CHAPTER III

RESEARCH METHODOLOGY

3.1 RESEARCH QUESTION

In the perspectives of the Faculty Staffs and the dental practitioners: what competencies should Chulalongkorn University new dental graduates have?
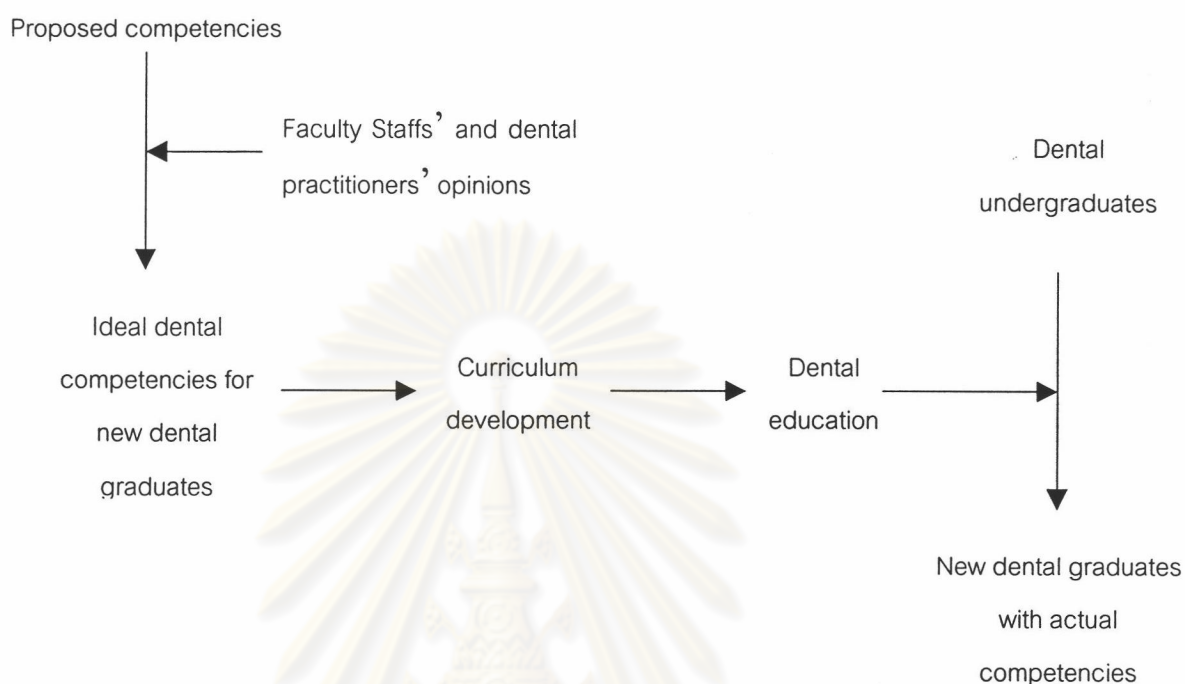
3.2 RESEARCH OBJECTIVE

To assess the opinions of the Faculty Staffs and dental practitioners about the competencies standards for new dental graduates in 4 domains

- Assessment of the patient and the oral environment

- Establishment and maintenance of a healthy oral environment

- Restoring of form, function and esthetics

- Community Dentistry

covering 15 major competencies

3.3 CONCEPTUAL FRAMEWORK

Proposed competencies

Faculty Staffs' and dental practitioners' opinions

Dental undergraduates

Ideal dental competencies for new dental graduates

Curriculum development

Dental education

New dental graduates with actual competencies

3.4 OPERATIONAL DEFINITIONS

Competent

Competent is the midpoint of the continuum of professional growth from novice to expert. The competent individuals are capable of independent performance. They are characterized by appropriate clinical judgment under normal circumstances, understanding what actions are necessary, recognizing when the challenge is beyond their talents, managing tasks that are not going well, and finding intrinsic reward in their own good performances. This is when dental students are ready for graduation.

Competencies

The behaviors expected of beginning independent practitioner.

Competencies combine skills, understanding and professional values and are performed independently in realistic settings.

Competency statements

Statements describing the abilities needed to begin the independent practice of Dentistry.

New dental graduates

Dental students who completed the programme of Doctor of Dental Surgery, from the Faculty of Dentistry, Chulalongkorn University.

Faculty staffs

Full time faculty staffs who are currently working in 10 clinical departments in the Faculty of Dentistry, Chulalongkorn University.

Dental practitioners

Dentists who are currently practice Dentistry, both in the government and/or in private sectors (in Thailand).

3.5 RESEARCH DESIGN

The research design was a cross-sectional descriptive study.

Questionnaires were used as the instruments for the collection of the data.

The questionnaire designed for the Faculty staffs consisted of two parts. The first part consisted of items of competency statements, which were considered general competency for all Faculty Staffs to give opinions. These competency statements included three major competencies in the first domain, "Assessment of the patient and the oral environment", and three major competencies in the second domain, "Establishment and maintenance of a healthy oral environment".

In the second part, items of competency statements in the major competencies that were related to the specialty of each department were arranged. Faculty Staffs in each department would respond to the

questionnaire, which consisted of competency statements that are related to the specialty of that department. These competency statements were supporting competencies for each major competency in the domain of "Establishment and maintenance of a healthy oral environment" or "Restoring of Form, Function and Esthetics" or "Community Dentistry".

The questionnaire designed for the dental practitioners was different from the Faculty Staffs in that all items in all domains were arranged for the dental practitioners to give consideration.

Details of the domains, major competencies and department being assessed are shown in Table 3.1

Table 3.1 : The domains, major competencies and departments being

assessed

Domains	Major competencies	Departments being assessed
Assessment of the patients and the oral environment	Examination of the patient	All Departments
	Diagnosis	
	Treatment planning	
Establishment and maintenance of a healthy oral environment	Prevention of diseases and maintenance of health	All Departments
	Emergency situation	
	Control of pain and anxiety	
	Endodontic therapy	Operative Dentistry
	Periodontal therapy	Periodontology
	Surgical Therapy	Oral Surgery
	Occlusal/ temporomandibular therapy	Occlusion
	Orthodontic therapy	Orthodontics
	Oral Mucosal Therapy	Oral Medicine
Restoring of form, function, and esthetics	Restorative therapy	Operative Dentistry
	Prosthodontic therapy	Prosthodontic
Community Dentistry	Community involvement	Community Dentistry

3.6 POPULATION AND SAMPLE

3.6.1 TARGET POPULATION

The target populations to whom the result will be inferred in this study are full-time Faculty Staffs of the Faculty of Dentistry, Chulalongkorn University, who are responsible for teaching clinical sciences and Thai dental practitioners who practice Dentistry in Thailand.

