CHAPTER V

DISCUSSION

5.1 INTRODUCTION

The Faculty of Dentistry, Chulalongkorn University, the first Dental School in Thailand, has been serving the nation by offering dental education for more than 60 years. To provide a standard education, the Faculty has continuously developed its dental curriculum. Although there is no formal evaluation report of the present curriculum, the curriculum seems to have many problems. As discussed in the literature review, to cope with all the problems, the dental school needs to look for new model in providing dental education. One model of interest is a model called "competency-based curriculum", which focuses on the outcome of the education: dental graduates. The foundation of the competency-based curriculum is based on the development competency statements that describe the dental graduates' capability characteristics. The competency statements will then serve as the basis for a curriculum improvement. This research provided an opportunity to introduce the Faculty staffs to other perspectives of reviewing the curriculum. This was accomplished by requesting them to give opinions to the competency statements provided. The study might lead to a curriculum improvement and result in the development of a new curriculum that will educate dental undergraduates to become competent general practitioners.

New dental graduates from a new curriculum will hopefully be better equipped to serve the nation in the twenty-first century.

The questionnaire was designed to assess and probably stimulate discussion among program directors, national groups about new models for design, description, evaluation, and accreditation of the dental undergraduate program.

5.2 DISCUSSION OF THE RESEARCH METHODOLOGY

The general objective of the study was to survey the opinions of the Faculty staffs and the general practitioners towards the competency statements that describe dental graduates.

The outcomes collected in this study were the opinions of the competency statements in 4 domains covering professional clinical competencies. The professional clinical competencies were chosen because of several reasons. Firstly, most of the Faculty staffs are responsible for providing education to their undergraduates. Clinical dental care is their fundamental function. Secondly, as the faculty staffs are used to the disciplined orientation, they would be more competent to give opinions towards the statements of the specialties they are involved.

Faculty staffs are the most appropriate group of dental educators to give opinions for the study. They are very important, as they have direct responsibility in teaching dental students. They are producers. They are assumed to be familiar with the overall emphasis, coverage, and status accorded to various course topics.

As a part of an evaluation or planning effort, opinions of practicing professionals are needed. Dental practitioners are important sources for

ensuring that a curriculum the dental school plan meets the needs in dental care. The plan will also take both the providers (the dental practitioners) and the public they serve into consideration. Practice-related information could be gained from the dental practitioners. What dental practitioners consider important should be taken into consideration. This is because what dentists do in practice might not be the same as the education they have acquired.

Central to planning of any such survey is the decision on how large a sample to select from the population under study. For the Faculty staffs, the researcher included all Faculty staffs who fit in the eligibility criteria. The reason for including all staffs was that the number of the staff working in each Department was relatively small, varying from 5 to 24 persons. The inclusion of every staff member had another advantage in that everyone was involved in giving his or her opinions, which is the key for developing a share vision among the Faculty staffs. It provides ways to participate in the development of a new curriculum and leads to a sense of faculty-wide ownership.

For the dental practitioners, it was appropriate to calculate the sample size. Although the greater the sample size would give better precision of the parameters and their differences, collection of the data from all dentists would be costly and time consuming. Since the competency statements in this study are statements that describe professional clinical competence of new dental practitioners, positive response in most items was expected. The choice of anticipated population proportion (P) given for the sample size calculation in this study was 90%, which resulted in a sample size of 138. After analyzing the data, it was found that the competency statements were rated "agreed" to "mostly agreed" up to 95% of the items. It meant that the sample used in this study was adequate to guard against the a α and β errors. The Dental

Association of Thailand, to which almost all dentists in the country registered as members, would not release the list of the dental practitioners. Dental practitioners were then randomly selected from the lists provided from other resources. The systematic bias might have been introduced because members of other organizations might have been some specific groups who were interested in those particular activities.

However, the number of the dental practitioners gathered from various organizations came out to be about one-third of the whole number of the dentists in Thailand. The result of the baseline data revealed that the respondents included varying age, worked with various agencies in various parts of Thailand. Hence, the respondents in this study could be the representatives of the population aimed.

The research methodology in this study did not include statistical tests of mean differences of the opinions between both groups (Faculty staff group and dental practitioner group). This is because the rating scales given to the statements might come from various perspectives and they depended on the experiences and backgrounds of the responders.

The statistical significance differences might not have any real educational importance and should not be of great concern in the consideration for curriculum revision. The real focus should be put on the open-ended opinions, which reflect the respondents' detailed opinions and their real needs. The interesting point of concerns should be on the competence items, which the responders rated as less agreed, and /or high standard deviation. The reasons of less agreement should be assessed and reconsidered whether those competency statements should be included in the objectives of undergraduate dental education or not.

Outcomes measures in this study were the opinions made by the Faculty staffs and the dental practitioners. The first type of outcomes was the level of agreement to each competency statement. The outcome would present the quantitative dimensions of the agreement. Another outcome was the open-ended opinions, which would give valuable information for curriculum improvement in qualitative dimensions. The opinions of respondents would present their different perspectives and/or reasons of their agreement for the competency statements. After analyzing the results, the researcher felt that the study would gain more valuable information if the questionnaire included requests for recommendations of how to improve the curriculum.

5.3 DISCUSSION OF THE QUESTIONNAIRE DESIGN

The questionnaire sought information about the opinions of the Faculty staffs and dental practitioner as to what should be the ability (competencies) of new dental graduates from Chulalongkorn University.

The composition of the questionnaires given to the Faculty staffs and dental practitioners were different because of the characteristics of their works and their educational background. The Faculty staffs, working in the dental school, focus their activities according to the department they work in. Some of them limit their practice only in the specialty they trained. The dental practitioners mostly practice general dentistry. The questionnaire for the Faculty staffs then did not include all major competencies for them to consider as did for the general practitioners.

In this study, the competency statements in the questionnaire were adapted from the dental schools in Americas and were validated by 8 experts

in the field of dental education. The underlying concept was that the responsibilities of the general dentists should be quite similar all over the world. What would be differences were the priorities or the emphasis that should be depended on local conditions of the country, the people and the society general dentists serve. Therefore, the existing competency statements from the Western country could be served as a model for our Faculty staffs and dental practitioners to give comments.

Questionnaire construction in this study was a compromise. It is known that a long questionnaire might result in non-response or inaccuracies in recording by the respondents. However, a rather short or crude instrument might not reflect the practice activity accurately. Decision had been made to include all domains of professional clinical competencies with the appropriate details of the competency statements. One hundred and fifteen items could be considered to be too many to become a good questionnaire. To compensate for the length, the researcher then tried to design a questionnaire that had clear directions, with questions placed in sequence with similar format and used an easy format so that the respondents would be able to complete all questions without difficulties.

5.4 DISCUSSION OF THE RESULTS

5.4.1 COOPERATION OF THE RESPONDENTS

The high response rate from both the Faculty staffs and the dental practitioners was a surprise and also delight. Low response rate from the Faculty staffs had been expected. They might not be interested in the topics of the research because they did not respond well to the previous attempt by the administration that tried to revise the curriculum. The explanation why the

response rate from the Faculty staffs was quite high in this study might be explained by some factors. Firstly, the questionnaire was not too long for them to complete quickly. The items for the Faculty staffs to consider ranged between 44-62 items. Secondly, the format of the questionnaire was made in a simple Likert-like-5 point scale. The responders would give extra opinions in a written form only if they wished to. Thirdly, they might have the sense or concern of curriculum improvement but had no clear ideas on how to do. Since the research project was directly helpful to the problem, they might consider cooperating and giving information to the improvement process.

For the dental practitioners, even lower expectation prevailed. Firstly, the questionnaire was sent to the dentists who graduated from various dental schools, not only from Chulalongkorn University. The respondents might not be interested in answering the questionnaire, the results from which are going to be used for Chulalongkorn Dental School. Secondly, the questionnaire for the dental practitioners was mailed survey. This data collection method was known to receive low response rate compared to other methods. Thirdly, the questionnaire was quite long (16 pages included baseline data).

In this study, however, no method had to be used to improve the response rate for dental practitioners group. The number of the questionnaire received after the first round of sending exceeded the calculated sample size already.

The reason why dental practitioners gave good cooperation with this survey might be because they felt it would be acted upon, and so would make a difference for future students.

From this study, it is found that to discuss the characteristics of competent newly qualified practitioners has been an effective mechanism for increasing dialogue between educators and the practicing dentist community.

5.4.2 BASELINE DATA

5.4.2.1 DEMOGRAPHIC DATA

The ratio of the female respondents were higher than male respondents in both Faculty staffs and dental practitioners group and was markedly different in the dental practitioners group. In recent decades the number of female dental graduates in Thailand had grown much more than male graduates. Male students were more interested in other careers such as Medicine, Engineer, and Computer sciences. The lower interest of male students in Dentistry might be due to the nature of the dental profession itself. The dental work takes long hours and can create a lot of stress.

Since the average age of the dental practitioners group was about 10 years lower than the Faculty staffs group, it could be expected that the number of female would be higher than male.

5.4.2.2 AGE

The average age of the Faculty staffs was about 10 years older than the dental practitioners group. The reasons why the average age of the Faculty staffs were much higher than the dental practitioners might be because the Faculty staffs that were excluded from this study were young Faculty staffs who were not currently working at the Faculty at the time of the study. Most of them were young staffs that were currently furthering their studies in higher degree. Furthermore, 60% of the dental practitioners who

responded to this study were dental practitioners who worked under the Ministry of Health. Many of them were newly graduated dentists who were obliged to serve the Ministry of Public Health for three years. Thus the average mean age of the general practitioners came out to be much lower than the Faculty staffs. Another reason might be that, as Chulalongkorn University is the first Dental school in Thailand with low turnover rate of faculty staffs, there should be more senior staffs than other Dental schools.

Concerning the curricular improvement, the advantage of the Faculty staffs having high mean age is that they had lots of teaching experiences. The disadvantages might include; they often had quite fixed ideas; they might be used to the conventional teaching techniques and might not be easy to adapt to newer educational models.

The advantages and disadvantages regarding the opinions of the dental practitioners having lower mean age might include: the advantage was that young dental practitioners might be able to give clearer idea about the competencies they need as new graduates because they have not have much experiences. The disadvantage might be that because they had fewer experiences, their perspectives might not be as broad and as deep as more senior general practitioners.

5.4.2.3 PREVIOUS RESIDENCE

Comparison of the present area of work to the previous residence showed growing number of the general practitioners who preferred to work in the same area of their previous residence.

5.4.2.4 EDUCATIONAL EXPERIENCES

The educational experiences of the Faculty staffs and the dental practitioners were highly different. For the Faculty staffs, 88% graduated for more than 10 years. Almost 90% of the staff graduated from Chulalongkorn University and 95% of the Faculty staffs obtained higher degrees. Many staffs obtained more than one degree and high number of them went abroad.

