------------|
| (1) Ultrasound | (2) Microwave diathermy |
| (3) Shortwave diathermy | |

- 13.1.3 Cold application by;
- (1) Cold pack
 - (2) Ice cube massage
 - (3) Cold immersion
 - (4) Ethyl Chloride spray
- 13.1.4 Electrical therapy by;
- (1) Interrupted direct current (I.D.C.)
 - (2) Faradic current (F.C.)
 - (3) Interferential current
 - (4) Iontophoresis
 - (5) Trans-electrical Nerve Stimulation
 - (6) Diadynamic current
- 13.1.5 Electrical diagnosis by;
- (1) Electromyogram
 - (2) Nerve Conduction Velocity (N.C.V.)
 - (3) Strength Duration curve (S.D. curve)
- 13.1.6 Hydrotherapy by;
- (1) Whirlpool
 - (2) Hubbard tank
 - (3) Pool
 - (4) Contrast bath
- 13.1.7 Actinotherapy by;
- (1) Infrared radiation
 - (2) Ultraviolet radiation
- 13.1.8 Manipulation and traction by;
- (1) Limb manipulation
 - (2) Spinal manipulation
 - (3) Spinal traction
- 13.1.9 Positioning such as;
- (1) Postural drainage
 - (2) Positioning to prevent deformities
- 13.1.10 Massage such as;
- (1) Stroking
 - (2) Kneading
 - (3) Petrissage
 - (4) Rolling
 - (5) Friction
- 13.1.11 Therapeutic exercise such as;
- (1) Passive exercise
 - (2) Range of motion exercise
 - (3) Strengthening exercise
 - (4) Co-ordinating exercise
 - (5) Breathing exercise
 - (6) Hemiplegic exercise
 - (7) Endurance exercise
 - (8) Pre- and post-[operative] exercise
 - (9) Amputee exercise (include pre- and post-prosthetic exercise)
 - (10) Gait training
 - (11) Postural training
 - (12) Activities daily living training
 - (13) Special technic in exercise

3.3 Health problems related to physical therapy. In this study, the planning and treatment of common diseases competence area is defined as global ability in planning and implementing the treatment for specified types of disease. There are many diseases that physical therapy involves in curation and rehabilitation.

These were listed during subgroup seminar session in the seminar on "Physical Therapy as Health Care for Quality of Life" at Khon Kaen University (Khon Kaen University, Faculty of Associated Medical Science, Department of Physical Therapy, 1987). This subgroup seminar on the topic of "Health Problems related with physical therapy care" had the purpose as to;

1. obtain primary data about the diseases needed physical therapy service and differentiate the roles of physical therapy in each disease,
2. find out and prioritize the diseases in which physical therapy can effectively take a preventive role,
3. apply as a guideline in survey and research.

The International Classification of Diseases (ICD) list of diseases was used to reclassified into three groups by considering on the burden of illness. The burden was based on the report of type of illness of inpatient who receive the health care during the year 1983-1985 collected by the Health Statistic Division, Ministry of Public Health; and the document of the diseases due to working during the year 1980-1984 of the Department of Labour, Ministry of Interior. These three groups were defined as follow; (a) the diseases are necessary to receive physical therapy service, (b) the diseases ought to be given physical therapy service, (c) the diseases which physical therapy take a responsibility for their consequence complication.

The above first draft of type (a) diseases listing was considered by what role physical therapy involves (the list of these diseases are shown in the Appendix B). Then, the diseases in which physical therapy takes a preventive role were prioritized as how much of burden, efficacy of physical therapy in prevention, feasibility of the applied technology, and concurrent of burden of illness to national socioeconomic. The list of these diseases are shown in the Appendix B.

3.4 Interpersonal relations and communication skills. The literatures in physical therapy field usually mentioned on communication skills rather than interpersonal relations. Sometimes these two skill were combined to be communication skills. There is no details description of Thai physical therapy competence in these areas. The Standards for Basic Education in Physical Therapy (1972) described about communication skills and individual patient services in the area of psychosocial health. The latter seemed to be the combination of the interpersonal relations competence and psychosocial therapeutic ability. The explanation of these two competence areas are shown in the Appendix B.