3.6.2 STUDY POPULATION

The investigation aimed to include all of the full-time Faculty Staffs, in 10 Departments of the Faculty of Dentistry, Chulalongkorn University and dental practitioners who were currently practice Dentistry all over Thailand both in the government and/or in private sectors. While the study included all full-time Faculty Staffs (except those who fit in the exclusion criteria), this study aimed to use simple random sampling technique to select dental practitioners from the combined lists of the members of the Dental Association of Thailand.

3.6.3 ELIGIBILITY CRITERIA

Inclusion criteria:

1. Full time Faculty Staffs who were currently working in the following Departments: - Departments of-

Community Dentistry	Orthodontics
Occlusion	Pediatric Dentistry
Operative Dentistry	Periodontology
Oral Medicine	Prosthodontics
Oral Surgery	Radiology

2. Dental practitioners who were currently working in governmental agencies or organizations and/or in private sector.

<u>Exclusion criteria</u>

1. Faculty staffs who were working in departments other than the 10 Clinical Departments (specified in Inclusion criteria)

2. Faculty staffs who were absent from work, e.g., on sabbatical leave, study abroad, etc.

3. Dental practitioners who were not currently practice Dentistry in Thailand.

3.6.4 SAMPLE SIZE DETERMINATION

This survey expected average positive response of 90 percent of items in the questionnaire from dental practitioners. Positive response meant response favorable or agreeable to the statements of the items (i.e., "agree" and "mostly agree"). Confidence interval for this study was 95% and precision of the survey was within ± 5%. The sample size calculated according to Lwanga, SK. and Lemeshow S.[47] was 138. The calculation is shown below.

$$n = z^2_{1-\frac{\alpha}{2}} \frac{P(1-P)}{d^2}$$

where
$z^2_{1-\frac{\alpha}{2}}$ = 1.96

P = 0.90

1-P = 0.10

d = 0.05

However, the expected response rate for the mailed questionnaires was 50%, the needed sample size was 276.

3.7 MEASUREMENT

3.7.1 OUTCOME MEASURES

Outcome attributes being measured are:

3.7.1.1 BASELINE DATA

Data about personal background of each group of respondents were obtained as followed;

3.7.1.1.1 Faculty staffs

- Demographic: sex, age, and previous residence.

- Academic background: year of graduation, the name(s) of University graduated from, higher degree(s) of education

- Working status: year of working as a civil servant in Faculty of Dentistry, Chulalongkorn University, previous works, characteristic of dental practice in other clinics and hospitals, present academic position in the dental school, previous and present administrative work responsibilities.

3.7.1.1.2 Dental practitioners

- Demographic: sex, age, and previous residence.

- Academic background: year of graduation, the name(s) of University graduated from, higher degree(s) of education

- Working status: type(s) and place(s) of work, year of experience and characteristic of dental practice.

3.7.1.2 DEPENDENT VARIABLES

The outcomes of this study were the opinions made by the faculty staffs in 10 clinical departments and the dental practitioners. Two types of opinions were assessed. The first one was the level of agreement to each competency statement provided. The second were the opinions in written form

to give comment to each competency statement and to give comment whatever they concerned about competencies.

3.7.2 MEASURING TOOL

3.7.2.1 CONSTRUCTION OF THE QUESTIONNAIRE

The instrument used in this study was a survey questionnaire. Lists of competencies standards were adapted from the competencies standards for the new dentists of 3 dental schools in the United States of America, which include:

- Baylor College of Dentistry [36]
- School of Dentistry, University of Minnesota [48]
- The University of Texas – Houston Dental Branch[49].

Competencies standards from the three dental schools were used to assess the opinions of full-time Faculty Staffs of 10 Departments of the Faculty of Dentistry, Chulalongkorn University and the dental practitioners. The adapted competencies standards were translated into Thai language.

Table 3.2 summarized the organization of the competencies standards of those 3 dental schools.

Table 3.2 : Organization of the competencies standards of Baylor College of Dentistry, School of Dentistry, University of Minnesota and The University of Texas- Houston Branch.

Dental School	Domains	Major Competencies	Supporting Competencies
Baylor	6	20	136
Minnesota	7	26	184
Texas	-	16	109

For the appropriate length of the questionnaire, the author decided to survey the opinions for competencies standard only in the clinical areas, which covered 4 Domains according to Baylor College of Dentistry organization.

When submitted the first thesis proposal, the items in the questionnaire were prepared by first compared the supporting competency statements of 3 dental schools. Then statements were grouped according to similarity or differences of the statements details. Lastly the chosen statements were translated in to Thai. At that time the number of competency statements to be considered came out to be 160 items. The rationale was that at that time the aim was to assess the opinions of the faculty staffs only. The design of the study of the first thesis (study) proposal required the Faculty Staffs in each department to consider all general competency statements in the first part which came out to be 66 items, and also to consider competency statements that were related to the specialty of that department in the second part which came out to be 2-25 items. By that design, the total items for each department to read and consider would be acceptable, so it would be appropriate to go into detail as much as possible.

However, after submitted the first proposal, the research project plan was altered. The study population was extended to include faculty staffs as well as dental practitioners. As dental practitioners work in general area in real practice, it would be appropriate to present all competency statements for them to comment. The resulting questionnaire would contain so many items that it would be unpleasant to complete the whole questionnaire. So the competency statements prepared in the first stage were to be pared down as much as possible. Some adjustment was made by combining some of the statements as well as by cutting out some statements that were considered to

give too much detail. The initial total number of competency statements that appeared in the questionnaire for the dental practitioner then came out to be 116 items dividing in to 15 major competencies. Comparison of "equivalent" competencies items from 3 American Dental Schools, items in the first proposal and items in the questionnaires is shown in Table 3.3. Although the number of the items was considered too many to become a good questionnaire, decision was made to keep the questionnaire without further cut. Many reasons supported the decision. Firstly, those 15 major competencies area that were chosen for the study would cover all of the disciplines in the clinical area which the dental school took direct responsibility in running the courses. Second, it was not known whether the dental practitioners would cooperate and gave good response to the repeated procedure to complete the list of all of the competencies in the future or not. To try to gather most of the information needed in fewer repeated procedure should benefit more, both for the dental school as a user of the study result and the dental practitioner to give cooperation. To make the questionnaire easier to respond, the competency statements were grouped and prepared in a format for measurement in an easy form.