The dental practitioners, on the other hand, were relatively recently graduated. About 60% of them graduated for less than 10 Years. Only 45% of them graduated from Chulalongkorn University. Only about 40% of them obtained higher degrees. Very few obtained their higher degrees from abroad.

The differences of the educational background between both groups affect the opinions towards the competency statements especially in their open-ended opinions.

5.4.2.5 WORKING EXPERIENCES

About 70% of the Faculty staffs had been working in the Dental school for more than 10 years. Although about 45% of the Faculty staffs worked somewhere else prior to becoming faculty staffs, it was only short periods (average mean = 2.88 years) and many worked as internships or residency in the Dental schools or worked in other Universities. Lacking of experiences working as full time general practitioners could affect the opinions of the Faculty staffs, as they might not have the clear picture of what general practitioners faced in the real practice.

Although 60% of the Faculty staffs were ranked as Associate or Assistant Professors, which meant that they had certain experiences in research. The researches they have done usually were more specific to their

specialties. The Faculty will have to put more emphasis on research in the field of Dental Education, which form some key components of curriculum improvement.

About 30% of the Faculty staffs reported having experiences in administrative work but very few reported having such experiences at the University level.

About 90% of the Faculty staffs reported having part time job usually in private clinics or private hospitals. This might reflect the compromised ability as full-time staffs compared to the Faculty staffs working in the Western Countries where they can totally devote their energy developing their career in the Dental school.

About 40% of the Faculty staffs who reported having part-time job limited their practice in their specialty and this could affect their perspectives in giving opinions. The tendency of Dentists working in the clinics and/or private hospitals was that they focus on treatment more than on prevention or on promotion of oral health. Furthermore the treatment would be for individuals rather than for the community. Thus their perspectives of taking care of the community might be different.

In conclusion, baseline data revealed different characteristics between Faculty staffs and the dental practitioners. The differences were the mean age, educational background and working experiences. These affect the opinions given to the proposed competencies. Nevertheless, the advantages of these differences included wider perspective information for curriculum improvement.

5.4.3 CLOSE AND OPEN-ENDED OPINIONS TOWARD THE PROPOSED COMPETENCY STATEMENTS

5.4.3.1 OVERALL PERSPECTIVE OF THE RESULTS

Looking through the quantitative data of the results, it might be generally concluded that both Faculty staffs and dental practitioners rated agreed to mostly agreed with all proposed "major competencies" given in the questionnaire except one major competencies: Orthodontics treatment where the Faculty staffs only moderately agreed. Although none of the mean differences for the major competencies between both groups exceeds 1.0, the differences that were more than 0.5 should be taken into consideration. These included; the major competencies in the area of Occlusal treatment, Orthodontics treatment and Community dentistry. The reason why the researcher considered that 0.5 point of mean difference should be taken into concern was because the performance profile results of those competencies showed the different level of agreement to nearly all items. This would be discussing more in the following discussion of each major competency.

5.4.3.2 EXAMINATION OF THE PATIENT

Patients seek care from dentists in order to maintain their oral health and getting the treatment of oral diseases. The examination of the patient is the first step in assessing the patient and the oral environment. Dentists need to know the exact problems or needs of the patients in order to give appropriate plan and treatment. New dental graduates must first be competent in examining the patients.

From the results of the closed-ended opinions, there was very little difference in the opinions between both groups. Both Faculty staffs and dental

practitioners rated "agreed" to "mostly agreed" to all items in this major competency except one competency statement. Item 1.7:Produce diagnostic casts and mount them in a semi-adjustable articulator using a face-bow transfer and inter-occlusal records, was rated as "moderately agreed" by the general practitioners. The main reason for lower rating of the general practitioners was the practicability in the real settings. The lack of the budget to obtain the instruments was reported. The Faculty staffs responsible in teaching this competency should take this into consideration. It might not mean that this ability is not necessary. The rationale and/or the importance of using semi-adjustable articulator should be clarified to know the true indications of the cases. The cases in real needed then could be properly managed such as refer patients or develop the borrowing system among dental offices. Another important possible development is to put problem of expensive and unavailable equipment into the opportunity to research and develop those equipment in Thailand.

Another item that was rated lower mean score in this major competency was Item 1.5 dealing with the ability to perform special diagnostic tests and/or order appropriate clinical laboratory, and understand their diagnostic reliability and validity. Reason for lower mean score might be due to nature of the statement. The statement included complex competency and did not specify the types of the tests. It is known that there are several diagnostic tests for several purposes. The special diagnostic tests vary from familiar ones, such as Electrical Pulp Test, Occlusal Bite tests, to more unfamiliar techniques, such as Apex locators, Electronic periodontal probes. Thus, it would be rather difficult for the responders to give their opinions.

Jeffcoat M.K. and Clark W.B. [50]suggested that dental schools should change conventional teaching of oral diagnosis. To order diagnostic tests, dentists in the future must take into account that not all patients have similar risk for dental diseases and might need different tests. Tomorrow's graduates must be educated to formulate and update a strategy on how and when to order diagnostic tests.

As patients need different diagnostic tests, the cost-risk-benefit analysis of a specific diagnostic test will become increasingly important as the range of options expand. At present, dental practitioners can rarely evaluate new instruments on scientific bases because no rationale for the assessment of diagnostic instrument is taught as a part of the dental curriculum. A further challenge is to teach dentists of the future to target tests to those patients who need them most.

Actually, specific tests should be ordered based on a patient's chief complaint, history, intraoral finding, and risk factors [50]. It might be useful to revise the current teaching of special diagnostics tests for major oral diseases and have a practical guideline in the view that when and what kind of special diagnostic tests are needed. How valid and reliable are the instruments, what are further investigations in cases that the information obtained clinically is not enough. For cases that are beyond their competencies, and/or cases, which need more sophisticated tests, where could the patients be referred.

Despite the high mean of agreement in most items, results of the open-ended opinions raised several concerns.

The first concern in many items was the extent of those competencies. What exactly are expected in term of outcomes? What are the breadth and depth of the particular competencies?

The second concern was that in some complex sentences of the proposed competencies, which covered many performances, there would be some performances that new dental graduates might not be able to perform or were considered to be less importance. For example, Item 1.2: Obtain a medical, psychological, socioeconomic and dental history, the aspect of the psychological and socioeconomic status of the patients was considered less important and too complex for new dental graduates. Another example, Item 1.3: Perform a complete head and neck and intraoral examination appropriate for the patient, the aspect of head and neck examination, was considered to be less important than intraoral examination.

The third concern was about performing the competencies in real practice. Although the dental practitioners agreed with the proposed competencies, some of the competencies were rarely or not performed in real practices due to the lack of instruments and financial supports or due to the limitation of the number of staffs and time.

The forth concern was about the inability or compromised ability to perform some of the competencies. Some of the dental practitioners admitted that they could not perform or they had inferior ability in performing some competencies. The examples included; to examine head and neck or to perform face-bow transfer.

The fifth concern was about the standard dental record forms. Some dental practitioners preferred to use some kinds of standard forms so that the same methods could be used with all patients. It might be useful to survey how dentists make their treatment plan records. The development of common forms both brief type and full type would provide many benefits such as easy

communication with other health personnel, standardized data information system established, timesaving, etc.

Another concern was about a common form to communicate and consult with other health professions. At the moment, the standard form is not available. Therefore, it is recommended that the professional association should facilitate the development and subsequent usage of common forms. Dental schools should encourage teachers and students to write report in the same methods and should provide the opportunity for the students to use the forms commonly used in the hospitals.

These concerns revealed the needs for the Faculty to discuss further about the competency statements in order to define the statements in more detail before establishing the final document..

5.4.3.3 DIAGNOSIS

For this major competency, all competency statements were rated with high scores. The fact that every good treatment plan begins with a good diagnosis is an explanation for the high agreement of both Faculty staffs and dental practitioners. Although all statements were rated with high scores, the scores were not enough to be classified as "mostly agreed" except for one item by the dental practitioners. The reasons might be due to the general characteristics of the sentences. The competency statements proposed in this group did not mentioned exactly what dental diseases and/or conditions were involved. The opinions given then might be rated as "agreed" in general as well.

Major concerns regarding to this major competency included the followings:

The first concern was about the range of both oral diseases and systemic diseases that new dental graduates should know well or just be familiar. The ability of new graduates to perform this major competency should depend on the difficulties or complexity of cases. Again it showed the importance of the Faculty staffs to explore, group and classify the groups of oral diseases and systemic diseases according to the prevalence and/or the difficulties. The benefits would be that the faculty would have a clearer picture of to what extent and what exactly should the graduates learn and be able to do. The practice guideline then could be established so that the dentists could evaluate the situations and properly manage the situations better.

Another concern was about the ability to recognize impending or potential emergency situations in order to identify conditions, which require preventive strategies. The reason why this competency was rated the first rank by the Faculty staffs and ranked second by the dental practitioners might be because it is the situation, which could cause unpleasant situations or serious problems to both the dentists and patients. To be able to prevent the situations would be worthwhile.

5.4.3.4 TREATMENT PLAN

Results of the closed-ended opinions regarding this major competency showed the highest agreement among the three major competencies in this domain. Except for Item 3.6, all were rated with the mean about 4.4 - 4.6. The reasons for high agreements might be due to the importance of the treatment plan as the first step of excellence in dental care. Both the treatment plan that is improperly executed and the well executed that are inadequately planned will result in less-than-ideal care.

Concerns regarding this major competency included the systematic treatment plan, the standard form of patients' records, the importance of dentist-patient communication and the experiences of new dental graduates to perform the proposed competency.

Although there might be many factors involving the treatment plan, dental student should learn how to develop treatment plan that is both comprehensive and properly sequenced. The treatment plan is the fundamental of the dental care that would benefit to the patients the most.

Some dental practitioners preferred to use some kinds of standard consent forms so that the same format could be used with all patients. Currently when patients are more educated and the dentist-patient relationships changes, consent form documenting the agreement between dentists and patients along with good dental records will definitely protect dentist from fraud sue.

The importance of good communication with the patient regarding to the treatment plan is another concerns. In current times patients have better education and be more concern of their own health, they then would like to obtain information and to be a part of the decision making process of their oral health care. Thus the importance of having good communication skills in order to explain and discuss the information and come to the definite treatment plan suitable to each patient is another area that the Faculty staffs should take into consideration. Dental graduates need to be able to discuss with patients about the advantages, disadvantages, and expected outcomes of various treatments.

The last concern is about the experiences of new dental graduates to form good comprehensive treatment plans. There were concerns that new

dental graduates might not have enough experiences to perform this major competency well. However, if new dental graduates obtained good basic principles of making such a systematic and comprehensive treatment plan, they would at least know the ranges of what could be done and/or to whom should the case be consulted and referred.