Dickson and Maxwell (1985) collected the content of interpersonal interaction skills from reviewing various author commending competence which necessary to

include in social skill training. The conclusion of these skill was proposed on the three sub-roles of the physical therapy which included; instructor, counsellor, and interviewer. The competence extracted from this conclusion are as follow;

(a) Skill basic to the process of relating to the patient

- (1) sensitivity to the way in which it can be conveyed by means of cues such as; eye contact, facial expression, touch, proximity, posture, and gesture.
- (2) ability in paying attention to the patient, to listen single-mindedly. This entailed the use of both nonverbal and verbal skills. The latter includes reinforcing utterance, reference to past statements, verbal following, reflecting statements and summaries.

(b) Effective questioning to the physiotherapy interview

(c) Skills needed for instructing and informing effectively

- (1) explaining and demonstrating in such a way as to maximize understanding on the part of the listener, whether it be patient, relative or other staff member.
- (2) skill of variation - skill in maintaining the attention, interest, and involvement of the person being linked to the study of clinical disciplines and the practice of the patient assessment.

Perry (1975) investigated nonverbal communication by observing patient-physical therapist interaction during treatment sessions, recording nonverbal behaviors capable of communicating, and interviewing the patient and therapist to discuss the nonverbal communication that occurred during the treatment. Twenty one patient-therapist interactions were recorded during observation. The observed nonverbal

behaviors of the physical therapists were categorized, according to function, as;

Instruction - any activity intended to show the patient what to do or how to do it

Attention gaining - any activity intended to gain the attention of the patient or to give attention to the patient

Rapport - any activity intended to create or maintain an atmosphere the treatment regimen

Caring - any act showing the patient that the physical therapist cares for him

Information gaining - any act designed to gain information from the patient or the therapist

Encouraging - any act specifically intended to encourage the patient to improve his performance

Approval - any indication to the patient that he has performed his task well

Reinforcing patient - any attempt to ensure that the patient would continue to execute his treatment program in acceptable manner

Evaluating - any activity designed to assess the present status of the patient

Reassurance - any attempt to calm or reassure a patient in order to relieve any anxiety that he might have

Explanatory - any activity intended to clarify or explain something to the patient

Punctuation - any gesture that seems to have no meaning but which occur during conversation and appears to punctuate the speaker's words

Rushed - any action which indicates that the therapist is rushed for time and cannot carry on the patient's treatment program as desired

Emphasis - any gesture or action which lends emphasis to the verbal message being spoken

Disappointment - any facial expression indicating that the person is unhappy or displeased with something

Acceptance - any activity, usually touch, which indicates to the patient that he is accepted as he is, with whatever deformities he might have

Reinforcing instruction - any action designed to ensure that the instructions being given will be followed by the patient

3.5 Continued education behaviors.

Sackett, Haynes, and Tugwell (1985) stated that the skills essential for continued effectiveness as a

clinician were clinical skills, skills in the critical appraisal of clinical evidence, and self-directed learning skills. In this study, continued education behavior is confined to self-directed learning skills.

Knowles (1975) listed the competence required for self-directed learning as follow;

1. An understanding of the differences in assumption about learners and the skills required for learning under teacher-directed learning and self-directed learning, and the ability to explain these differences to others.

2. A concept. . . as being a non-dependent and a self-directing person.

3. The ability to relate to peers collaboratively, to see them as resources for diagnosing needs, planning. . . learning, and learning and to give help to them and receive help from them.

4. The ability to diagnose learning needs realistically, with help from teachers and peers.

5. The ability to translate learning needs into learning objectives in a form that makes it possible for their accomplishment to be assessed.

6. The ability to relate to teacher as facilitators, helpers, or consultants, and to take the initiative in making use of their resources.

7. The ability to identify human and material resources appropriate to different kinds of learning objectives.

8. The ability to select effective strategies for making use of learning resources and to perform these strategies skillfully and with initiative.

9. The ability to collect and validate evidence of the accomplishment of various kinds of learning objectives.

Sackett, Haynes, and Tugwell (1985) summarized the self-directed learning skills as; (1) formulating clear learning objectives, (2) reading to solve problems, (3) highly selective browsing, (4) establishing and maintaining a personal information system, (5) carrying

out self-assessment, (6) executing personal behavior modification.