Table 3.3 : Comparison of "equivalent" competencies items from 3 American

Universities items in the first proposal and items in the questionnaire

Items submitted in the first proposal	Items from U. of Minnesota	Items from Baylor college	Items from U. of Texas	Items in the questionnaire
Examination of the patient				
1.1	1.1	3.2,3.5	1.1	1.1
1.2	1.2	3.3	1.2	1.2
1.3	1.3	3.8	1.4	1.9
1.4	1.4	3.6	1.5	1.3
1.5	1.5		1.8	1.6
1.6	1.6	3.7	1.5	1.4
1.7	1.7	3.9		1.5
1.8	1.8	3.10		1.7
1.9	1.9	3.4	1.3	1.8
Diagnosis				
2.1	2.1		1.2,1.10	2.1
2.2	2.2	4.1	1.11	2.2
2.3			1.12	2.3
2.4	2.3			2.4
2.5	2.4			2.5
2.6		3.5		
2.7	2.5	4.2		
2.8	2.6	4.3	6.1	
2.9	2.7	4.5		
2.10	2.8			
2.11		4.6	1.9	
2.12	2.9	4.7		
2.13	2.10	4.8		
2.14	2.11	4.4		
2.15	2.12	4.9		
2.16	2.13	4.9		
2.17	2.14	4.10		
2.18	2.15	4.11		
2.19	2.16			
2.20	2.17	4.12		2.7
2.21	2.18			
2.22	2.19			
2.23		4.13		2.6

Table 3.3 : Comparison of "equivalent" competencies items from 3 American

Universities items in the first proposal and items in the questionnaire

Items submitted in the first proposal	Items from U. of Minnesota	Items from Baylor college	Items from U. of Texas	Items in the questionnaire
Treatment plan				
3.1	3.1	5.1	3.5	3.1
3.2	3.2	5.2	2.1	3.2
3.3	3.3	5.3		
3.4	3.4	5.4	2.2,2.4	3.3
3.5	3.5	5.5	2.3	3.4
3.6		5.6	2.5	3.6
3.7		5.7		3.5
3.8				
Prevention of disease and maintenance of health				
4.1	4.1	6.1	3.1	4.1
4.2	4.2	6.3	3.2	4.2
4.3	4.3	6.7	3.6	4.3
4.4	4.4	6.5	3.4	4.4
4.5	4.5	6.6	3.7	4.5
4.6	4.6		3.3	
4.7	4.7		3.8	4.6
Periodontal treatment				
5.1	5.1			8.1
5.2	5.2	10.1	6.2	8.2
5.3	5.3	10.6	6.3	8.3
5.4	5.4	10.6	6.3	
5.5	5.5			
5.6	5.6	10.4	6.2	8.4
5.7		10.5	6.4	8.5
Caries management				
6.1		8.1		13.1
6.2	6.1	8.2		13.2

Table 3.3 : Comparison of "equivalent" competencies items from 3 American

Universities items in the first proposal and items in the questionnaire

Items submitted in the first proposal	Items from U. of Minnesota	Items from Baylor college	Items from U. of Texas	Items in the questionnaire
Occlusal therapy				
7.1			9.1	10.1
7.2		13.1	9.1	10.1
7.3	7.1			
7.4			9.2	10.2
7.5			9.4	10.6
7.6	7.2			10.6
7.7			9.5	10.4
7.8		13.2,13.3	9.3	10.3
7.9			9.6	10.3
7.10			11.7	10.7
Restorative therapy				
8.1	8.2	16.1,16.4	7.9	
8.2			7.6	
8.3	8.4	16.3	7.1	13.3
8.4	8.1	16.1	7.8,7.9	13.4
8.5	8.5	16.4	7.2	13.5.1-4
8.6		16.4	7.3	13.5.5
8.7	8.17,8.19	16.7		13.6
8.8	8.18			13.7

Table 3.3 : Comparison of "equivalent" competencies items from 3 American Universities items in the first proposal and items in the questionnaire

Items submitted in the first proposal	Items from U. of Minnesota	Items from Baylor college	Items from U. of Texas	Items in the questionnaire
Prosthodontic therapy				
9.1	8.2	16.4	7.9	
9.2			8.1	14.1
9.3			8.7	14.1
9.4	8.4	16.3		14.4
9.5	8.3	16.2		14.3
9.6			8.5	14.2
9.7			8.6	14.1
9.8	8.5		7.5,8.3	14.6
9.9	8.6			14.5
9.10	8.7			14.7
9.11	8.11	16.5	8.12	14.9
9.12	8.10			14.8
9.13	8.9			14.10
9.14	8.8			14.10
9.15	8.12		8.10	14.11
9.16		16.4		14.13
9.17		16.4	7.4	14.13
918	8.13		8.2	14.12
9.19		16.4	8.8	14.13
9.20		16.4	8.11	14.13
9.21			8.4,8.9	14.14
9.22	8.14			14.15
9.23	8.15			
9.24	8.16	16.6		14.16
9.25	8.19			

Table 3.3 : Comparison of "equivalent" competencies items from 3 American
Universities items in the first proposal and items in the questionnaire

Items submitted in the first proposal	Items from U. of Minnesota	Items from Baylor college	Items from U. of Texas	Items in the questionnaire
Endodontic therapy				
10.1	9.1			9.1
10.2	9.2	9.2	10.3	9.3
10.3	9.3			9.4
10.4	9.4	9.1	10.2	9.2
10.5	9.5			
10.6	9.6			
10.7	9.7			9.6
10.8	9.8	9.3	10.5	9.7
10.9	9.9			9.5
10.10	9.10			9.8
10.11	9.11	9.4	10.6	9.9
Surgical therapy				
11.1	10.1	11.1	11.1	7.1
11.2	10.2	11.2		7.2
11.3	10.3	11.2	11.2	7.3
11.4	10.4	11.3	11.3	7.5
11.5	10.5			7.6
11.6	10.6	11.4	11.5	7.7
11.7	10.7			7.4
11.8	10.8			7.10
11.9	10.9			7.10
1110	10.10			7.10
11.11	10.11			7.10
11.12	10.12			7.10
11.13		11.5	11.6	7.8
11.14		11.6	11.8	7.9