5.4.3.5 ORAL DISEASE PREVENTION AND ORAL HEALTH MAINTENANCE

The results of the close-ended opinions revealed consistent agreement between both groups. Both Faculty staffs and dental practitioners rated items 4.1,4.2 and 4.3 as "strongly agreed" while rated the rest as "agreed". Apart from Item 4.5, the mean differences were less 0.15. The consistent agreement demonstrates the affirmative attitudes towards the responsibility of dentists to emphasize the prevention of oral diseases and to support the maintenance of the oral health.

The slightly lower agreement was given to Item 4.5, which concerns the ability to monitor and assess patient compliance in the prevention of dental disease including the record of appropriate indices. It might be due to the practicability to really perform in real practice because of the limitation of staffs and time and also of the patient compliance.

Item 4.6: The ability to manage effective recall system is another strategy to maintain patients' oral health. Although dental assistants or other personnel could manage the appointment, dental practitioners should be able to evaluate the treatment results and provide or recommend additional action and maintenance.

The present undergraduate curriculum has not emphasized the importance of this major competency as much as it should be. The competency has been taught but the importance of this major competency should be stressed. The assessment of the students' attitudes and performance of this major competency should be established. In Thailand where the number of the dentists is still low and the economy is not good, disease control and good prevention are the strategies that must be improved to be efficient. The strategies are cost-effective. The fact that oral diseases are largely preventable makes it important for dentists to perform such competency in order to reduce the treatment needs which cause more expense, more time and reduce workloads.

As beliefs, attitudes, and values play a large role in determining care-seeking behavior and oral health habits, dental practitioners should try to educate their patients in order to promote positive feelings of their oral health.

Preventive measures should be taught in every specialty in dentistry not just community dentistry and dentists should also be concerned about protecting patients from iatrogenic or dentists' initiated oral diseases.

5.4.3.6 MANAGEMENT OF EMERGENCY SITUATIONS

Emergency situations, though do not occur frequently, are conditions that can cause serious effects so that dentists have to be cautious and be prepared to cope with the situations. It is the situations that require both very good decision and management.

The result of the close-ended opinion revealed very high relatively agreement between both groups towards the competency statements proposed in this section. There was only one item (Item 5.7) that was rated as

"mostly agreed", the rest were rated as "agreed". The reason for other items not being rated as "most agreed" might be that the competency statements given were quite general in contexts and general practitioners might need some experiences to be able to do so.

Open-ended opinions showed some concerns regarding this major competency. The first concern was about the importance to effectively develop and implement office strategy for preventing and managing emergencies. Although both Faculty staffs and dental practitioners admitted that this competency was important, it seems like neither dental schools nor dental offices take serious concern. Dental schools provide factual knowledge but do not provide practicing skills. Some dental practitioners reported having no equipments in their offices and for those working in hospitals said that there were already emergency rooms. However, the ability to effectively use the equipments and mange the situations is as important as having all the equipments necessary and being ready for use. To be able to do so, dental schools should provide their students not only knowledge but also the practicing skills. It might be necessary to set scenarios if there are not enough experiences in the schools' dental clinics.

The practicing skill was another concern regarding this major competency. From Item 5.2-5.4 both Faculty staffs and dental practitioners stressed the importance of dental schools to provide practicing skills to their students. As mentioned above, dental schools should find strategy to overcome the problem of having not enough real patients or situations. Simulated scenarios or patients might help.

Another concern was about pharmacological agents employed in dental treatment and ones that used in life threatening emergencies. Some

dental practitioner criticized about pharmacology taught in dental schools that was unclear. In the researcher opinion, the problem of non-integration among subjects being taught in dental schools is the cause. Dental students learned in pieces and bits and could not integrate their knowledge together and without practice provided were the major factors that prevent dental graduates from performing such competencies.

Item 5.7 was rated the highest mean by both Faculty staffs and dental practitioners. The reason for giving highest score might be because the statement was straightforward. It is the researcher view that not only the emergency situations, for the most benefit of the patients, dentists should know their own ability and limit of every competency.

5.4.3.7 CONTROL OF PAIN AND ANXIETY

Dental pain is one of the most unbearable pains. Many patients seek dental treatment because of dental pain and vice versa many patients avoid seeing dentists because they are afraid of having pain. Anxiety is another major factor affecting dental treatment. Patients generally have significant fear and anxiety about having dental treatment. As pain and anxiety are fundamental aspects of most patients' experiences in dentistry, to promote student competency in controlling of pain and anxiety using both pharmacological and non-pharmacological (behavioral and psychological techniques) is necessary.

The range of scores given by Faculty staffs and dental practitioners toward the statements of this major competency was the widest. The mean average for this major competency was the lowest as rated by the dental practitioners and the second lowest as rated by the Faculty staffs. However,

on examination of all competency statements in this group, it was found that the first three items were rated in the same ranking order from the first to the third rank with the mean average more than 4. Item 6.4, 6.6 and 6.7, at the other end, were rated in the lowest mean group in this study. The reason for such controversies could be explain by the fact that in order to control of pain and anxiety, there are several methods, both pharmacological and non-pharmacological, ranging from less complicated to complicated techniques. The competency statements that were proposed in this study also raised various issues, varied from less complicated to complicated ones. Thus there could be various opinions towards the statements. At Chulalongkorn Dental School, there is neither lecture subject nor clinical practicing subject that deals directly with the whole perspectives of controlling of pain and anxiety. Control of pain and anxiety is taught in many Departments at Chulalongkorn Dental School. This highlights the importance given to this topic. It also demonstrates the piecemeal approach to the topic and non-integration/inco-ordination nature of the curriculum. There are 2 credit lectures that teach about local anesthesia (Local anesthesia and Exodontias 1&2), under the responsibility of Department of Oral Surgery. One credit lecture about general anesthesia is under the responsibility of section of Academic Affairs. Topics dealing with pharmacology of analgesics, sedative hypnotics, tranquilizers and anesthetic drugs are under the responsibility of Department of Pharmacology. The practicing skills then would vary depend on the students' experiences in various clinics.

Item 6.4 that dealt with the ability to use inhalation sedation in controlling pain and anxiety was rated the lowest mean in this study by both Faculty staffs and dental practitioners. The explanation could be that this

technique was introduced under the topic "sedation and general anesthesia for children with behavior problems in dental care and some types of the handicapped" under the responsibility of Department of Pediatric Dentistry. No clinical training has been offered. As a result, no dental students expect to obtain this competency. The question arises whether this should be one of the competencies for new dental graduates. From the competencies standard of three dental schools, all require their dental graduates to be able to utilize inhalation sedation techniques. For Chulalongkorn Dental School, this competency should be reviewed and reconsidered. If it would become one of the competencies required, the clinical practicing skills is going to be required as well as the assessment of the performing ability prior to graduation. From the open-end opinions, all agreed that this competency needs special training, and most mentioned training in continuing education course or post-graduated course. However, some thought that the use of nitrous oxide/oxygen techniques could be taught in the undergraduate level.

Item 6.5 was the item that was rated the forth rank by both groups. The reason why this statement had lower agreement was due to the nature of the statement that was quite broad. As reported in the open-end opinion, both Faculty staffs and dental practitioners felt that this competency was not quite clear because it did not mentioned the techniques involved.

Item 6.6 and 6.7 were the statements that were rated within the five lowest means in this study by both groups. Even though the statements proposed in this study require just the ability to discuss and explain the use of the intravenous sedation and general anesthesia with patients, the Faculty staffs and the dental practitioners only "moderately agreed" with the statements. The reason for this might be that in general practice, the use of

intravenous sedation and the use of general anesthesia are not common. These two competency statements proposed, however, came from the standard of only one of the three Dental schools, which the researcher adapted from. The Chulalongkorn dental school needs to reconsider about these two statements.

In the researcher opinion, dental practitioners' ability to control pain and anxiety is one of the most important competencies in the profession. It is the strategy to earn patient's confidence and cooperation and it will influence the patient's desire to seek dental care. The dental school needs to explore and reconsider whether new dental graduates possess this major competency and to what extent prior to their graduation.

5.4.3.8 SURGICAL THERAPY

The result of the study showed relatively high score of approval by both the Faculty staffs and dental practitioners. The means rated for this major competency were the third rank by general practitioners and the forth rank by the Faculty staffs. All of the statements were rated by the Faculty staffs with the means higher than 4.30 and only one equaled to 4.00.. For the dental practitioners, apart from Item 7.9 and 7.10, all were rated higher than 4.30.

The reason why this major competency was rated with high mean was that the statements were quite specific in scope and quite common in general practice except for the last two items.

Item 7.9 and 7.10, which deal with the ability to explain and discuss about surgical placement of dental implants and other complicated surgical procedures, were rated with lower score by the dental practitioners than by the Faculty staffs. This might be due to the nature of the procedure that is not

normally performed by the general practitioners together with the fact that little knowledge had been taught in the undergraduates' level.

For the dental implants (Item 7.9), although it is a good alternative or supplementary treatment for patients who need teeth replacement, is the procedure that requires specialists who have been properly trained. The cost of treatment is also very high. Then the number of patient who could afford might be less. This might be the reason why Faculty staffs and dental practitioners considered this competency not much necessary.

The major concern of this major competency from the dental practitioners were that undergraduates did not have enough experiences from the dental schools due to the reducing number of patients. They emphasized the need in real life practice and persuaded the dental school to find the strategy to overcome the problem.

5.4.3.9 PERIODONTAL TREATMENT

Periodontics is the branch of Dentistry that deals with diseases of the supporting structures of the tooth, including alveolar bone, root surface cementum and periodontal ligaments. Periodontal diseases are common problems in Thailand. This study showed that this major competency was rated the highest mean by both the Faculty staffs and dental practitioners. All items in this competency were rated with scores of more than 4.00. Four out of five items were rated as "mostly agreed" by Faculty staffs whereas dental practitioners rated "mostly agreed" with three items. The reason why Item 8.1,8.2 and 8.5 were rated as "most agreed" was that the statements described the ability normally performed by general practitioners and Item 8.1& 8.2 are the basic practice in periodontal treatment.

The largest mean difference was found in Item 8.3, which concerns with the ability to evaluate the results of periodontal treatment and to establish and monitor a maintenance program. The reason why dental practitioners agreed less was the chances to practice this competency in real practice were fewer. The obstacles included the lack of time and patients' compliance. In the researcher's view, the evaluation of any treatment should be planned and done as much as possible.

Apart from the competency statements proposed, Jeffcoat M.K. and Clark W.B.[50] discussed the potential of education changes due to the advance of sciences and technologies. In their view, apart from the mechanical therapy to remove plaques and calculus and to plane the roots, periodontal treatments tended towards more complex and possible lengthy treatment with drugs and/or growth factors. Dental students in the future might need to be taught with more emphasis on the biology of the disease, the bacterial etiology of periodontitis, pharmacology, oral medicine, medical management, critical review of clinical trial results, and the evaluation of risk-benefit ratios.