Titchen (1985) developed the in-service education model for use in physiotherapy department. The aims were to enhance critical thinking and to develop the attitudes, qualities, and skills required for self-initiated learning by using the following main model existed in the department; patient presentation, small group discussion, self-directed learning strategies, teach-back (a process where the learner talks to others about a topic which is new to that individual). She described the competence required by this education model as follow;

First, it is suggested that three attitudes must be held, namely that CE is necessary to maintain competence to practise; therapist should play an active part in it; and that they, as well as their employers or senior colleagues, are responsible for initiating and organizing it.

Second, the qualities that must be possessed are: self-discipline; interest; a desire to increase knowledge to maintain competence to practise; and a willingness to give time and energy.

Third, the necessary skills are the ability to self-diagnose learning needs; to use a library and look up references; to read critically and selectively; to organize events or meetings; and to approach resource people (interpersonal skills).

The Standards for Basic Education in Physical Therapy (1972) also stated about continued education behaviors as one component in the fifth standard category of professional growth (ability to increase the contribution of physical therapy to health care) which are seen in Appendix B.

3.6 Clinical problem solving skills. May and Newman (1980) defined problem solving as the internal and sequential of finding a solution to the problem which includes cognitive, affective, and psychomotor behaviors. They developed the model by combining problem-solving and decision making process. The problem solving competences were delineated according to those three domain and sequenced as; (1) problem recognition, (2) problem definition, (3) problem analysis, (4) data management, (5) solution development, (6) solution implementation, (7) outcome evaluation (see details in Appendix B).

Titchen (1987) demonstrated the problem-solving processes in three different conditions such as; patient treatment/management, problem-based learning, evaluation of practice. She found that the processes of these are similar. The six-steps problem-solving sequence in patient treatment/management was based on the work of the Education Development Unit for the Remedial Professions' team who designed the 'Care of the Elderly Course' (EDURP) (see details in Appendix B).

3.7 Personal qualities. Many personal attitudes, values, and behaviors necessary for Thai physical therapy were mentioned in the section of Thai physical therapy competence. There is no details and additional evidences specifically described the required personal qualities.

Related Literature of Follow-up Studies.

Vichitr Srisa-an (1980) classified follow-up study into two types; qualitative, and quantitative. There are many literature of follow-up study both foreign and Thai. In this literature review part, it will confine to the physical therapy and other health professions. The quantitative type of follow-up studies will not be mentioned because they have only career measurement.

1. Follow-up study in physical therapy field.

1.1 Study of Thai physical therapy. There was only one study in physical therapy education which was curriculum evaluation by Sutassanee Wiwatanapataphee (1984). She used CIPP Model to evaluate the context, input, process, and product of the physical therapy curriculum of the Faculty of Medicine at Siriraj Hospital. The data were collected from the study of curriculum materials; the survey of instructors' status, and teaching-learning situation; the interview and the survey of opinion of curriculum experts, instructors, students, graduates, and graduates' supervisor concerning curriculum objectives and structure, teaching-learning situation, and graduates' characteristics.

The population of the study were selected groups of experts in physical therapy curriculum, instructors,

students, graduates, and graduates' supervisors. One interview schedule and five types of questionnaire were used in the study. Percentage, arithmetic means, standard deviation, t-test, one way analysis of variance and Scheffe's test were employed to analyze the obtained data.

The only part of product evaluation will be demonstrated here. In the part of product evaluation, the data were obtained from two sources, graduates and graduates' supervisors. All of the graduates who completed during 1967-1982 were eligible for study. One hundred twenty of the one hundred seventy (70.59%) responded to the mailed questionnaire. The graduates' supervisors were the hospital directors or the head of the graduates. The position and status of the graduates' supervisors was not defined.

The supervisors evaluated the graduates on the actual and desirable general characteristics of physical therapist, and the actual and desirable characteristics specified to the physical therapist. However, the supervisors did not used one form for rating one graduates (i.e. one form was used to evaluate the characteristics of overall physical therapy graduates). So the perception of overall Siriraj graduates were received. The graduates rated themselves on the degree of acquired characteristics from the program.