Table 3.3 : Comparison of "equivalent" competencies items from 3 American

Universities items in the first proposal and items in the questionnaire

Items submitted in the first proposal	Items from U. of Minnesota	Items from Baylor college	Items from U. of Texas	Items in the questionnaire
Control of pain and anxiety				
12.1			4.1	6.1
12.2			4.2	
12.3			4.4	
12.4	11.1	7.1	4.3	6.3
12.5	11.2	7.2	4.6	6.4
12.6	11.3	7.3		6.2
12.7	11.4			6.6
12.8	11.5			6.7
12.9	11.6	7.4	4.5	6.5
12.10	11.7			
Emergency treatment				
13.1	12.1	12.2	5.1	5.3
13.2	12.2	12.2	5.1	5.3
13.3	12.3	12.2	5.1	5.3
13.4	12.4	12.2	5.1	5.3
13.5	12.5	12.5	5.5	5.5
13.6	12.6		5.1	5.4
13.7	12.7	12.3	5.3	5.2
13.8	12.8	12.4	5.4	5.6
13.9	12.9		5.3	
13.10	12.10	12.1	5.2	5.1
13.11			5.6	5.7
Orthodontic treatment				
14.1		14.1	12.1	12.1
14.2		14.1,14.2,14.3	12.2	12.2
14.3	13.1	14.4	12.4	12.3
14.4	13.2		12.4	12.4
14.5	13.3		12.4	12.5

Table 3.3 : Comparison of "equivalent" competencies items from 3 American

Universities items in the first proposal and items in the questionnaire

Items submitted in the first proposal	Items from U. of Minnesota	Items from Baylor college	Items from U. of Texas	Items in the questionnaire
Radiographic assessment				
15.1			1.6	
15.2			1.7	
Oral mucosal therapy				
16.1		15.1		12.1
16.2		15.2		12.2
Community involvement				
17.1	23.1			15.1
17.2	23.2	17.4		15.2
17.3	23.3			15.3
17.4	23.4			15.4
17.5	23.5	17.2	15.1	15.5
17.6	23.6	17.3		15.6
17.7	23.7	17.1		15.7
17.8	23.8			

3.7.2.2 THE FORMAT FOR MEASUREMENT

For each question, a response will be requested on a Likert-like 5-point scale.

The scale is as followed:

Score	Definition
5	Mostly agree
4	Agree
3	Moderately agree
2	Slightly agree
1	Least agree

Under each question, a space was provided for the respondents to give comment of that statement.

At the end of the questionnaire, space was provided for the respondents to give further comments whatever they concerned.

3.7.2.3 THE PLAN FOR EXPERTS REVIEW

Eight experts in the area of dental education were requested to evaluate the initial items. One of the experts was the Associate Dean of Academic Affair of the Faculty of Dentistry, Chulalongkorn University. The others were the Faculty staffs that were actively involve in the area of Dental Education but did not currently work in the Department to be assessed. The name of the eight experts was listed in the Appendix D. An envelope was delivered by hand to each expert. Enclosed in the envelope were: 1) cover letter explaining the objectives of construction and usage of questionnaire and the evaluation work requested, 2) the full research proposal and 3) the first draft questionnaire. The items were evaluated in terms of content validity, internal consistency, language, wording and lay out of the questionnaire. The experts were also asked to rate a score for each item as will be explained in the statistical test topic (3.10.1) described below. After test of the content validity, the questionnaire was corrected and improved. The changes after this procedure were listed in Appendix E. As a result of the changes, the competency statements were decreased from 116 items to 115 items.

3.7.2.4 ADMINISTRATION OF THE ITEMS TO THE DEVELOPMENT SAMPLE

The questionnaires were sent to a group of eight part-time staffs and twelve dental practitioners. The part-time staffs completed their undergraduate

and/or post-graduate studies from Chulalongkorn University and were currently working as part-time staffs in the area of clinical sciences, at the Faculty of Dentistry, Chulalongkorn University. The general practitioners were currently studying in the first year of the post-graduate curriculum at Chulalongkorn University. The criteria for selection were convenient to direct contact and had quite similar characteristics to the population samples. The name of the pre-tested group of the part-time staffs and the dental practitioners were listed in the Appendix E.

An envelope, which enclosed a cover letter explaining the objectives of the research and the work requested, the improved questionnaire, was deliver by hand to each subject.

The subjects were asked to complete the questionnaire and gave suggestions to improve the questionnaire

The data obtained from the development sample were analyzed. The questionnaire was improved. Changes that were occurred were listed in the Appendix E. After completing the process of improvement and correction, it was used as the questionnaire to assess the opinions of the Faculty staffs in 10 departments of the Faculty of Dentistry, Chulalongkorn University and the dental practitioners.

3.8 DATA COLLECTION

The measurements were performed once in each group. Direct access questionnaire was used for the faculty staff. Mailed questionnaire was used for the dental practitioners.

3.8.1 QUESTIONNAIRE FOR THE FACULTY STAFFS

The steps of sending the questionnaire to the faculty staffs were as followed:

1) A list of the names of the full-time faculty staffs working in the 10 clinical departments was requested from the Personnel Department of the Faculty

2) Codes were given to the faculty staffs who fit in the inclusion criteria of the study for identifying each respondent and printed on each questionnaire

3) A questionnaire together with a cover letter was enclosed. A return envelope printed the researcher's name and address was also provided

4) The researcher went to the Faculty of Dentistry and directly contacted the Heads of every Department who were at work on that day. The researcher explained the objective of the study and requested them to answer the questionnaire as well as to motivate their staffs to participate. If the head of the department was not there, the researcher then contacted with other senior staffs in the department. The questionnaires were given by hand to other staffs that were at the office on that day. For the rests, the questionnaires were posted in the individual mailed box in the department.