5.4.3.10 ENDODONTIC TREATMENT

Endodontics is the branch of Dentistry that concerns with the morphology, physiology, and pathology of human dental pulp and periradicular tissues. Its study encompasses the basic clinical sciences including biology of the normal pulp, the etiology, diagnosis, prevention, and treatment of diseases of and injuries of the pulp, and associated periradicular conditions.

The result of the study indicated relative high agreement by both Faculty staffs and dental practitioners. None of the competency statements

were rated lowers than 4.00. Exploring the open-end opinions of the proposed competency statements, there was much concern regarding the treatment of multi-rooted teeth. While Faculty staffs preferred the cases to be referred, some dental practitioners concerned about the patients' needs.

Endodontic treatments in recent decades has resulted in increasing number of patients seeking endodontic treatments to preserve their teeth as long as possible but the number of endodontists is inadequate to cope with all those who require treatments. It is necessary to train undergraduate dental students, most of whom will become general practitioners, to treat routine and uncomplicated cases.

The complexity of the anatomy of the root canals is one of the important factors affecting the success of the treatment. In selected cases, endo-molar lesions might be less complex to treat than some complicated anterior or pre-molar teeth. General practitioners who obtained good principles of endodontic treatments should be able to perform endo-molar procedures in selected cases. In dental schools, more practicing skills might be nurtured by allowing undergraduates to perform more in extracted teeth placing in phantom heads. In selected cases, some senior dental students who have good record of clinical practice and high responsibility might be able to train in real patients.

Other concerns from dental practitioners were clinical experiences of various competencies gained during at the undergraduate level. Non-vital bleaching, apexogenesis, apexification, and correction of perforation are procedures they would like to be trained.

5.4.3.11 OCCLUSAL THERAPY

The results of closed-end opinions showed different thinking between Faculty staffs and dental practitioners. The average mean of this competency given by the Faculty Staffs (4.62) was much higher than the average mean given by the dental practitioners (3.91). While Faculty staffs rated "mostly agreed" in 5 out of 7 proposed competency statements, dental practitioners rated "mostly agreed" in none of the statements. In all items, dental practitioners rated with lower scores compared to the scores rated by the Faculty staffs. The reason why dental practitioners agreed less with the statements might be explained by the fact that diagnosis, treatment planning and treatment of occlusion and temporomandibular joint disorders are areas that involve somewhat complex levels of clinical decision-making. These competencies require extensive and repeated exposures to patient problems. The competency also requires the application of knowledge across disciplines. As mentioned by some dental practitioners, this branch of Dentistry is one of the most difficult subjects to understand. As a result, dental practitioners who do not feel competent in performing such competency would then try to avoid the treatment. Furthermore, the number of patients seeking for treatments for these problems might not be high. There has never been any survey of the incidence of the problem nor what treatment has been provided. Apart from didactic knowledge, which is very difficult to understand, undergraduate students have very few experiences in clinical practice. Faculty staffs who are responsible in teaching this branch of Dentistry might use the competency statements to review and redesign the curriculum and seek newer models to help students understand better and to enable them to perform basic treatments in this field.

5.4.3.12 ORTHODONTIC THERAPY

Differing from the results of already-mentioned major competency, the result of the opinions given to the competency statements in orthodontic therapy showed lower agreement of Faculty staffs when compared to the dental practitioners'. This major competency was rated the lowest average mean by the Faculty staffs. It could be said that the Faculty staffs only moderately agreed with all of the competency statements proposed. The two items that were classified into the agreed group had the mean scores of 3.50 that were the lowest score in this category. Dental practitioners expressed their needs by agreeing with all statements and by rating higher scores compared to the Faculty staffs to every statement.

Similar general practitioners' needs were reported in the study of Gerbert B. et al. [51] where the respondents wanted more orthodontic training. They concluded that the needs might result from the rising demand for such cares.

The American Association of Dental School conducted annual surveys of graduating dental students from year 1978 to 1992. Students were asked to rate the level of instruction as inadequate, appropriate or excessive in 19-subject area. Orthodontics received 52.9% as "inadequate" responses and was the highest subject in this category. [24]

As Faculty staffs gave no written opinions, it would be difficult to explain why Faculty staffs only rated "moderately agreed" for all the statements. The Orthodontic Department at Chulalongkorn University has concentrated more on post-graduate students. It might be the nature of the specialty that the treatment is quite complex and maltreatment might cause

serious problems to patients. Thus less emphasis for the specialty has been placed at undergraduate level.

Dental practitioners' concerns were expressed in their written opinions. The major concern was the lack of clinical experiences at undergraduate level. General practitioners would like to be able to provide treatments for their patients due to the increasing needs.

Demand for Orthodontic care increases continuously but the number of the specialists to cope with all demands does not match with the demands. General practitioners should be able to select intelligently those orthodontical patients whom they can handle. Hence faculty staffs who are responsible in teaching Orthodontics might reconsider the undergraduate curriculum by setting the appropriate competencies for general practitioners in order to obtain better educational objectives. In order to establish the competency statements, Faculty staffs who are responsible of this subject might consider what the general practitioners really should be able to do in this area. How could the general practitioners acknowledge the indications for orthodontic treatment, its possibilities, and its limitation? What knowledge should they have, to be aware of the scope of treatments they could perform and to be aware of the risk of the treatment? What would be the appropriate teaching-learning strategies that help students gain these competencies?

Profit W.R. and Norton L.A.[52]recommended that if Orthodontics is to be successfully incorporated into a well-run general practice, two things are necessary: Firstly, diagnostic skills must be developed to the point of differentiating between relatively simple and relatively complicated orthodontic problems. Secondly, treatment skills in the use of effective appliances for

movement of teeth must be developed. Of the two skills, the diagnostic skills is more important.

5.4.3.13 ORAL MUCOSAL THERAPY

There were two statements in this major competency. Both were rated as "agreed" by both Faculty staffs and dental practitioners. the statements proposed were quite generous in nature and the competencies required for both statements were at the manageable level. These are reasons that made both group agreed. Comments from the Faculty staffs were that the competency of new dental graduates should cover only diseases with high prevalence. However, the incidence of oral mucosal diseases and abnormalities are quite low. Undergraduates might not have good chances to see cases and , for this reason, their competence might be lessened. Dental schools would have to find some supplementary methods to help them learn. Dental practitioners had some concerns about the ability to differentially diagnose oral cancers and to appropriately prescribe drugs for treatment of oral lesions. Dental practice guidelines, which are systematically developed and periodically revised, would help general practitioners in making decision on the appropriate management for patients.

Rovin S.[53] stressed that the roles of the general practitioners are to be able to detect and determine the general nature of a disease condition rather than to establish a definitive diagnosis. What should be expected of the general practitioners, in his view, was the ability to detect, to approach to diagnosis, to refer, and to interpret the significance of a diagnosis and manage the patient appropriately.

5.4.3.14 RESTORATIVE THERAPY

Restorative dentistry covers prevention, diagnosis, and treatment of diseases of the dentition; correction of malformations and of accidental injuries affecting the permanent dentition by restoration of parts of teeth; replacement of missing teeth with fixed restorations; and restoration of function, including occlusal adjustment[54]. Therefore, it includes operative dentistry, fixed prosthodontics, and occlusion. However, at the Faculty of Dentistry, Chulalongkorn University, there are separate Departments of Operative Dentistry, of Prosthodontics (that also covers fixed restoration) and of Occlusion. In this study, the competency statements in this major competency covered only the aspect of Operative dentistry.

The result of the study revealed high relative agreement between Faculty staffs and dental practitioners for the first seven competency statements. They were rated with very high scores with a range from 4.71 up to 5.00. The reason for very high agreement was that they include procedures most general practitioners regularly perform in their practices. Open-ended opinions revealed some particular points that Faculty staffs and dental practitioners felt should be emphasized.

Differences in opinions could be observed in the rest of the statements. Item 13.5.4 was rated "moderately agreed" by both groups. Reasons for lower score were different. Some of the Faculty staffs felt that this competency should be better taught at post-graduate level. Dental practitioners had other reasons including patients' unaffordability, need of high precision techniques and preference to refer specialists.

From Item 13.5.5 – 13.7, dental practitioners and Faculty staffs had different opinions. The reason why Faculty staffs rated "moderately agreed" for

these statements might be that the procedures are more sensitive and complex. Dental practitioners, on the other hand, felt that there were increasing needs from the patients and practicing experiences had better be gained at undergraduate level. The advents of new biomaterials and techniques, coupled with increasing patient education and dental awareness have resulted in an increasing demand for cosmetic and esthetic dental treatments. Dental schools might have to prepare current graduates to meet these challenges.

Elderton R.J.[28] wrote an article criticizing dental education, especially the education in Operative dentistry. He argued that dental education was burdened by outdate curricula. Caries and restored teeth were still largely managed by traditional Operative Dentistry, which led to repeat restoration cycle. He recommended that dental education should emphasize the philosophy of maximum non-invasive intervention and minimal invasive interference. The problem of dental schools was that they still rewarded students for filling a tooth rather than for remineralizing incipient carious lesions. He stressed the importance of changing the emphasis of teaching towards prevention. The present philosophy should be one of prevention, and for intervening invasively as little as possible. But, if necessary, dentists could intervene non-invasively to an optimal level.

Jeffcoat M.K. & Clark W.B.[50] gave their opinions regarding dental education. They admitted that the task of teaching restorative dentistry would be complicated by the needs of clinical patients. The dilemma faced by curriculum committee was how to free up sufficient time to include new techniques while ensuring the level of competency in basic restorative skills for graduating practitioners. They commented that, in a time of rapidly

expanding knowledge, dentists in the future needed to know more than how to competently place an excellent restoration. They would have to be able to read research results and to judge for themselves which new materials met reasonable criteria for adoption in practice. Furthermore, since all restorative materials contain chemicals with potential adverse effects, the dentist would need to be able to weigh both risk-benefit and cost-benefit ratios. Those issues were of particular importance in helping a patient make an informed decision.

5.4.3.15 PROSTHODONTIC THERAPY

At the Faculty of Dentistry, Chulalongkorn University, students learned how to provide prostheses with the Faculty staffs in the Department of Prosthodontics, which is the largest Department. However, the Department is further divided into 4 sections including section of crown and bridges, section of removable partial dentures, section of full dentures, and section of dental materials.