The five points rating scale of 19 items and 12 items of characteristics derived from the curricular objectives were rated by the supervisors and the graduates accordingly. The statement of characteristic rated by the graduates and their supervisors were not the same. Most of them were in affective and cognitive domain. The data were summarized in arithmetic means and standard deviation.

The finding showed that the graduates' characteristics were rated quite high by their supervisors but significantly lower than the desirable characteristics. The acquired characteristics were in the medium value. The quality of the product met the curricular objectives. However these finding were not analysed to focus the causes by computing association with the context, input, and process.

1.2 The studies of foreign physical therapy. Four studies of foreign physical therapists' professional competence were reviewed. One was studied in Canada (Aston McCrimmon, 1986), three were in the United States (Nelson, 1971; Conine, 1972; Larson and Davis, 1975). The Canadian study was not aimed on evaluation of physical therapist' professional competence solely, in fact, was to collect and edit a comprehensive list of physical therapy competence. These are the useful guideline for competence delineation and instrument used.

One of the three American studies did not report the finding and analysis method (Nelson, 1971). All of these three studies collected other graduates' profile and opinion but did not analyse the correlation of the educational factors and the professional competence. One study was done on the physical therapy assistants (Larson and Davis, 1975).

1.2.1 Conceptual framework. Larson and Davis (1975) demonstrated the concept framework of their study that the relevance of a curriculum could be judged in terms of how well the graduates and their supervisors believed the assistants had been trained in performing specific tasks representative of physical therapist assistants' responsibilities. This relevancy was showed by the area of correspondence between competence learned in the program and on-the-job requirement (see model in the figure 2.1).

The discrepancies between the competence learned in the program and those required on the job were considered as a measure of irrelevance of the curriculum. These feedback information were evaluated and given for decision making on curriculum modification by the program faculty.

