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ABSTRACT

An individualized, self-paced curriculum at Temple University Dental School is being used to break the lock-step pattern of the lecture-oriented system and to help students reach the clinical learning environment more quickly. Freshmen begin work in periodontology with 12 programed lessons studied in a Learning Resources Center open 75 hours a week. Lessons consist of 35mm color slides, audio cassettes, and workbooks. Students take exams when they are ready and can repeat units without penalty. Clinical units, an attitudinal seminar, and optional problems are taken after completion of the initial units. Sophomores proceed through 13 lessons on periodontal pathology and clinical diagnosis, followed by clinical work on a co-therapist. A computer monitors the progress of each student and evaluation indicated that cognitive and clinical performances are high, and that student attitudes are positive and their self-concept improved. In addition, student-faculty contact has become oess threatening as it shifts to a one-to-one teaching relation rather than a purely impersonal evaluative one. The media used are deliberately kept simple, with total production costs for software for the first year and a half amounting to slightly more than $10,000. (Author/PB)

THE IMPLEMENTATION OF AN INDIVIDUALIZED CURRICULUM IN PERIODONTOLOGY AT THE TEMPLE UNIVERSITY SCHOOL OF DENTISTRY

by

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Abstract: Let me begin with a brief overview of the individualized curriculum at the Temple University School of Dentistry, in regard to facilities and procedures as they relate to the use of media for instruction.

There are approximately 600 dental students enrolled at the school with each year's class composed of some 150 individuals. During their freshman year, the students begin their work in periodontology with a series of 12 programmed lessons which are studied in the Learning Resources Center.

The lessons are made up of 35 mm color slides, audio-tape cassettes and printed workbooks prepared by the faculty. The students report to the Learning Center, which is open 75 hours per week, and work at a time and a pace of their own choosing. A log is kept of the time each student spends in the Center.

When the student has completed a series of four programmed lessons and feels adequately prepared, he presents himself for an evaluation which is held every Tuesday afternoon. There is no penalty attached to a failure to score above the

required 90 percent level. The student merely returns to the Center for further study until he achieves mastery.

The department curriculum secretary fills a vital role in the smooth function of the administrative details of the program. A computer monitors the progress of each student and each week the faculty receive a revised print-out which reports the current position of each member of the class.

Students in the School of Dental Hygiene are now using the freshman programmed units in periodontology as a part of their training.

At the beginning of the sophomore year, the students proceed through a series of thirteen programmed lessons on periodontal pathology and clinical diagnosis. When these are completed, they begin working with patients in the clinic under the new co-therapist system which is similar to that of an intern/attending staff relationship in a hospital.

The essential purpose of media is to help the student reach the clinical learning environment as quickly as possible. The media selected for use in the periodontal curriculum is deliberately simple. Total production costs for the software used in the first year and a half of studies amounted to little more than $10,000.

About three years ago, in weekly department meetings of the Department of Periodontology at Temple Dental School, frustrations concerning teaching methods began to surface to the verbal level. Most department members started to realize that they shared dissatisfaction. Therefore, we began, as a group, to attempt to look for the source of these frustrations.

One of the first areas with which everyone seemed dissatisfied was the lecture. For several years, we had functioned with very general written objectives for our lectures. With the passing of time, and the constant change in lecture assignments, the objectives became essentially meaningless. The value of the objectives did not extend past the individual who had originally written and used them. The lecture system was cause for real concern, because it attempted to service 140 to 150 students at one time, and it was not uncommon for students to be subjected to as much as five hours of continuous lecture. This format forced students to assimilate material in an environment undoubtedly far exceeding their ability to concentrate. Much of the knowledge we thought the students had acquired was just not present when they arrived in the clinic, presumably with sufficient background.

Upon closer inspection of our curriculum, we began to realize that there was no meaningful way to evaluate students in a fair way, or in fact, to relate to them as individuals.

We had no method for meeting students' individual needs and interests. To add to the problem, increased class sizes had become necessary to obtain government funding. Therefore, anticipation of a better faculty-student ratio was not realistic. It seemed a monumental task just to maintain current levels of proficiency, much less deal with each student as an individual. There was little hope for catering to individual needs within the existing system.

In addition to the problems cited, student-teacher rapport was seen as practically non-existant. Most personal or one to one contact with the students took place in the clinical setting, with the instructor principally in the role of an evaluator. This environment tended to stifle students. They seemed to prefer minimum contact. The subtle message conveyed was that the patient and instructor were obstacles to students in the acquisition of a D.D.S. degree. Since contacts with instructors were always evaluative, we concluded that these contacts were threatening to the students and, therefore students were isolated from an openness to learn.

Further, the large didactic and vocational training responsibilities which the teaching staff carries led us to overlook student development as a professional. We therefore came to feel that a portion of the curriculum should be devoted to affording the student an opportunity to examine and to clarify his goals within the profession. We hoped this type of learning

would result in an individual professional who is dedicated to continued acquisition of knowledge, as well as one who is interested in providing a high quality service. In actuality, we strongly suspected that our students valued the more extrinsic rewards of material gain far more than they valued the intrinsic self esteem which they could derive from a different approach to their profession.