The results of the study revealed relatively high agreement between the Faculty practitioners and dental practitioners. Eleven out of seventeen statements were rated as "mostly agreed" by both groups. Only the last statement (Item 14.17) was rated as "moderately agreed" by Faculty staffs. The reason why most statements were rated with high scores might be because most of these statements were main procedures in replacing teeth for patients

Three items that were rated with lower scores included item14.7, 14.16 and 14.17. Item 14.7 dealt with the ability to obtain working cast and mount them on a semi-adjustable articulator using a face-bow transfer, and

inter-occlusal records. Concerns about this competency as obtained in the open-ended opinions showed different perspectives between Faculty staffs and dental practitioners. Faculty staffs questioned about the ability of the Faculty staffs to specifically teach this competency due to the problem that some of them did not use the equipment themselves. Dental practitioners concerned more about the lack of equipments in real practice. The ability to establish and verify maxillo-mandibular jaw relationships is necessary for dentists who perform prostheses. Apart from using techniques proposed in the statement, it might be necessary for undergraduates to learn to use other techniques that are simpler and can be used with more available equipments. Furthermore, students should have real understanding of the indications and of patients that need this delicate method and should manage appropriately.

Item 14.16 stated about the ability to explain and discuss with patients about the theory and application of endosseous implants with regard to form, function and esthetics. The opinions of the Faculty staffs, with low scores, were that the subject should be taught at the post-graduate level and that general practitioners had better refer cases to specialists. Some general practitioners proposed that more contents should be put into the curriculum.

Item 14.17 dealt with the ability to explain and discuss the theory and application of oral rehabilitation. The opinions of the Faculty staffs and the dental practitioners were generally the same as Item 14.16.

The researcher's opinion for Items 14.16 and 14.17 was that undergraduates should learn about rationales of treatment and the overview of the subject without going into details. It would benefit the students if they have the opportunity to observe cases or to learn by audiovisual aids. General practitioners should be aware of the cases that have the indications and

should manage the patients appropriately. If they did not have any experiences during their undergraduate training, they might not be able to differentiate cases or to consider the array of choices of treatments.

In educating complex treatments and procedures to the students, Jeffcoat M.K. & Clark W.B.[50] recommended using the model that medical schools used to teach medical students. The difference in teaching mode was that in dental schools, dental patients was assigned to students to be treated under the supervision of licensed dentists, while in the medical schools, patients were treated by doctors and medical students learned when cares were provided.

5.4.3.16 COMMUNITY INVOLVEMENT

The last major competency surveyed in this study is the community involvement. In the history of the dental profession, dentists in the past used to act as if the ultimate objectives of dental practice were the removal of teeth and the construction of dentures. However, with the development of sciences and technologies, Dentistry was further developed. Mechanical techniques were then used in dentistry to try to keep and restore patients' teeth. The concepts and methods of prevention have also developed. In the United States of America, The first Department of Community Dentistry was created at the University of Kentucky in 1962[55]. In Thailand, the Department of Community Dentistry at Chulalongkorn University was established in 1973[1]. It could be seen that the science of Community Dentistry is relatively recent compared with other disciplines in Dentistry.

The result of the study showed rather different opinions between the Faculty staffs and the dental practitioners. Although all statements were rated

as "agreed" by both faculty staffs and dental practitioners, two observations were made. Firstly, Faculty staffs gave lower scores to every statement when compared to dental practitioners. Compared with other major competencies, the averages mean for this major competency, given by the Faculty staffs, was ranked the third from the lowest end. Secondly, Faculty staffs gave no written opinions.

The reasons why these statements were rated with lower score might be due to the nature of the statements. The statements did not mention directly what the general practitioners should be able to do in term of patients or community management. The statements were more like behavioral objectives rather than true competencies. Furthermore, some of the statements were competencies that are quite difficult to perform. It might be necessary to reestablish the competency statements in this major competency to obtain a clearer picture of the graduates' ability in this area.

Dental practitioners gave some interesting opinions. Question had been raised that "What really are the roles of our dentists to community"? In one general practition's view, what our dentists do are mostly giving treatments. This might reflect the unsatisfactory result of the curriculum, especially in Community Dentistry, because fundamental to any involvement at the community level is the commitment to Preventive Dentistry.

Community Dentistry should be one of the very important aspects of the dental profession in Thailand for two main reasons. First, the ratio of our dentists comparing to the population is low. The total number of the dentist in Thailand is about seven thousands comparing to the population of about sixty-two millions. There is no way that dental professionals can adequately provide the dental treatment required by the population. If dentists concentrated more

on treatments, a lot of people would lack care and congregate more needs and problems. Thus, Community Dentistry, which concentrates in preventive dentistry, would be the means that dentists can serve the population in the "one-to-many" role and help the population achieve good oral health.

Second, the cost for Dental treatment is high. Almost all the equipments and materials used in Dentistry are imported from abroad. Professor Prawase Wasi[56] reviewed the health system of the country in the past and found that Thailand had developed a relatively good health care services. However, the health expenditure also increased at a very high rate in the past several years. The excessive increase in the rates of health care expenditure over those of income indicated that the system was running into crisis and needed to be improved. The health promotion system needs to be fully developed and the disease control and prevention system must be improved to be fully efficient.

The dental service system as part of health care service may also not be cost-effective and need to be improved as well since the emphasis of dental services tends to concentrate on treatment rather than on prevention. Dental schools will have direct responsibility to train dental students towards the new system. Apart from giving cognitive knowledge in community dentistry, dental schools should train students in such a way that they can integrate their knowledge and are able to promote disease control and prevention system to the community. The learning issues of health economy might help students understand why prevention scheme is as or even more important to bring about good dental health for all.

Dentists have role to improve the oral health of people and will have to serve the community whether they work in public or in private settings.

Furthermore, whether they are dealing with patients individually, or in-groups, their professional efforts will influence the health of the public. On the other hand, the environment of the community and the use of certain types of preventive procedures on a mass basis will be relevant to the treatment of individual patients, since they have an important impact on the incidence of dental diseases. Fundamental to any involvement at the community level is a commitment to Preventive Dentistry. Dental schools should put emphasis on Preventive Dentistry and make clear that Preventive Dentistry is a basic philosophy of practice including all aspects of oral care. One of the keys to preventive dentistry is high quality services to all patients. Dental schools should educate their students to understand and to be internalized into the profession and to realize that the ultimate objective of dental practice is the maintenance of the entire dentition in health and function for the entire life of the patient. In order to do so, they should learn about what would be their proper roles to the community.

5.4.4 OTHER COMPETENCIES

The provided area at the end of the questionnaire to obtain open-ended opinions of any concerns about the competencies from the respondents brought good results and many considerations were obtained. There were 20 messages from Faculty staffs and 35 messages from general practitioners. Other competencies that did not appear in the questionnaire had been mentioned, especially the competencies about ethics, communication and interpersonal skills, life long learning and self-directed learning, and teamwork.

5.4.4.1 ETHICS

There were many concerns regarding other competencies not included in the questionnaire. Among those, the competency about ethics was the most concerned. The concerns made almost all called for a dental curriculum that stresses the importance of teaching dental students to become a dentist with high ethics. Some noticed that new generation of dentists had less responsible to patients and became more concerned about their earnings. The clinical competence, although is important, could be continually developed after graduated. The ethics, on the other hand, have to be taught during their trainings.

The present curriculum at the Faculty of Dentistry has two subjects, which are lecture-based called: "Basic of Community Dentistry" and "Laws, Ethics and Forensic Dentistry". They teach about Ethics. The first subject is placed in the first semester for the first-year students and the second is placed in the first semester for the sixth-year students. Ethics is also taught in an informal way throughout the curriculum by Faculty staffs who are concerned about it. What is really missing is the formal evaluation of the behavior. Ethical topics should be raised from the first day students enter into dental schools. Dental schools should modify the curriculum to emphasize more on ethics. Other teaching-learning strategies should be implemented. And most importantly, dental schools must also assess the attitudes of the students and make sure that the students develop the right attitudes in their future careers.

Apart from the ethical practices, students should learn about the appropriate relationship between health care providers and patients. Students should learn to pay attention to humanistic values in patient care and

professional behaviors. Ethics courses should intend to stimulate students to ethical dilemmas in the practice of the profession.

The teaching-learning strategies should not be all delivered in a lecture format. Role model, problem-solving dialogue (case-based), video feedback, small group discussion are some of the techniques that can be used[57 58]. Clinical observations, feedback, evaluation of ethical practices and decision-making are assessment techniques that have been recommended[24 57-59].

5.4.4.2 COMMUNICATION SKILLS AND INTERPERSONAL SKILLS

Communication skills and interpersonal skills are competency areas that were also mentioned. Some said the Faculty did not emphasize these skills, which were important in real life work. Others mentioned that dental students should learn how to handle the conflict situations and how to work with others, especially other health personnel.

There was concern of practice management and interpersonal skills. This is in consistent with surveys conducted in the western countries which suggested that dental education system is not fully responsive to the states needs of its graduates [51].

Effective patient/provider communication is another competency that needs more emphasis. The nature of patient/dentist interaction shifts from dentists' informing and prescribing to two-way communication. Patients' collaboration and greater involvement of patients in decision-making about their oral health care will greatly influence dentists to communicate effectively with dental pateints.

Dental schools should pay attention to training dental students to obtain basic communication and interpersonal skills. All medical schools in the United Kingdom have communication skills courses. Role-play, video feedback and small group discussion are favored teaching methods [60]. In the present curriculum, the topic of communication is taught under the subject: Applied Medical Psychology, which is lecture-based.

5.4.4.3 LIFE LONG LEARNING AND SELF DIRECTED LEARNING

Some concerns were made recognizing the needs for self-direct learning ability. Rather than the passive reception of knowledge that characterizes a lecture-based course, the recognition of the importance of students taking an active role in learning has been a major issue in the twenty-first century. The fact was that there was information overload in dental curricula as a result of rapid advances in sciences and technologies as well as changing health care needs of the population. These necessitated dental educators to seek for better models in the teaching-learning strategies.

It is now accepted that undergraduate dental education can hardly be sufficient to fulfill requirements for independently practicing dentistry. The public will inevitably demand that dentists bring both their knowledges and skills up-to-date throughout their practicing lives. Actually, much of what dentists learn is learned after graduation. Self-directed learning in the first few years following graduation will increasingly become a matter of priority. It follows that dental curricula should promote self-directed learning skills.

Dental educators recognize the importance of students taking an active role in planning and organizing their learning, in identifying their own learning objectives and receiving constructive feedback on their progress.

These principles of adult learning apply very well in higher education and will result in better long-term recall and retention of facts, in more motivated and stimulated students and in the acquisition of independent learning skills.

Dental schools can no longer teach only academic facts and theories. The skills of being able to identify problems, to search for evidences, and to critically appraise evidences should be highlighted in the training period. The appropriate process of evaluation of the thinking process should also be included.