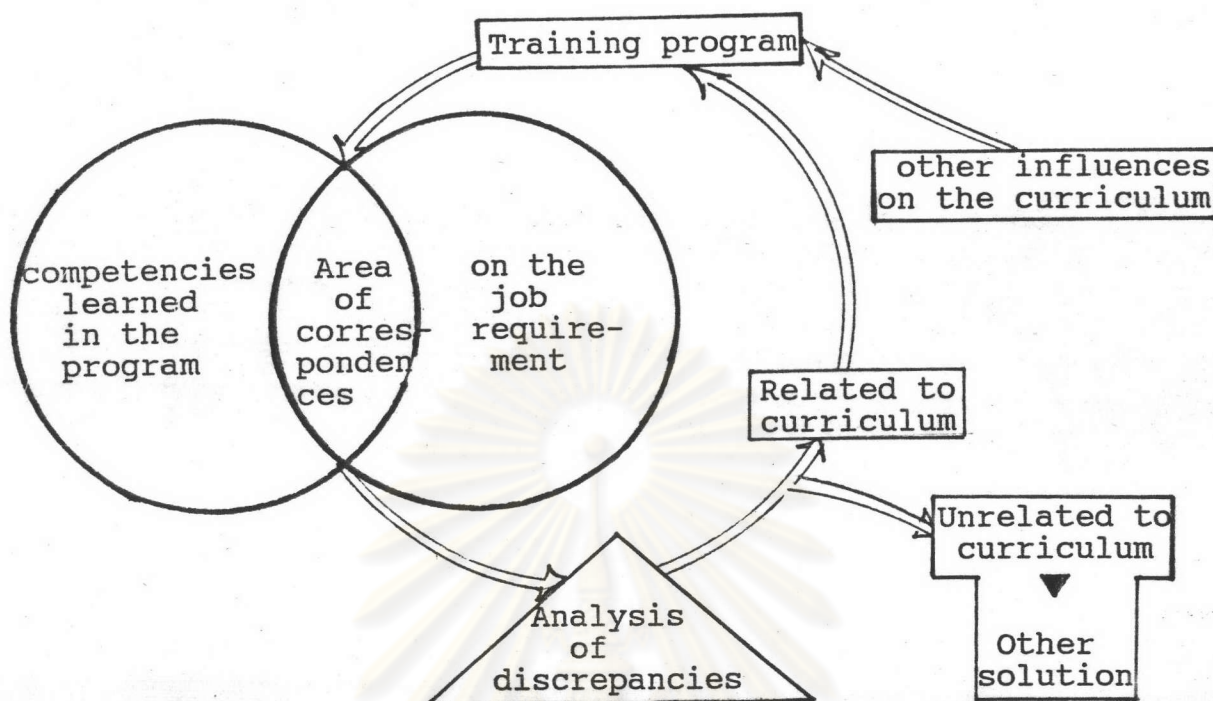


fig. 2.1 Conceptual framework of Larson and Davis study (1975)

Conine (1972) made the concept that the achievement of the curricular objectives (Indiana University) was evidenced by the activities, career, and opinions of the graduates. The basic assumption of her conceptual framework were;

1. Graduates are capable of evaluating their own educational experience and are capable of doing so even when one or more year have elapsed.
2. Follow-up studies are a practical means of determining strengths and weaknesses of educational programs.
3. The competence rated by the employers as having been demonstrated by the graduates were achieved through the educational program of Indiana University and not through other experiences.

Nelson (1971) used survey of graduates as only one of many methods for curriculum evaluation which the above two studies did not mention. The product appraisal

were not only confined to the program graduates but also students.

1.2.2 Sample. All of the American studies surveyed on all classes of graduates since establishment of the school which were more than one class and more than one year of experience. The determination of how many classes of graduates should be included in the study was not stated strictly elsewhere. If the perception of competence acquired from school is measured, the credibility will be determined by the memory of the graduates. However, it can be assumed that the graduates can memorize as given by Conine (1972). Even if the assessment is directly done on the actual performance, the measured performance will not be purely received from the school as assumed in the Conine study. Then, the year of experience should be concerned very much.

The follow-up manual in the study of Larson and Davis (1975) recommended that graduates should be surveyed after about one year of work to ensure that they have had enough time to become acclimatized but have not yet lost the ability to distinguish between the skills they acquired on the job and those acquired during their training.

The supervisors were included in all studies for making confirmation of data and receiving the opinion of

supervisors in other data. Nelson (1971) also included students, faculty and others document of admission information and trends in physical therapy in her studies as a system of curriculum evaluation. All studies did not stated about inclusion and exclusion criteria.

1.2.3 Outcome measures.

1.2.3.1 Primary outcome

measures. The competence was used as primary outcome measure in all studies but in different questioning. In the Canadian study, the graduates and physical therapists in Quebec rated competence according to their perceived level of importance to physical therapy practice and self-evaluation of their level of competence.

The graduates in Nelson study rated their knowledge and ability to perform in subject area listed (not competence).

In Conine study, the graduates rated their degree to which acquired from school. The employers rated the graduates on the degree to which demonstrated.

In Larson and Davis study, both graduates and their supervisors rated on graduates' level of independence of professional competence.

1.2.3.1.1 Competence

delineation. The competence were derived from one main

source of curriculum (not for Aston-McCrimmon). The content areas derivation was used by Nelson. Larson and Davis did not specified the sources. The detailed competence delineation were presented by Aston-McCrimmon and Conine, the former was the best example. The various sources for derivation were task analysis, standard of training protocols, course outlines (objective, content), occupational studies, job descriptions.

Only one study (Aston-McCrimmon) showed validation of competence statement by group of physical therapy experts.

1.2.3.1.2 Competence

component. Almost all studied on combined competence areas. Two did not defined the categorization of the competence (Nelson, 1971; Larson and Davis, 1975).

Conine (1972) listed 29 specific competence in 4 areas as; patient care, administration, teaching, and personal and professional growth.

Aston-McCrimmon (1986) categorized 224 competency statements into more specific areas than conine. The definitions of these 11 competence categories were described in the Appendix C.

1.2.3.1.3 Instrument.

Rating scale was used as measuring the competence in all studies but in different points and wording. They were

ranged from; (1) ordinal type 3 points as; extensive, moderate, little or none.; (2) ordinal type 4 points; inadequate, adequate, superior, and excessive; (3) ordinal type 8 points; from "lack of competence (or not importance)" represented by "1" to "high level of competence (or very importance)" represented by "8". All were continuous scale.