In summary, our curriculum as a whole seemed very restrictive. It was a tightly instructor dictated curriculum, affording students no real opportunity to control their educational experience. There was no opportunity for students to choose what, where and how they were to learn. There was no mechanism whatsoever to deal with them as individuals. On the other hand, there was no way for student to treat us as individuals, either.

Movement from verbalization of problems went rapidly to the stage of development of new curriculum modalities. The first task undertaken was to look at our curriculum as a whole and to establish an overall goal. We wanted to create a curriculum that would free students from as many locksteps as possible, offer them choices, aid them in becoming independent learners, increase their learning efficiency, treat them as individuals, increase student-teacher rapport and finally, guide students to clearly establish their own goals and values concerning professional life.

We decided to approach the problem by developing one year of the curriculum at a time. The most logical place to begin seemed to be the first year material, which dealt with normal anatomy and histology of the periodontium. Previously, this material was presented in a series of thirty one hour lectures. We decided to implement an individualized programmed instruction segment to replace these lectures. What evolved was a series of 12 programmed units, covering all the basic material. These units are stored in a learning center which is open seven days a week. Evaluations are of the written multiple choice variety. There is an examination for the students to take after every four units of learning are completed, and one cumulative exam after all the units are completed. It is suggested to the students that it is best to take these exams in sequential order, but it is only a suggestion. They may do as they wish.

In order to pass an evaluation or exam, students must achieve a 90% grade. This 90% grade was determined to be a fair grade because the examinations are criterion referenced evaluations. Every unit of instruction has behavioral objectives specifying exactly what we expect of the students. Since these are the behaviors we consider necessary for competence, they are the sole criteria for questions in our examinations.

Examinations are offered every Tuesday throughout the academic year, and students may take any evaluations they wish

on that day. In fact, they are free to take two exams, if they so desire, provided they ration their time adequately. There is no punishment for failing, except having to retake the exam. By structuring this part of the program in this manner, many locksteps in the curriculum have been broken and the lecture, which the faculty found so bad, has been eliminated. Students may gather material in the learning center seven days a week at the time they choose. Since they can take examinations every week, students are essentially freed to move at their own pace, provided they complete the required portion by the end of the academic year. In addition to the didactic units, there are three clinical units presented in programmed formats, as well. Clinical units are basically introductory in nature. Students are introduced to the physical layout of the clinic, charts and disease control. There are places in these programs where the students are directed to consult with a clinical instructor who is assigned to the clinic.

The final area of curriculum that a student must complete is an attitudinal seminar. The goal of these seminars is to provide an open ended experience to expose the student to the attitudes of others, to allow him to identify his own attitudes, and hopefully to direct change of some attitudes in a positive direction. Each seminar group is divided into three subgroups

and given the task to investigate the importance of journals to the dental student, general dentist or specialist. Thirty minutes is allotted to this task, after which time the group of 12 is reformed. The remainder of a session is devoted to open discussion which usually begins to uncover and to identify concerns related to continuing education as a responsibility to patients. At the end of the session, students are asked to respond anonymously to a questionnaire about their feeling toward this type of experience. To date, the results have been fairly positive. It is the belief of the faculty that these types of experiences encourage the surfacing of unintended instructional outcomes which can, in many cases, be more valuable to the growth of a professional student than those outcomes that were intended.

The three areas of instruction (12 programmed units, clinical exercises and attitudinal seminars) are the minimal performances students must successfully complete. Then they are faced with the choice of receiving a "C" grade or contracting through additional work for a "B" or and "A". To achieve a higher grade, students must select and complete a specified number of optional experiences. Optional experiences are problems the students select to solve from a list of topics. The students are directed to the literature for resolutions.

Answers are submitted in a written essay form, marked and returned to the students with pertinent comments.

Everything a student does in this curriculum is reported to a computer and a print-out of every student's individual progress is provided, on a bi-monthly basis. This enables the individual who is the curriculum head to monitor each student's progress. Students having difficulty achieving the minimal behaviors are screened for diagnosis of problems early, so that help can be provided in various ways. For students having difficulty with the subject matter per se, a staff member serves as a tutor. Problems of a more complex nature are referred to more appropriate areas of the university. This aspect of the curriculum will be covered in much greater detail later on in this presentation.

Many elements of this first year curriculum have been studied by a Dr. David Spillers, in preparation of his Doctoral dissertation. A summary of his findings at this point, might be helpful.