3.8.2 QUESTIONNAIRE FOR THE DENTAL PRACTITIONERS

The steps of sending the questionnaire to the dental practitioner were as followed:

1) A letter requesting a list of the names and addresses of all of the dental practitioners was sent to the Dental Association of Thailand. However, the President of the Dental Association of Thailand sent a letter to inform the

researcher that it was the policy of the Association not to release a list of name and/or address of its members to anyone. It was to protect its members' rights and privacy. The researcher then sent a letter requesting a list of dental practitioners who were currently working under the Division of Dental Public Health of the Ministry of Public Health. A list of dental dental practitioners who were working in various parts of Thailand together with their office addresses was provided. In order to gain more subjects and varieties of working places, the researcher then made requests to other sources of information. The resources included: the Division of Dental Public Health of the Bangkok Metropolitan Authority, the Endodontic Society of Thailand, the Implant Society of Thailand, and the Alumni Association of Chulalongkorn Dental School.

2) Names and addresses from the above-mentioned resources were keyed into a computer using Microsoft Excel program. They were then sorted using the first name as the first key sort order and the last name as the second key sort order. Names (and corresponding addresses), which appeared more than once, were deleted and only unique names (and corresponding addresses) remained in the database. Thus, a total of 2,450 names (and corresponding addresses) remained.

3) The samples were randomly selected from the database according to a randomization scheme. This randomization scheme was prepared using a simple random sampling technique and a random number table.

For the ease of using the table of random numbers, dental practitioners were then recoded into 3 groups: numbers 001-999 were recoded into A001-A999; numbers 1000-1998 were recoded into B001-B999; numbers 1999-2450 were recoded into C001-C452.

The table of random number from Fishers RA and Yates F(1974) was consulted. The researcher pointed to one spot on the table and started reading 3-digit number. The next number was then read along a row from left to right and from top to bottom. The first 112 randomly selected numbers were sorted out from the first group (A001-A999). The second 112 randomly selected numbers were sorted out from the second group (B001-B999) and the third 52 randomly selected numbers were sorted out from the third group (C001-C425). In all, 276 randomly selected numbers equaled the sample size needed for the study. In the third group, the numbers retrieved from the table that exceeded the number of the names in the database were skipped. The dental practitioners whose codes were matched to the number selected from the random number table were chosen as the sample population.

4) Code for each respondent was printed on every page of each questionnaire. Names and addresses of the respondents and the researcher were printed on envelopes. A questionnaire, a cover letter, a return envelope completed with the researcher's name and address and a stamp were put in each envelope. All envelopes were sent by mail.

3.8.3 FOLLOW-UP PROCEDURES
3.8.3.1 THE FACULTY STAFFS

The questionnaire was sent on December 20, 2000 and asked to respond and be returned the completed questionnaire to the researcher's postbox at the Operative Department in the dental school as soon as possible. At that time, it was very near Christmas and New Year holidays, the researcher then waited until a week after the New Year to go to collect the data. In order to increase the response rate, a second questionnaire together with a new

cover letter explaining the importance of the respondents to complete the questionnaire was sent to all of the faculty staffs who had not responded to the first questionnaire. The request to complete the questionnaire and to return it as soon as possible was made along with appreciation of cooperation.

3.8.3.2 THE DENTAL PRACTITIONERS

Normally, the main problem of mailed questionnaire is that the response rate is generally low and this depends on the interest, intention or the incentives given. The researcher then expected very low response rate with additional reason, which was the questionnaire sent to dental practitioners was quite long and work of this kind was not familiar to the respondents (to criticize or give opinion regarding the dental curriculum). The plan to increase response rate included both follow-up methods and select new samples after follow up procedures. The response after the first questionnaire was mailed, nevertheless, exceeded the number of the sample size needed. Therefore, no follow-up procedure was necessary.

3.9 DATA PROCESSING

The results collected were prepared for analysis by checking all the data, correcting the data, pre-coding the questionnaires and processing by computer.

3.9.1 CHECKING AND CORRECTING THE DATA

The objectives of this procedure were to examine the completeness and the accuracy of the data. After receiving the questionnaire all data were checked for blank or not-answered questions and the consistency between the answers and the questions. The corrections were done by contacted directly to ask for correction if the respondents were the faculty staffs and

contacted by mail if the respondents were the dental practitioners. The criteria for requesting additional response of the questionnaire were the questionnaire that some pages were left blank or more than 5% of the items were left blank. For the dental practitioners, the blank part together with a cover letter asking for help in the correction of the data was sent by registered mail.

The number for returned questionnaires were 4 for the dental practitioners. All dental practitioners returned their corrected part to the researcher.

3.9.2 PRECODING THE QUESTIONNAIRES

All questionnaires were coded prior to the data entering process. The codes were run in series of the items and were separated into 15 groups according to the major competencies. The code given to the respondents also identified the status of the respondents whether they were faculty staffs of which departments or they were dental practitioners.

3.9.3 COMPUTER PROCESSING

The computer programs used for entering the data and analyzing data were shown in Table 3.4.

Table 3.4 : Types of data and programs used for entering and analyzing the data

Types of Data	Program used for entering the data	Program used for analyzing data
Pre-test of the content validity	Microsoft Excel	Microsoft Excel
Pre-test of the internal consistency reliability	Microsoft Excel	SPSS for Windows V. 10
Demographic data	Microsoft Access	SPSS for Windows V. 10
Close–end questions	Microsoft Access	SPSS for Windows V. 10
Open–end questions	Microsoft Access	Microsoft Access

3.10 DATA ANALYSES

The statistical analyses in this study consisted of two main parts. The first part comprised statistical methods for questionnaire development. The second part was the statistical tests for analyzing the obtained data.

3.10.1 STATISTICS FOR QUESTIONNAIRE DEVELOPMENT

The questionnaire developed for this study had undergone two statistical tests for determining its validity and reliability. The measurements were performed in the pre-testing step. The areas tested included content validity and internal consistency.

3.10.1.1 TEST FOR CONTENT VALIDITY

The Item Correlation method was chosen to test the content validity of the questionnaire. It was chosen because the questionnaire constructed was sent to the experts to check the content validity.