1.2.3.2 Secondary outcome

measures. The type of data obtained from graduates on each study were based on the rational of that study. The main objective was evaluation of graduates' status and activities for recommendation for further change. The commonly data obtained were; demographic data, recommendation for curriculum change, employment data, education since graduate, extracurricular activities (particular in professional organization).

1.2.4 Analysis.

1.2.4.1 Competence data.

Conine (1972) analyzed competence by determining on the agreement of the graduates and their employers as how attainable of the graduates to the competence listed in the questionnaire. The finding showed that, in the attainment group, 80% and 75% of agreement of the graduates and their supervisors respectively were used as criteria. The more concern made on the non-attainment competence, if at least 10% of the graduates and 10% of

the employers indicated, those competence item were recommended for change.

Larson and Davis did not analyse directly on the professional competence rated, but asked the recommendation on task needed increased emphasis.

Aston-McCrimmon summarized the level of competence and importance as mean, standard deviation and range mean. An average mean score of 6 (from 8 points) or greater was considered to indicate a consensus of high importance or of a high level competence. An average mean score of less than 6 was considered to be an indication of a consensus of a lower level of importance or competence.

In the first two studies, they analyze the data as number of competent physical therapist but the last one consider the competence of all physical therapist.

Further analysis of correlation or difference were not done in almost all studies. Larson and Davis showed analysis for the relation of the frequency independence of professional competence and curriculum recommendation to type of facility. But the result were not reported. Aston-McCrimmon used a one way analysis of variance (ANOVA) to test for significant difference between the importance and competency rating of the respondents grouped according to the years of

professional practice and the respondents grouped according to position.

2. Study of other health profession.

Two studies of nurse , three of physician are reviewed. In three studies of medical graduates; one evaluated the competence of first graduates of newly developed curriculum of Khon Kaen University (Chaloem Varavithya, Boonnart Laisanitserikul, and Thongchan hongladarom, 1981); one evaluated the interns and the last year medical student from every medical school in Thailand (Arunee Vachirapornthip, Ukrit Plengvanich, and Channivat Kasemsant, 1979); the last studied graduates of Chulalongkorn Medical Faculty which included medical and medical technology graduates (Banterng Ratchatapithi et al., 1986). In two studies of nurse; one evaluated the graduates of BSc. Program in Nursing and Midwifery of Mahidol University (Sudthiratana Pimpong et al., 1984); another studied the graduates from Bachelor degree of Education' program (Nursing) of Faculty of Education, Chulalongkorn University (La-iad Jamjantara, 1983).

Of five studies, two studied the educational factors and correlated them with the competence.

2.1 Conceptual framework. The study of the graduates of Chulalongkorn Medical Faculty by Banterng Ratchatapithi et al. (1986) demonstrated the concept

that; evaluation of the graduates' quality and the effected factors were the initial process in curriculum development. The qualities to be evaluated covered the broad area of characteristics such as; knowledge, ability, moral, work performance, and quality of life. The evaluation concerned not only the graduates' qualities but also the student's qualities development. The study of the effected factors covered graduates background, curriculum and teaching-learning, quality of teacher, internal and external context.

2.2 Sample.

2.2.1 Graduates. Almost all studies included the graduates who had worked or completed for one year except the study of La-iad Jamjantara and Banternng Ratchatapithi et al. The graduates in Banternng Ratchatapithi et al. study completed during 1979-1983, five classes, which included more number of classes than other. However this was less than in the physical therapy study mentioned in the previous section. Exclusion and inclusion criteria usually were not defined and all target population were eligible to studied. The graduates who were working were only included in the studies, except in the Banternng Ratchatapithi et al. study. It included both graduates in working market and in Graduate School in Thailand. In Mahidol nursing study, Sudthiratana Pimpong sampled 96 from 119 target

population by inclusion only the graduates who worked in Nursing Service Division of Siriraj Hospital.