Improvement in this area needs more attention since technology and knowledge increase at a rapid rate. Graduates have to be in close touch with continuing education to keep up with the changing standards of management in their fields of interests.

Innovations such as problem-based learning, group projects, and learning contracts in many schools are all designed to encourage the learning of such skills. Many dental schools in the Western countries have tried problem-based curriculum[6-11]. In Thailand, the Faculty of Medicine, Chulalongkorn University has also tried to use problem-based curriculum[61]. Several reports described the outcomes of such curricula[6-11]

For implementing self-directed learning into the dental curriculum, what should be taken into consideration is that dental students might not be familiar with self-directed learning since the pre-University education has been based primarily on passive learning. Students might not be well prepared for independent study. The important benefit of self-directed approach is obvious that students who develop such skills will be able to learn and relearn themselves as knowledge keeps developing. Thus the Faculty of Dentistry,

Chulalongkorn University will have to realize the importance and to find proper strategies to develop students' skills in this area.

5.4.4.4 TEAMWORK

There were concerns about the new graduates' ability to work with other health personnel as members of health care teams.

Teamwork is another area that receives interests recently. In medical education, team working within a multidisciplinary setting has been developed. Moves towards more effective ways of learning include task-based activities in small groups that focus on real clinical issues or on preparation for working together in health services. In dental education, the move towards teamwork is in a continuing development[62 63]. Meadows h., Ireland r., and Bligh J. conducted a survey to examine the attitudes of general practitioners towards changes in undergraduate dental education[44]. A high proportion of respondents recognized the importance of team learning and pointed out that it should become an integral element of the undergraduate course.

Dental schools should consider the adoption of learning mechanisms that support dental students working together. Dental students should be able to work in a group drawing up and managing care plans for patients and community.

5.5 GENERAL DISCUSSION

In order to set an educational program suitable for producing general dental practitioners in the 21st century, there is a need to focus more exactly on the competencies that dental graduates need to acquire.

The educational program should have objectives that are highly relevant to the health needs of the population. Analysis of the oral health problems in the community is seen as an essential step in the changing of existing educational systems for oral health personnel.

Baseline data on the populations' oral health status is the key for logical development of the oral health plan that would link to the educational plan[64]. The baseline data should include information regarding all areas of oral health problems and not limited to caries and periodontal diseases. Examples of other information needed include the followings: the prevalence of headache and facial pain, of anomalies of craniofacial development, the prevalence and identification of possible causes of temporomandibular joint problems, of possible causes of pathological mucosal conditions, and the prevalence and nature of oral health problems in the older population and handicapped groups.

The health needs will lead to the relevant manpower plan and the definite role and function of oral health personnel in assisting in the resolution of the community's oral health problems. For these reasons the needs and interests of the community must be represented in the formulation of the educational objectives and in the design of the evaluation system.

The logical development of educational systems for oral health personnel and the maintenance of the relevance of the systems to the needs of the countries, links closely to well-defined manpower plan. Such plans must be developed in coordination with all stakeholders. Usually the model used in manpower planning had been based on the supply/demand model and the numbers determined on a dentist-to-population ratio[64]. However, there are other factors that should be taken into account in manpower planning. Other

factors are role and function for each type of personnel should be well defined in relation to individual and community oral health needs, the oral health and other characteristics of the population to be served (such as diet, socio-economic status and education etc).

The oral health goals need to be compatible with the educational goals. The development of the educational program must be related to the oral health goals. Trained oral health personnel must be competent to perform their defined activities in a dental health service structure that permits them to function in a manner that will achieve stated goals. Hence the health care system and the educational system are intimately linked.

Considering contemporary education, it is necessary that the Faculty of Dentistry, Chulalongkorn University improves the undergraduate curriculum to meet the present needs, i.e., the education that focuses on the outcome of the education.

Competency-based curriculum, a different model from the discipline-based model currently used in the Faculty of Dentistry, Chulalongkorn University, is recommended. The rationale and the principles of competency-based curriculum have been reviewed in chapter 2.

If the competency-based education model is to be implemented, the whole curriculum will require considerable changes. The first step will be defining educational objectives that focus the outcomes of the education, i.e., the graduates in terms of their competencies to be able to respond to the oral health needs of the population.

This study used proposed competency statements to assess the opinions of the Faculty staffs and dental practitioners. The results of the study revealed many useful points for the Faculty to take into considerations when

improving the curriculum. The study gathered opinions from both the Faculty staffs, who were on the producing side, and from dental practitioners, who were the outcomes of dental education and worked in real practice. So the results of the study were useful because it provided different perspectives and the reasons from both groups.

Competency statements in the study were adapted from 3 Dental schools in the United States of America. Although they were the latest documents that were available at the time of the study, there might be further improvement of the documents since the whole development of this model in those schools has not been completed. As observed by Glassman P. and Chambers D[39], there were many statements that were not true competencies but looked more like behavioral objectives in the conventional discipline curriculum. Thus, many of the statements in the study, although were rated as agreed, might have to be further modified to reach a clearer view of the competencies.

In this study, the result of the rating scale only indicated the level of the agreement to the proposed statements. The different levels of the agreement would depend on many reasons or perspectives of the responders, which could not be clearly identified by the design of the study. The scope (the specificity or broadness), the simplicity (difficult or easy to perform), the practicability (the practicable in real practice) of the proposed statements and the experiences of the respondents might have influenced their opinions.

The competency statements that were rated as "moderately agreed" should be reconsidered whether they are necessary or not to the present needs. Some parts of the results identified specific topics, in which dentists

considered themselves to be under prepared in their training. These should also be taken into consideration when improving the curriculum.

It seems that dentists in the twenty-first century may have to become oral physicians, who take responsibilities for not only high technology treatments but also in all aspects of oral health care. Oral physicians will become leaders of the oral health teams, select strategies, plan, organize and evaluate goals that would be set up to achieve oral health. Furthermore, they will take responsibility on prevention and oral health promotion activities. Faculties that want to produce dental graduates suitable for this era will have to establish competencies that will describe the abilities suitable for the contemporary dentists.

To change the educational systems is difficult. However, the change is needed. There have been recommendations to help enhancing the possibility of the difficult tasks.

5.6 WORKING STEPS TOWARDS CURRICULUM IMPROVEMENT[12 24 39 65-67]

5.6.1 PLACE CURRICULUM IMPROVEMENT INTO THE STRATEGIC PLAN

Faculty strategic plan for curriculum changes is mandatory. True curriculum improvement requires an incredible investment of dental school resources: time and effort of faculty, staff, and students, facilities, faculty development. This can be accomplished successfully only through a strategic planning process. Philosophy shift among the administrators must begin first. They will have to give full support and help removing the obstacles throughout the process.

5.6.2 SET UP A COMMITTEE RESPONSIBLE FOR THE CURRICULUM IMPROVEMENT

The curriculum planning necessary for competency-based education also requires strong centralized management of the curriculum by a committee sufficiently empowered to proactively monitor implementation and make modification as needed.

A Committee must be set up to have direct responsibility in improving curriculum. Staffs from various disciplines incorporate with others stakeholders are to share their ideas and working towards the goals.

The guiding principles should be created. The guiding principles should describe the characteristics of an ideal or "goal standard" curriculum, which can serve as outcome, measures to evaluate the success of the remodeling. These principles should be communicated to the faculty for discussion, modification and eventual approval. The principles should be endorsement by the chairs of the school's academic departments, again, for emphasis, before starting curriculum review.

5.6.3 PHILOSOPHY SHIFT OF THE WHOLE FACULTY

The competency-based curriculum is different from the discipline-based curriculum that the dental school has been used since its first curriculum. The whole faculty staffs should understand the philosophy of the competency-based curriculum, the differences between the two models, the limitation of the old model, the need to look for the new model. They must have clear perspective of how would the competency-based model make a better curriculum. The philosophy shift of the whole faculty is needed. Acceptance of competency philosophy in curriculum means that we must have faculty

consensus as to what constitutes competencies for the entry-level dentist and then ensure that those competencies are met prior to graduation

5.6.4 DEVELOP A SHARED VISION AND GOALS FOR THE NEW CURRICULUM

Change began with a vision. Change in an organization must involve all of its members. Changes were most successful when they reflected broad-based ownership of the innovations. The change process should start by let the entire faculty develop a shared vision. The whole faculty staffs should be involve in making this strategic plan, as they would have the same vision and be involved in the changes.

The purpose of pre-doctoral dental education must be redefined

A task force to create and disseminate models of pre-doctoral curricular that incorporate the various improvements should be established.

Definite objectives area of the under graduate curriculum, in which it wished to see significant improvement, also need to be set up. The examples include: reduce factual knowledge (information), encourage self-directed learning through curiosity, integrate learning with clinical practice, enhancing communication skills, community involvement, public dental health as a prominent part of the courses, assessments of understanding not recall, developing appropriate attitudes and attributes towards patients and colleagues.

5.6.5 DEFINE THE COMPETENCY DOCUMENT

Having a shared vision that the Dental school should improve the curriculum in terms of competency-based; the Faculty will have to develop the

document "Competencies for the dental graduates" as the first stage of the project.

Top-down curriculum planning that begins with the identified tasks and responsibilities of general practitioners and works backward to create learning experiences that help students acquire these competencies.

The Faculty staffs have to identify future-oriented competencies that reflect the roles, responsibilities, and practice environment of the dentist functioning in a professionally managed practice.

The first draft could be established by setting up working groups to define others competencies that has not yet been covered from this study. Others domain such as Professionalism and Ethics, Patient management, Practice administration, Information Management and Critical thinking are the examples of Competencies that had not been proposed in this study. The same process like this study might be done to assess the opinions of the stakeholders.

After finish documenting the first draft, the workshop might be set up in order to communicate with the whole Faculty about the competency-based curriculum and to disseminate the proposed competencies (the one that cover the whole range of competencies) for the Faculty staffs to discuss, feedback and make consensus. The document will be revised again by the working group and might be sent for external review for validation proposes. The final document then will be established and distributed to the whole Faculty for continuing on the next step.

Having the whole Faculty to work together on competencies document will make Faculty staffs having general acceptance and awareness of the new profile as well as having commitment for a further improvement process.

Glassman P. and Chamber D.[39] believed that reaching agreement on a set of competency statements is a rational activity and a political process. It engages stakeholders in discussions of the best way to express standards for qualification to begin independent dental practice.

Competency statements will act as a bridge between education and practice. Competency statements can become reasonable yardsticks by which to measure the efficacy of the curriculum.

The language establishes better communication among the stakeholders. It creates goals that can be communicate of what we want our graduates in dental settings to know and do after completing the undergraduate program. The language has the potential to inform and enliven debates over curriculum improvement.