The meanings of scores given by the experts were as follow

+1   =   relatively valid item

0   =   not sure

-1   =   relatively irrelevant

The obtained scores from each item were calculated to demonstrate the validity of each item. The formula of the Item Correlation used was as followed:

$$IC = \frac{\sum R}{N}$$

Where   R   =   total score of that item

N   =   number of experts

The acceptable value was IC that was equal or higher than 0.5

The results of this validity testing are showed in Table 3.5

Table 3.5 : Results of content validity testing of the questionnaire

Item number	1	2	3	4	5	6	7	8	IC
1.1	1	1	-1	1	1	1	1	1	0.75
1.2	0	1	1	1	0	1	1	0	0.63
1.3	1	1	-1	1	1	1	1	1	0.75
1.4	1	1	-1	1	1	1	1	1	0.75
1.5	1	0	1	1	1	1	0	0	0.63
1.6	1	1	0	1	1	1	1	1	0.88
1.7	1	-1	-1	1	1	1	1	1	0.50
1.8	1	1	1	1	0	1	1	1	0.88
1.9	1	1	-1	1	1	1	1	0	0.63
2.1	1	1	1	1	1	1	1	1	1.00
2.2	1	1	1	1	1	1	1	0	0.88
2.3	1	1	1	0	1	1	1	0	0.75
2.4	1	1	1	1	1	0	1	1	0.88
2.5	1	1	-1	1	1	1	1	1	0.75
2.6	1	1	1	1	1	1	-1	1	0.75
2.7	1	0	1	1	1	1	1	1	0.88
3.1	1	1	1	1	1	1	1	1	1.00
3.2	1	1	1	1	1	1	1	1	1.00
3.3	1	1	1	1	1	1	1	1	1.00
3.4	1	1	1	1	1	1	1	1	1.00
3.5	1	1	1	1	1	1	1	0	0.88
3.6	1	1	1	1	1	1	1	0	0.88
4.1	1	1	1	1	1	1	1	1	1.00
4.2	1	1	1	1	1	1	1	0	0.88
4.3	1	1	1	1	1	1	1	0	0.88
4.4	1	1	-1	1	1	1	1	1	0.75
4.5	1	1	1	1	1	1	1	0	0.88
4.6	1	1	1	1	1	1	1	-1	0.75

Table 3.5 : Results of content validity testing of the questionnaire

Item number	1	2	3	4	5	6	7	8	IC
5.1	1	1	1	1	1	1	1	1	1.00
5.2	1	1	1	1	1	1	1	1	1.00
5.3	1	1	1	1	1	1	1	1	1.00
5.4	1	1	1	1	1	1	1	1	1.00
5.5	1	1	1	1	1	0	1	1	0.88
5.6	1	1	1	1	1	1	1	1	1.00
5.7	1	1	1	1	1	1	1	1	1.00
6.1	1	1	1	1	1	1	1	1	1.00
6.2	1	1	1	1	1	0	1	1	0.88
6.3	1	1	1	1	1	1	1	1	1.00
6.4	1	1	-1	0	1	-1	1	0	0.25
6.5	1	1	1	1	1	0	1	1	0.88
6.6	1	1	0	1	1	1	1	1	0.88
6.7	1	1	0	1	1	1	1	1	0.88
7.1	1	1	1	1	1	1	1	0	0.88
7.2	1	1	0	1	1	0	1	0	0.63
7.3	1	1	1	1	1	1	1	1	1.00
7.4	1	1	1	1	1	1	1	1	1.00
7.5	1	1	1	1	1	1	1	0	0.88
7.6	1	1	1	1	1	1	1	0	0.88
7.7	1	1	1	1	1	1	1	0	0.88
7.8	1	1	1	1	1	1	1	0	0.88
7.9	1	1	-1	1	1	1	1	1	0.75
7.1	1	1	1	1	1	1	1	1	1.00
8.1	1	1	1	1	1	1	1	1	1.00
8.2	1	1	1	1	1	1	1	1	1.00
8.3	1	1	1	1	1	1	1	0	0.88
8.4	1	1	1	1	1	1	1	1	1.00
8.5	1	1	1	1	1	1	1	1	1.00

Table 3.5 : Results of content validity testing of the questionnaire

Item number	1	2	3	4	5	6	7	8	IC
9.1	1	1	0	1	1	1	1	1	0.88
9.2	1	1	1	1	1	0	1	1	0.88
9.3	1	1	1	1	1	1	1	1	1.00
9.4	1	1	1	1	1	1	1	1	1.00
9.5	1	1	1	1	1	1	1	1	1.00
9.6	1	1	1	1	1	1	1	1	1.00
9.7	1	1	1	1	1	1	1	1	1.00
9.8	1	1	1	1	1	1	1	1	1.00
9.9	1	1	1	1	1	1	1	1	1.00
10.1	1	1	1	1	1	1	1	1	1.00
10.2	1	1	1	1	1	1	0	1	0.88
10.3	1	1	1	1	1	1	1	1	1.00
10.4	1	0	1	1	1	1	1	1	0.88
10.5	1	1	1	1	1	1	1	1	1.00
10.6	1	1	1	1	1	1	1	1	1.00
10.7	1	1	1	1	1	1	1	1	1.00
11.1	1	1	1	1	1	1	1	1	1.00
11.2	1	1	1	1	1	0	1	1	0.88
11.3	1	1	1	1	1	1	1	0	0.88
11.4	1	1	-1	1	1	1	1	1	0.75
11.5	1	1	1	1	1	1	1	1	1.00
12.1	1	1	1	1	1	1	1	1	1.00
12.2	1	1	-1	1	1	1	1	1	0.75
13.1	1	1	-1	0	1	1	1	0	0.50
13.2	1	1	1	1	1	0	1	1	0.88
13.3	1	1	1	1	1	1	1	1	1.00
13.4	1	1	1	1	1	1	1	1	1.00
13.5.1	1	1	1	1	1	1	1	0	0.88
13.5.2	1	1	1	1	1	1	1	0	0.88
13.5.3	1	1	1	1	1	1	1	0	0.88