All studies did not mention about calculation or rationale for justification of sample size. In Chulalongkorn Medical Faculty study, the criteria of selection of sample and justification of sample size were as follow;

- (a) The graduates in working place, sampling the number of 20-50 (included all in the case that less than 20) from each field (physician, medical technologist), and all fields should have the total number of 100-200 (included all when less than 100).
- (b) The graduates in graduate school; the same as (a).

Arunee Vachirapornthip et al. (1979) selected 200 from 459 graduates and allocated by using stratified random sampling proportion of the graduates of each school.

2.2.2 Other population. The

supervisors of the graduates were surveyed by all studies but the criteria for selection were not specified. Because the position and acquaintance of the supervisors influenced on the rated competence of the graduates. However the baseline personal data were kept. One to one rating (one supervisor rate one graduates) were used by only two studies (Banterng Ratchatapithi et al., 1986; La-iad Jamjantara, 1983).

The Chulalongkorn medical faculty study also

obtained the data from students and teacher. No selection criteria were posted. Development of competence of student in each class were also obtained.

The Khon Kaen study (Chaloem varavithya et al., 1981) also included peer Inturn, and nurse to evaluate graduates' competence.

2.3 Outcome measure. All studies used questionnaire as collecting of overall data. Specified types of instrument were used for measuring different data such as; rating scale for competence, closed or opened ended question for measuring respondents' opinion. The Chulalongkorn medical faculty study also used document analysis.

2.3.1 Primary outcome measure.

**2.3.1.1 Dependent variables
(competence).**

2.3.1.1.1 Competence delineation. Two studies derived the competence from Medical Council Intern Standard (Arunee Vachirapornthip et al., 1979; Chaloem Varavithya et al., 1981); one from the university purposes (Banterng Ratchatapithi et al., 1986); one from curricular objectives which were received by interviewing with the head of Academic Affair Department, Bangkok Nursing College (La-iad Jamjantara, 1983); the last one did not explain the source.

The studies that used Intern Standard were not necessary to validate and correct the wording. Only one study report validation of competence by group of ten experts which contained curriculum administrators and faculty in any field of nurse (La-iad Jamjantara, 1983).

2.3.1.1.2 Competence components. All studies demonstrated categorization of competence. One competence area had more than two competence item which had the advantage of high reliability (one competence represented by many items or statements). The study of Sudthiratana Pimpong et al. (1984) did not state competence clearly and did not category them. Almost all studies did not differentiate the competence as domain of cognitive, affective, and psychomotor except those used Intern Standard.

2.3.1.1.3 Instrument for measuring competence. Rating scale were used as main tool for measuring competence. Another preferred tool was closed or opened end question.

Two studies did not report the tools in details of numbers of point, type of tools, used for specific competence area (Arune Vachirapornthip et al., 1979; Sudthiratana Pimpong et al., 1984).

La-iad Jamjantara (1983) used 5 points rating scale. Seven points rating scale was mainly used in

Banternng Ratchatapithi et al. study for measuring competence of graduates, and development of students which almost were in affective (attitude, behaviors). Chaloem Varavithya et al. (1981) used closed end question to measure psychomotor skill in medical procedure, minimum knowledge in interpretation of laboratory data, human relationship, personality and creativity, and used rating scale of 5 points to measure clinical performance in term of medical problem solving ability.

2.3.1.2 Independent variables.

Sudthiratana Pimpong et al. (1984) obtained the data of nursing graduates' attitude toward curriculum. Type and specification of tools were not reported.

Banternng Ratchatapithi et al. (1986) gave details of independent variables and specified types of measurement as showed in the table 1.

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Table 2.1 Independent variables, measurement, and sources in the study of Banterng Ratchatapithi et al. (1986)

Variables	Measurement	Sources
1. Background of graduates and students		
(1) Demographic; sex, religious, race etc.	questioning	student & graduate
(2) Family background; occupation, education of parents etc.	questioning	student & graduate
(3) Secondary education; type of school, grade etc.	questioning	student & graduate
(4) Entrance examination; selection of field etc.	questioning	student & graduate
(5) Academic success in BSc. program; grade etc.	questioning	student & graduate
(6) Extracurricular during study	questioning	student & graduate
2. Curriculum and teaching-learning		
(1) Content arrangement in general education and profession courses	analysis	curriculum guide
(2) Appropriate and modernization of curriculum	rating	faculty
(3) Values of each subject	rating	student, graduate, faculty
(4) Quality of teacher	questioning	student, graduate, faculty
(5) Learning style of students and graduates	questioning	student, graduate, faculty
(6) Interaction with teacher	questioning	student, graduate, faculty
(7) Value of teaching, learning and interaction	rating	student, graduate, faculty