The competency statements could serve as the objectives of the curriculum, as the expected outcome that are clear standards and could be assessed. The defined profile serves as an accepted reference point in the further development of the dental curriculum. They are used to establish more effective teaching and learning methods. They reinforce relationship between the biomedical and behavioral sciences.

There might be some problems when writing the competency statements. Glassman P. and Chamber D.[39] analyzed the competency statements from six dental schools and the set developed by the American Association of Dental Schools. They found that early attempts were sometimes idealistic and occasionally too specific. Early attempts to develop competencies contained the residual of educational objectives in curriculum guidelines from an earlier period of dental education.

They found out that there has been a clear trend toward a smaller number of competencies framed in terms of meeting patients' needs rather than procedures and elimination of supporting objectives among the list of competencies.

Furthermore the competency statements although clearly stated which skills should be included in the core of undergraduate curriculum, but what remains to be clarified is the level of competence required for particular tasks. The concept of level is important when devising courses for the development of "core" and "specialist" clinical skills[41].

The competency statements should be further discussed at a later stage in order to clarify about the levels of competence. For particular tasks, whether they should be "proficient" (to be able to do with repeated quality and efficient utilization of time), "competent" (adequate ability to perform a particular activity) or just "exposed" (level of skill attained by observation). This will serve as a blue print to go back and reconsider of the present content about what content must, should or may be learn. Reconsideration of the learning contents and processes should be made to judge whether they should be learn "in depth" (thorough knowledge of concepts and theories to be used to critical analyze, synthesize and evaluate) or "be understood" (adequate knowledge with the ability to apply) or just "be familiar" (simplified knowledge for the purposes of orientation and recognition of general principles).

5.6.6 SYSTEM EVALUATION OF STUDENT COMPETENCE

The next step of improving the curriculum is to improve the evaluation system. Competency evaluation composes of both evaluating the competence

of individual students and incorporating competencies as part of outcome assessment in the accreditation process.

5.6.6.1 EVALUATING THE COMPETENCE OF INDIVIDUAL STUDENTS

Competency-based education assumes that learning to become a professional is a progression through stages. Because novices, beginners and competent individual are learning in different ways, the best educational experiences for each of them will differ. Thus different evaluation methods should be established. Chamber D. and Glassman P.[37] suggested that the dominant mode of evaluation for novices would be the test; beginners would be evaluated through simulation and competent students through authentic evaluation.

The competencies serve as the educational goals; the document of competencies then would serve as a blueprint for the assessment of student outcomes. What the Faculty will have to do is to determine how each competency is currently evaluated in the program. Another way might be to assess the present evaluation techniques used and to determine what competencies that have never been assessed.

The Faculty then will have to improve the evaluation plan that is appropriate to the objectives of the curriculum. Competency-based curriculum focus on the outcome of the students at various stages, evaluation must also focus on students' attainment of knowledge, skills, performance, and competence at different stages. Continuous assessment during the program or formative assessment will play an important role as well as summative assessment.

Mossey P.A., Newton J.P. and Stirrups D.R.[41] suggested that continuing assessment could take various forms all of which should have two main aims.

A) They should record achievement of competency in as objective a manner as possible

B) They should encourage continuous self-evaluation.

A self-assessment system encourages trainees to take control of their own learning process, which lead graduates, and therefore a future generation of professionals to having both the enthusiasm and the ability to be independent learners. The main advantage of this system is the encouragement of deep reflective learning as opposed to the superficial factual learning, which is characteristic of the more traditional curriculum

In the competency-based education, teaching and learning processes are going to be complex. A wider range of learning and teaching styles will be used. Using just one approach to assess learning is fraught with difficulties. Varieties of examinations will have to be developed and used according to the setting objectives and goals. Since the aim of competency-base education is to combine knowledge, acquisition of skills to form competence or change practice behavior, assessment tools that examine those combined practical skills are needed.

Summative evaluation can no longer rely on a single assessment tool but must include measures of skill, knowledge, behavior and attitude. New assessment tools do not necessarily duplicate each other but assess and evaluate different components of a dentist's performance.

It has been established that the mode of assessment influences the learning style of students and the students are susceptible to these

influences[58]. The dental school should therefore seek the way to change their assessment procedures to meet the future curriculum philosophy.

Apart from traditional written examinations that normally test isolated facts or some clinical performance tests that normally test how close to ideal could the student perform, others evaluations techniques will have to be developed to evaluate all major competencies of the profession.

The following are some evaluation methods that have been recommended.

Assessment of core knowledge:

The major principles influencing the choice of assessment methods for core knowledge are reducing the factual overload on students, assessing knowledge at higher levels than simple factual recall, and rigorously assessing the core.

Multiple-choice questions that tests higher cognitive skills, short answer questions, modified essay questions, extended matching items questions, Key features questions are examples of methods developed to test higher cognitive skills[59 60].

Assessment of core skills

Objective structured clinical examination was developed in1979 and considered to have high reliability and validity for assessment of clinical skills. An objective structured video examination was developed to assess the students' ability of communication skills[60].

Assessment of clinical competence

Global rating, Observation and checklist, Clinical Logbook, Objective structured clinical examination (OSCE), Structure clinical operative test

(SCOT), Simulated patients were methods developed to assess clinical competence[37 60].

Assessment of attitudes

Written assessment and assessment by observation are two possible alternatives that had been recommended to assess attitudes[60].

It is apparent that no single method is appropriate for assessing all aspects of dentistry. A combination of techniques will thus be required to satisfy the requirements.

Some schools have replaced grading with pass/fail marking to attempt to downgrade the competitive element of learning that can be so destructive of small group teaching, and anxiety provoking amongst students

5.6.6.2 OUTCOME ASSESSMENT OF THE COMPETENCY-BASED EDUCATION

Educational evaluation is the systematic appraisal of the quality of teaching and learning. In many ways evaluation drives the development and change of curriculum. Assessment is central to a competency-based education at the individual course and curricular levels [58].

The Faculty will have to plan an evaluation system that assess the Faculty governance and organization, the educational content and process, resources and supported service, and procedural and quantitative information in order to be aware of the effectiveness of the educational process. Furthermore there should be evaluation plan that assess the impact of the graduates to the society they serve to reflect the relevance of the educational process to the needs of the society.

5.6.7 DEVELOP A COMPETENCY-BASED EDUCATION

To define competency-based education as responsive to the oral health needs of diverse segments of the population, challenge structures upon which dental education is now built. The curriculum, clinical arrangements, accreditation, licensing, and continuing competency evaluation would require considerable change [24].

The arguments for changing the present system must be based on first, the identification of an existing problem, and second, that any proposals made are the most appropriate way forward. Furthermore when consideration must be given not only existing problems will be over come but in addition, making sure that new problems are not introduced [68].

Developing a competency-based curriculum involves establishing a new framework or organization for the curriculum. This framework will provide a better rationale for why do we teach what do we do. The process will identify redundancies and gaps in both content and evaluation procedures, identify the needs for curriculum improvements, identify the needs to shift to more active and realistic learning strategies in the classroom and the ongoing basis to determine the effectiveness of the curriculum in facilitating student competence.

The goal of an academic program based on competency-based education principles is to provide students with experiences that allow the integrated development of the multi-components of competence, rather than the isolated development of subordinate skills, with assessment focusing on the students' ability to perform the generalized competency[14]. Because competency based curriculum are broad statements encompassing skills, knowledge, and values, the curriculum for students to learn should not be one

that is similar to the discipline based curriculum. It should be one acquiring the ability to function appropriately in the environment learners are entering.

Each stage in the development from novice to expert requires a different educational strategy because of the changing tasks that engage the professional. Novices need great structure, clarity of goals, external rewards, and single, clearly explained approaches. The experience necessary for producing competence is different. The structure must be withdrawn systematically so that the students are given opportunities for applications where multiple approaches exist. They must be expected to evaluate their own work and to articulate the reasons for their decisions[23].

Teaching faculty will necessarily become more involved, across disciplines, with issues related to what students know, as well as what students can do as a result of competency-based curriculum[24].

In order to plan the learning experiences for the dental undergraduates in the competency-based curriculum, ones must understand the different approaches between the Discipline-based and the Competency-based. The development of the Discipline-based curriculum is an "bottom-up" approaches lies on the foundation that certain pre-matriculation courses are accepted as being suitable foundations for entry into the professional program. Layers of instruction are sequentially superimposed on top of these foundations, with each discipline building its own vertical column of courses, largely independent of the other specialty areas, thus creating the vertically organized, compartmentalized curriculum. Competency-based curricula are more commonly developed "top down". In these approaches, faculty starts with well-validated competencies for the entering practitioner and work backward to create a logical sequence of performance-based learning

activities and assessments that prepare students for unsupervised practice and predict performance after graduation[14].

Hendricson W.D. and Kleffner J.H.[14] provided an excellent explanation on the connections among teaching, learning, and the curriculum. In the context of competency based education, they pointed out, three most important questions needed to be discuss would be:

1) What learning events are desirable at various stages of learning continuum to promote competence?

2) What are the components of a competency-based education program?

3) What are the implications of competency-based education for the dental school curriculum?

The curriculum committee who are going to improve the curriculum will have to consider about these improvement agenda that had been recommended, which include[12 24 32]:

- Decompress of the curriculum by eliminating outdated and peripherally relevant material to allow room for introduction of new ones or expansion of other existing subjects.
- Increase educational collaboration between dentistry and other health professions, featuring more curricular emphasis on the interaction of dental and medical problems
- Redirect the curriculum toward production of oral physicians,
- Redirect basic sciences coursework toward disease pathophysiology and oral medicine taught by problem based techniques.
- Expose students to patients and their oral health and systemic medical problems from the first day of the curriculum to the last

- Revitalize the science underlying clinical decision-making via evidence –based approaches
- Opportunities provided for differential student progress through the curriculum based on individual capacity. Diminished emphasis on educational progress determined by time and number.
- Organize group practice teams in the clinical years to promote more continuity in faculty-student relationships and expand peer teaching by students working together in clinical teams
- Increase learning of clinical skills at chair-side and decrease time spent in pre-clinical laboratories
- Increase the use of community based clinics as clinical training sites for students.
- Include a clinical experience in the final year of the curriculum, or a postgraduate's internship year, which replicates the comprehensive care environment of the general dental practitioner
- Utilize technology to enrich student learning including informatics and operatory simulations
- Learning modules based on case scenarios depicting oral health problems
- Less reliance on lectures to communicate information and more reliance on small group learning
- Teaching–learning strategies must embody active learning and evidence-based clinical decision making as the dominant mode of instruction with adequate time for reflection, synthesis, discussion, and evaluation.
- Faculty functioning as mentors, tutors and coaches.