Table 3.5 : Results of content validity testing of the questionnaire

Item number	1	2	3	4	5	6	7	8	IC
13.5.4	1	1	1	1	1	1	1	1	1.00
13.5.5	1	1	-1	1	1	1	1	1	0.75
13.6	1	1	1	1	1	0	1	1	0.88
13.7	1	1	1	1	1	1	1	1	1.00
14.1	1	1	1	1	1	1	1	1	1.00
14.2	1	1	1	1	1	1	1	1	1.00
14.3	1	1	1	1	1	1	1	1	1.00
14.4	1	1	1	1	1	1	1	1	1.00
14.5	1	1	1	1	1	1	1	1	1.00
14.6	1	1	0	1	1	1	1	1	0.88
14.7	1	1	1	1	1	1	1	1	1.00
14.8	1	1	1	1	1	1	1	1	1.00
14.9	1	1	1	1	1	1	1	1	1.00
14.10	1	1	1	1	1	1	1	1	1.00
14.11	1	1	1	1	1	1	1	1	1.00
14.12	1	1	1	1	1	1	1	0	0.88
14.13	1	1	1	1	1	1	1	1	1.00
14.14	1	1	1	1	1	1	1	1	1.00
14.15	1	1	1	1	1	1	1	1	1.00
14.16	1	1	1	1	1	1	1	1	1.00
14.17	1	1	1	1	1	1	1	1	1.00
15.1	1	1	1	1	1	1	1	1	1.00
15.2	1	1	0	1	1	0	1	1	0.75
15.3	1	1	1	1	1	1	1	1	1.00
15.4	1	1	1	1	1	1	1	1	1.00
15.5	1	1	1	1	1	1	1	1	1.00
15.6	1	-1	1	1	1	1	1	1	0.75
15.7	1	1	1	1	1	0	1	1	0.88
15.8	1	-1	0	1	-1	0	0	-1	-0.13

The results from the item correlation showed 59 items that reached perfect agreement, 55 items passed acceptable level, whereas 2 items did not reach satisfactory results. The item that yielded most conflict result was item 15.8 (IC=-0.13) where 2 experts agreed, 3 experts disagreed and the rest were not sure. The sentence in the statement " Recognize and manage oral disease that is broader in scope and greater in degree than is typically experienced in dental school clinics" yielded conflicting opinions. The comments mentioned about new graduates, had some experienced in the undergraduate level but were expected to be competent in broader circumstances, were not reasonable. After discussion about the problem, it was decided to leave out this statement.

Another item that received the second lowest score was item 6.4 about the competency to utilize inhalation sedation techniques. For this statement, 4 experts agreed, 2 experts disagreed and the rest were not sure. The reason for disagreement with the statement was this competency was not taught in the Faculty of Dentistry, Chulalongkorn University. After discussion with experts, it was decided to keep the statement in order to compare the result of the study with the western standard and to compare the result between the study groups.

Apart from the statistical results, written comments were given for many items. Some comments were given to improve the clarity, or to make the sentences more easily understood or to correct the translation of some words and some comments suggesting translating technical terms into Thai language and putting the original English technical terms in the bracket after the Thai version. All of these were taken into consideration and were discussed with advisor and some experts. Improvement that had been done

included deletion of one item, reorientation of some statements, and putting the original English technical terms in the bracket after the Thai version for increased clarity. The alterations made are shown in Appendix E.

3.10.1.2 TEST FOR INTERNAL CONSISTENCY RELIABILITY

The internal consistency method using Cronbach's Coefficient Alpha was chosen to test the reliability of this questionnaire. The technique requires only a single administration whereas Test-retest and Alternative-form methods require two testing situations. The Split-Halves method was not chosen because there are different ways to group the items into two groups and the result may be different.

The formula of the alpha coefficient is as followed:

$$\alpha = \frac{n}{n-1}\left\{1 - \frac{\sum S_i^2}{S_t^2}\right\}$$

where   n = No. Items

$$S_i^2 = \frac{\sum\left(x - \overline{x}\right)^2}{n-1} \quad = \text{Items Variance}$$

$$S_t^2 = \frac{n\sum x\,t^2 - \left(\sum x\,t\right)^2}{n(n-1)} \quad = \text{Total Variance}$$

The acceptable value is: α that is equal to or higher than 0.8

The data collected from pretest population as described previously were analyzed by using computer software program SPSS for Windows version 10 to calculate the Cronbach's coefficient alpha. The calculation revealed the alpha coefficient to be 0.9745

The details of this reliability testing are shown in Table 3.6

The reliability test yielded satisfactory results. Overall reliability as tested by Cronbach's Coefficient Alpha was higher than the acceptable level.

Table 3.6 : Results of reliability testing of the Questionnaire

Item	Mean	S.D.	Corrected Item Total Correlation	Alpha If Item Deleted
Q1.1	4.75	.5501	.0713	.9747
Q1.2	4.50	.6070	.4322	.9744
Q1.3	4.45	.5104	.5965	.9743
Q1.4	4.55	.6863	.3194	.9745
Q1.5	3.45	.9987	.4402	.9744
Q1.6	4.45	.6863	.3695	.9745
Q1.7	3.80	1.0052	.3946	.9745
Q1.8	4.75	.5501	.3423	.9745
Q1.9	4.70	.5712	.4932	.9743
Q2.1	4.65	.5871	.2399	.9746
Q2.2	4.45	.5104	.0275	.9747
Q2.3	4.10	.6407	.2620	.9746
Q2.4	4.20	.6959	.6110	.9742
Q2.5	4.50	.6882	.3917	.9744
Q2.6	4.55	.6048	.6634	.9742
Q2.7	4.90	.3078	.0684	.9746
Q3.1	4.80	.4104	.4173	.9744
Q3.2	4.60	.5982	.4442	.9744
Q3.3	4.65	.5871	.5715	.9743
Q3.4	4.80	.4104	.5496	.9744
Q3.5	4.65	.5871	.4702	.9744
Q3.6	4.50	.5130	.3771	.9745
Q4.1	4.85	.3663	.2800	.9745
Q4.2	4.85	.3663	.4179	.9744
Q4.3	4.70	.4702	.5863	.9743
Q4.4	4.50	.7609	.3814	.9745
Q4.5	4.05	.8870	.8107	.9739
Q4.6	4.30	.8013	.5407	.9743

Table 3.6 : Results of reliability testing of the Questionnaire (continued)