Table 2.1 (continued)

Variables	Measurement	Sources
(8) Student activities participation	questioning	student, graduate,
(9) Values of student activities	rating	student, graduate, faculty
(9) Values of student activities	rating	student, graduate, faculty
(10) Administration of curriculum	questioning	student, graduate, faculty
3. Faculty		
(1) Qualification	questioning	faculty
(2) Academic position	questioning	faculty
(3) Satisfaction to faculty	rating	student & graduate
(4) Confidence to faculty	rating	employer
(5) Attention in teaching	rating	student & graduate

2.3.2 Secondary outcome measures. La-iad Jamjantara (1983) obtained data about graduates' status (position, income, education after graduation) and benefit of acquired knowledge or learning experience to present job performance.

Sudthiratana Pimpong et al. (1984) obtained the data about graduates' status (not reported), graduates' opinion on understanding of curriculum philosophy and objectives, confidentiality in job performance and factor influenced on it, the courses needed improvement in content and teaching method, fairness of evaluation in theory and practical course work.

2.4 Analysis. Competence in affective and cognitive domain and overall competence (combined domain or competence in complex task which demonstrated in La-iad Jamjantara study) were summarized in mean and standard deviation except the cognitive competence in Arunee Vachirapornthip et al. study and affective competence in Chaloeam Varavithya et al. study which summarized as percentage.

Competence in psychomotor domain were summarized in percentage of attainable competence.

Banternng Ratchatapithi et al. study and La-iad Jamjantara study interpreted the competence upon presetting criteria.

The comparison of competence were usually done between graduates' perception and supervisor' opinion. The two studies which used competence derived from Intern Standard also compared the result with the criteria of competence defined in that standard.

Correlational analysis was done only in two studies. Sudthiratana Pimpong et al. (1984) analysed the relationship between attitude toward curriculum and job performance effectiveness by using linear regression.

Banternng Ratchatapithi et al. (1986) analysed the correlation on the following steps;

- (1) Analyse on clustering of independent and dependent variables into factor
- (2) Analyse the relationships between the factors in independent variables and the factors in dependent variables
- (3) Analyse the partway of effect from the independent factors to dependent factors

These three steps analysis were simultaneously performed by using computer statistical package of partial least square analysis.

2.5 Other studies. Malee Phulklontan and Chaloe Varavithya (1984) assessed the 6th year medical students and interns medical competence against Medical Council Intern Standard and also compared the clinical competence between the 6th year medical students and interns of Faculty of Medicine Chulalongkorn and Khon kaen University in 1981-1982 academic year. All competence area interested in this study were in psychomotor domain which contained 12 items of skill in using instrument and interpretation, 3 items of skill in sending for and interpreting laboratory investigation, 26 items of skills in performing emergency treatment, 24 items of skill in diagnosis and treatment of common diseases, and 37 items of skill in performing medical procedure. In gathering data, all samples were assessed by self reporting technique in questionnaires. This study used rating scale of 3 points described as; 0 - cannot perform, 1 - not confidence to perform, 2 - can perform by himself. The competence rated as ordinal

continuous data. So they were summarized in mean and standard deviation. This differed from the study of Chaloeem Varavithya et al. (1981) which used closed ended question and summarized in percentage.

Another interesting point of this study was the analysis of relationship of competence with experience in those skill item. The data obtained were level of three kinds of experience as; 1) experience by seeing rated on three points, classified as; have never seen, have ever seen 1-3 cases, have ever seen more than 3 cases; 2) experience by assisting in performance, classified as; have never assisted, have ever assisted 1-3 cases, have ever assisted more than 3 cases; 3) experience by doing by themselves, classified as; have never done, have ever done 1-3 cases, have ever done more than 3 cases.

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