- Rededicate dental school clinics to serving oral health needs of the public rather than primarily reviewing patients as disposable and interchangeable educational material for students

- Improvement of the clinical education environment

Hendricson W.D.and Kleffner J.H. [14]pointed out four systemic diseases of the traditional curriculum that need to be considered. The first systemic problem was the use of requirement to drive student activity. The dental school clinic functioned unlike any other clinical training site in the health professions in that it primarily served the needs of students in their efforts to complete procedural requirements, with patient care as a secondary outcome. The environment like that tended to create self-centered habit and narrow vision.

The second systemic problem was the lack of faculty role modeling. Dental students rarely observe faculty treating patients. Faculty staffs primarily acted as checker or graders.

The third systemic problem was the distracting and disconcerting learning environment created when each department simultaneously operated clinical training programs and literally competed for students' attention.

The fourth systemic problem was the lack of efficiency and patient friendliness. They pointed out that If the dental school and its clinics were to position themselves as a magnet that could attract additional patient populations to the academic health center's medical plan and generate sufficient income to sustain operations, it was essential to create an efficient patient-first clinic operation that stressed service, convenience, flexibility, and quality.

Hendricson W.D. and Kleffner J.H. [14]also proposed the 3Ps model (Prepare, Practice, and Perfect) to convey the instructional events that appear to enhance learning at each phase.

During the preparation (for performance) phase of the continuum, learners benefit from orientation to the competencies that comprise professional practice, study and observation of exemplary competency performance, and acquisition of cognitive knowledge about performance standards and rules guiding application. Case-based learning is one of the best ways to lay down good foundation for students. They can apply these principles to patients' problems at an early stage of their training. Later in preparation phase, students benefit from observing expert practitioners performing targeted competencies in clinical or laboratory settings follow by assisted practice. Instructor can be helpful by providing encouragement, practical suggestions consistent with the student's skill level, extensive hands-on but non-judgmental assistance, and praise for accomplishments. Evaluation at this stage should remain primarily formative type[14].

During the practice phase, learners benefit from encounters with increasingly varied problem situations and realistic "field" work settings in which they can practice and refine skills. Education program should also help the learner develop integrated knowledge networks, which allow individual to retrieve pertinent information relevant to a perceived problem. Evaluation systems that reward students for self-critiques of both process and outcome facilitate learning, encourage openness and candor about limitations, and prompt students to take self-assessment seriously.

In summary, one of the primary goals of the dental school curriculum should be to provide learning experiences that will facilitate the student's

transition from a vertical organization of knowledge to a horizontal, network structure.

5.6.8 DEVELOP TEACHING LEARNING METHODS

Competency-based education typically consists of a series of carefully designed and sequentially arrange learning modules, each linked to specific competency or inter-related set of competencies. Modules typically include several different learning activities, some required and some optional on an either-or basis, with an emphasis on active learning. Reading assignments, case-based application seminars, individual or group research projects, computer-based tutorials, laboratory projects, video demonstrations, supervised patient care experiences, preceptorships at community sites, self-assessment exercises, and occasional special topic lectures are methods that have been recommended[14 23]. Teaching learning strategy also introduced more complex structures with a trend towards progressive learning with integration between subjects and disciplines rather than the more familiar program of traditional approach. Learning modules are structured in a stair step hierarchy like building blocks so students work from the ground up acquiring foundation skills before proceeding to more complex competencies. Testing procedures require students to demonstrate mastery of the competency embedded in each learning module before moving on to a subsequent module[14].

In conclusion, the working steps towards the competency-based curriculum regarding the teaching-learning sequence and experiences might include:

▶ Identification of the teaching-learning techniques used in the present curriculum.

▶ Analyze the content being taught in the present curriculum in the way that answer what course contents (Major topics and Foundation topics) support each major competency statement.

▶ Reviewing course content and the actual sequencing of course material. Comparison should be made between the competency statements, which were set up as the goal, with the analyzed content, teaching learning techniques and evaluation methods in the present curriculum. Then suggested curriculum changes could be established.

▶ Modification or improve the schedule, the courses, the teaching-learning techniques for most advantages for student learning. Changes might concluded deleting and adding courses, changing course content, developing new evaluation methods, implementing new faculty calibration exercises, or modifying the competency document.

In addition, the curriculum committee might need to explore whether existing criteria relate to adequate competence. Notion of perceived competence level of competence might be included as part of criteria to review the competencies of the graduates. The competencies the new dental graduates perceived as low need to be taken into consideration. The school might need to carefully revised the appropriate level of experience require to graduate from the program. Some topics are better learned in the post graduate world, whilst others are better placed later in the undergraduate course.

In the U.S.A. there are trends for the place of required post-graduate experiences. Some envision a time when the undergraduate curriculum would

be able to place greater emphasis on the cognitive aspects of dental practice and leave to later stages of education in depth experience with many procedures that occupied the curriculum [32].

5.6.9 ORGANIZATION CHANGE

Parallel to improve the curriculum, an organization change has to be developed. The aim of the organization change should be one that turns the organization from a closed system to one that is an opened system. The atmosphere of an opened system is the organization that if flexible, collaboration, consensus, and authentic communication.

The administrators (Deans, chairs, and division heads) of dental schools is to facilitate the process by initiating the change, removing obstacles and rewarding members who take the lead in implementing changes that mesh with the shared vision of the organization.

Strategies to form an opened- organization included

- Sense of urgent as the catalyst to change
- Develop a share vision
- Develop direction and strategic plan
- Development of new leadership skills, among current dental school administrators, to initiate the programs.
- Encouraging and nurturing dialogues.
- Developing and nurturing an active program in team learning and team management
- Investing in development workshops
- Promoting and rewarding innovations
- Development evaluation tools

- Communicate and implement
- Stimulate by assessing and reporting the short-term gain and continuing the process.

5.6.10 HUMAN RESOURCES DEVELOPMENT

Although we have the best faculty staffs in the dental school who are experts in their specialty, they might not have deep understand about health profession education or be up to date with the contemporary education. In order to improve the curriculum, Faculty staffs' development is a must. Many of the staffs are used to the traditional teaching techniques which are much based on lectures and others passive styles. They have to be trained in other models that serve the contemporary education, which has been shift towards student-centered. Furthermore, changing the curriculum needs a lot of management skills, development management skills for responsible staffs is a compulsory. Training workshops that demonstrate how to orchestrate a curriculum remodeling process should be developed.

There are need for significant investment of resources to give faculty opportunity to acquire the knowledge and skills necessary to deliver the new curriculum and to teach across disciplines.

Dental educators should have advanced training in clinical, education, and health services research methods. Such training should be formally organized for new faculty and be part of their work activities during the first few years of their academic careers

Young, developing faculty are positioned to have the greatest long-term impact on dental education. Faculty should set a policy to develop their

ability to understand about dental professional education and use of various models.

5.6.11 OBSTACLES AND PROBLEMS

Resistance to change in the university is the norm. Berquist W.H.[69] studied the culture of universities and the values of faculty as the basis for analyzing adaptability to change, and Delbecq A.L. and Gill S.L.[70] examined the extent to which health center administrators value teamwork and collaboration. They observed that university faculty value independence, desire autonomy, and do not value collaboration, but have a strong need for job security and insulation from risk. Goffee R and Joans G.[71] found out that university faculty, identifying more strongly with their disciplines than with the university itself, typically lack of solidarity.

Ismail A.I.[65] viewed the organizational systems in schools of Dentistry as a closed system that emphasizes stability, group loyalty, security, clear boundaries, and tight control. He pointed out that such a system does not encourage self-critique, dialogue, progress and disputation that are vehicles for self-development and progress. Dentists have been described as cautious and conservative, valuing orderliness and conformity, with a desire to control events.

Tedesco L.A. [24]observed that dental education had minimal success in implementing or sustaining educational improvements. Converting an existing discipline based program into a competency-based program required a significant philosophical shift among many faculty and potentially, significant alterations in overall structure of the curriculum. This conversion was difficult to achieve without adroit and persistent leadership

Institute of Medicine concluded that the problem in improving dental education was not on direction for changes but was the difficulty in overcoming obstacles to changes[5].

Prawase Wasi Professor of Medicine Emeritus applied an approach structure called "Triangle that moves the Mountain "when trying to improve The health system in Thailand[56]. The triangle consists of 1) creation of relevant knowledge through research, 2) Social movement and social learning and 3) political involvement. The dental school aiming to improve the dental curriculum might use this strategy in order to win this difficult task by create relevant knowledge of present and future direction of dental education, transform knowledge into forms and language that can empower the faculty staffs to shift their philosophy and work together to improve the curriculum as well as use the administration authority involvement

5.7 SUMMARY

Meeting the demand of dental care needs in the twenty-first centuries, the undergraduate program will require new, innovative, and flexible models. Many dental schools in the western countries include the American Association of Dental Schools believed that the model must be competency-based which focus on the outcomes of undergraduates. By defining the competencies of new dental graduates, the dental school will have a benchmark with which to review, redefine, and restructure the pre-doctoral curriculum, review and improve student evaluation process and promotion criteria, establish and apply outcome measures to access the effectiveness of the pre-doctoral program.

Faculty of Dentistry Chulalongkorn University if prefer to improve the curriculum will have to put this project into the strategic plan. The curriculum improvement requires its entire member to be involved. The Faculty has to develop a shared vision. The Faculty staffs should work together and getting consensus of the competencies that describe graduates. The competencies then can become the objectives that lead to the changing of the curriculum structure and the whole education cycle. Organization change and Human Resource Development are some key factor to the succession. The administrators play important roles in giving full support, help removing obstacles and consider tenure and promotion policies

This study surveyed the opinions of Faculty staffs and dental practitioners towards the proposed clinical competencies for new dental graduates of Faculty of Dentistry, Chulalongkorn University.

From this survey, statements that were rated highly by both faculty staffs and general practitioners could serve as the basis for a core set of statements to describe the abilities of undergraduates. However, these data should stimulate further discussions among the stakeholders about the futures of dental undergraduate program and get consensus. Statements that receive lesser agreement needed to be further studied whether they are suitable to be used.

The study has provided a useful insight into how Faculty staffs and dental practitioners view about the standard of the Dental undergraduate education

Competencies statements in other domains that were not included in this study should be established and discuss to find consensus. Teaching and learning activities, as well as assessment techniques for these competencies,

should be reviewed and revised, to ensure that undergraduates posses those competencies prior to graduate.

Change in educational system is difficult. However, the Faculty of Dentistry, Chulalongkorn University will definitely have to change and start immediately. As the first and the biggest Dental school in our Country, we have to be the leader to change the dental educational system for preparing our graduates to be competent in their professional roles in the rapid evolutionary cycles of the twenty-first centuries.

5.8 SUGGESTED FURTHER INVESTIGATION

1) Vision, goal and strategic plan for curriculum reform
2) Opinions on competencies statements in other domain not included in this study
3) Content analysis of the present curriculum compared to new competencies standard