Item	Mean	S.D.	Corrected Item Total Correlation	Alpha If Item Deleted
Q5.1	4.60	.7539	.5232	.9743
Q5.2	4.35	.8127	.5856	.9742
Q5.3	4.70	.7327	.3911	.9744
Q5.4	4.25	.7864	.4954	.9743
Q5.5	4.30	.8013	.4829	.9743
Q5.6	3.90	.7182	.3967	.9744
Q5.7	4.75	.4443	.4429	.9744
Q6.1	4.55	.6048	.6131	.9742
Q6.2	4.15	.8751	.7062	.9740
Q6.3	5.00	.0000	.0000	.9746
Q6.4	2.10	1.0208	.3126	.9747
Q6.5	3.85	1.2680	.5538	.9743
Q6.6	2.75	1.2085	.3406	.9747
Q6.7	2.50	1.2773	.3865	.9747
Q7.1	5.00	.0000	.0000	.9746
Q7.2	4.70	.4702	.5554	.9743
Q7.3	5.00	.0000	.0000	.9746
Q7.4	4.80	.4104	.4702	.9744
Q7.5	4.20	.7678	.6748	.9741
Q7.6	4.20	.8944	.5492	.9743
Q7.7	4.85	.3663	.2439	.9745
Q7.8	4.75	.4443	.4728	.9744
Q7.9	3.55	1.4318	.8404	.9738
Q7.10	3.15	1.3089	.4826	.9745
Q8.1	4.90	.3078	.2983	.9745
Q8.2	4.95	.2236	.1593	.9746
Q8.3	4.50	.6070	.6784	.9742
Q8.4	4.10	.7881	.6664	.9741
Q8.5	4.65	.5871	.2276	.9746

Table 3.6 : Results of reliability testing of the Questionnaire(continued)

Item	Mean	S.D.	Corrected Item Total Correlation	Alpha If Item Deleted
Q9.1	4.85	.3663	.1686	.9746
Q9.2	4.85	.3663	.1980	.9746
Q9.3	4.40	.6806	.3297	.9745
Q9.4	4.10	.8522	.2451	.9747
Q9.5	3.95	.8870	.5010	.9743
Q9.6	4.55	.6863	.6575	.9742
Q9.7	4.55	.6048	.5970	.9742
Q9.8	4.60	.5982	.5110	.9743
Q9.9	3.95	1.0990	.6166	.9742
Q10.1	4.40	.6806	.8272	.9740
Q10.2	3.85	.9333	.8053	.9739
Q10.3	4.00	.9733	.8939	.9737
Q10.4	4.10	.7881	.5857	.9742
Q10.5	3.90	1.1653	.6249	.9742
Q10.6	4.15	.9881	.6978	.9740
Q10.7	3.60	1.1877	.9402	.9736
Q11.1	4.25	.7864	.6382	.9741
Q11.2	4.10	.8522	.5703	.9742
Q11.3	4.05	.8870	.6607	.9741
Q11.4	3.80	.9515	.4644	.9744
Q11.5	3.70	1.3416	.8401	.9738
Q12.1	4.55	.6048	.4805	.9744
Q12.2	4.05	.9445	.4584	.9744
Q13.1	4.95	.2236	.1593	.9746
Q13.2	5.00	.0000	.0000	.9746
Q13.3	5.00	.0000	.0000	.9746
Q13.4	4.80	.4104	.5408	.9744
Q13.5.1	5.00	.0000	.0000	.9746
Q13.5.2	5.00	.0000	.0000	.9746
Q13.5.3	.4894	.4894	-.0084	.9747

Table 3.6 : Results of reliability testing of the Questionnaire(continued)

Item	Mean	S.D.	Corrected Item Total Correlation	Alpha If Item Deleted
Q13.5.4	2.85	.8751	.3740	.9745
Q13.5.5	3.05	.7592	.3860	.9745
Q13.6	4.15	.8751	.7823	.9739
Q13.7	3.90	1.0712	.7770	.9739
Q14.1	4.85	.4894	.1458	.9746
Q14.2	4.65	.5871	.6626	.9742
Q14.3	4.65	.5871	.7228	.9741
Q14.4	4.75	.5501	.5843	.9743
Q14.5	4.70	.6569	.5138	.9743
Q14.6	4.75	.4443	.6498	.9743
Q14.7	3.95	.9445	.7449	.9740
Q14.8	4.60	.6806	.7231	.9741
Q14.9	4.70	.5712	.6377	.9742
Q14.10	4.50	.8272	.6308	.9742
Q14.11	4.65	.8127	.6697	.9741
Q14.12	4.60	.5982	.6919	.9742
Q14.13	4.70	.5712	.6015	.9742
Q14.14	4.40	.8208	.7593	.9740
Q14.15	4.90	.3078	.4781	.9744
Q14.16	3.10	1.2524	.6540	.9741
Q14.17	3.10	1.3338	.6001	.9743
Q 15.1	4.50	.8885	.5473	.9743
Q15.2	4.55	.8256	.6934	.9741
Q15.3	4.10	.9679	.5946	.9742
Q15.4	3.75	.9665	.6348	.9741
Q15.5	4.05	.9987	.6756	.9741
Q15.6	3.90	1.0208	.5864	.9742
Q15.7	4.40	.6806	.4115	.9744

Based on these validity and reliability analyses, the questionnaire seemed to be acceptable to be used as a measuring tool of the faculty staffs and the dental practitioners' opinions towards the competencies standards for new dental graduates.

3.10.2 STATISTICS FOR DATA ANALYSES OF THE OBTAINED DATA

The obtained data were analyzed using descriptive statistics

Baseline data will be summarized as number, percentage and then tabulated.

The close ended opinions of the Faculty lecturers and dental practitioners were measured in ordinal, continuous type of data, they were summarized as frequency, mean and standard deviation (SD).

In each area of major competencies, there were many statements which each represent as one component of competencies in that area. So the data were summarized in two steps:

(1) Each score in one competencies statement will be summed up and summarized as means and SD, so called item mean and item SD,

(2) Sum of all scores from all competencies statements in one major competency was done and summarized as average mean and SD for that major competency.

The frequency and mean scores of the opinions of the faculty staffs and the dental practitioners of each competency statements were tabulated to show the specific values. This would be shown in 15 Tables according to the major competencies to ensure unambiguous understanding.

The opinions would be analyzed by interpreting the opinions mean according to the following criteria.

4.50 – 5.00   mostly agreed with the competency statement

3.50 – 4.49   agreed with the competency statement

2.50 – 3.49   moderately agreed with the competency statement

1.50 – 2.49   slightly agreed with the competency statement

1.00 – 1.49   least agreed with the competency statement

For the open-ended opinions, the answers would be listed out.

Summary of statistical methods to be used in this study are shown in Table 3.7

Table 3.7 : Summary of statistical methods used in this study

Indication	Statistical Methods
Statistical methods for questionnaire development	
Test for content validity	Item correlation
Test for internal consistency	Cronbach's coefficient alpha
Statistical methods for data analyses	
Baseline data	Descriptive statistics (Frequency/Percentage)
Data summary of outcomes variables	Descriptive statistics (Frequency/Percentage Mean, SD)