1) Students in this self instruction portion of the course seemed to assimilate cognitive information and to pass evaluations in less time than in a traditional course;

2) The students elected to cover programmed cognitive information before performing the clinical case exercises;

3) After finishing cognitive information, students elected to perform optional work for higher academic grades;

4) In the evaluations, the students exhibited a low failure rate, even though they are not penalized for unsuccessful attempts;

5) When seated alphabetically in traditional courses taken concomittantly with a self-instruction course, the students progressed through the self-instruction experiences in alphabetical clumps;

6) Examinations in concomittant traditional instruction courses affect performance of the students in the self-instruction course, while holidays are not related to students' performance in the self-instruction course;

7) The students in a self-instruction course indicated that they have higher self concepts as learners in the self-instruction course than in traditional courses;

8) These same students indicated a predominantly positive attitude toward all elements in the self-instruction program involving the individualized experiences, the materials, the staff and colleagues;

9) Elements in students' backgrounds, performance in traditional courses, and attitudes toward the self-instruction course are associated with the types of performance exhibited in the self-instruction course.

The data collected in this study will be again collected at the end of this academic year and succeeding academic years for comparative purposes.

The first year material was relatively simple recall material, whereas the second year curriculum covers a much larger and more complex body of knowledge. The pathology and clinical diagnosis of periodontal disease has been programmed utilizing two additional distinct strategies that were not included in the first year programs. These are first, a conceptual theme and second, utilization of the presented material almost immediately in higher level problem solving situations. These will be more thoroughly described later on.

It is in the clinical portion of the second year that the students are called upon to deal with psychomotor skills within the curriculum. Teaching clinical psychomotor skills in an efficient, effective and pleasurable manner always has been a difficult task, and this year has been no exception. In this area, the faculty is of the opinion that students profit more from maximum contact with patients and minimum laboratory exercises. In response to these feelings, they have implemented a co-therapist teaching mode for the second year clinical experience. Students work with an instructor and both are responsible for the patients' welfare and treatment. During this relationship, there is no grading or evaluation of the students. When students think they have acquired the diagnostic

and treatment skills necessary to handle patients on their own, they take an evaluation patient and treat him unassisted. The clinical evaluations have been made intentionally thorough, impersonal and unsupportive, in contrast to the atmosphere of the co-therapist situation. Students may ask for no help from the evaluators who are individuals totally separate from the co-therapists. Their sole relationship to the students is to evaluate their clinical proficiency. It is in this context only that students face instructors in what might be interpreted as a threatening situation. A great deal of attention is being focused on this aspect of the curriculum at the present time. The bias is that students will profit much more from personal interaction with instructors than with laboratory exercises at this stage of the curriculum. Support for this was derived from an interview with students in the clinic, which revealed that most enjoy the co-therapist teaching approach, and wish to learn their clinical skills, therapy, treatment planning, etc. primarily with these individuals. At the end of the year, the faculty anticipates examining the effectiveness of this teaching strategy with the hope that this technique can be expanded to enhance personal interactions between students and teachers.

There is a general feeling by the faculty that development of this curriculum has reached a level where personal contact

between instructors and students in a more open learning environment will best suit the needs of the curriculum. Therefore the thrust is now to develop strategies that will encourage students to utilize their basic background in an open end inquiring environment. The orientation will be toward a free and open ended exploration of problems, the toleration of problems resolved in a non absolute way, and consistant attempts to achieve understanding by relating facts and concepts to personal experience.

Further development of software is viewed as purely resources for the use of the co-therapist and students, and not as the backbone of the curriculum, in a programmed format, as it has been used to this point.

One of the most distinctive features of dentistry as a profession is the unusually large volume of knowledge which a dental student must first acquire before he can engage in actual practice. The central problem of dental education is to find efficient ways of transmitting this knowledge to students in a manner that it will be retained over a long period of time for successful application to problems of clinical practice.

In the fall of 1971, the Department of Periodontology at the Temple University School of Dentistry established their freshman year on the basis of an individualized curriculum. In previous years the student went directly from the lecture hall

to begin working with patients in the clinic about two months after beginning their second year of studies. It was the distinct impression of the faculty that although the students had apparently mastered their studies and had done well in their examinations, they appeared unable to function effectively with patients for several months, due presumably to their inability to remember important factual subject matter from their lectures (Salkin and Freeman, 1972).

The freshman studies cover the normal anatomy and function of the dental structures and tissues. Subject matter is presented in a series of twelve programmed lessons using 35 mm slides, audio cassette tapes and programmed workbooks prepared by the faculty. The programmed lessons follow the Crowder branching method in which the student is given a segment of information followed by a question. If the question is answered correctly, the student proceeds to the next frame. If incorrect, the student is referred to a remedial frame before proceeding. Constant practice and reinforcement is designed to increase both the stability of the information in the student's mind and at the same time, to cause an interaction on the part of the student with his material in a way which is not always achieved under the lecture system.

The second year of studies begin with Periodontal Pathology and Clinical Diagnosis. Thirteen programmed lessons were prepared

by the faculty and were designed to serve as a transition from pre-clinical to clinical learning. The following three teaching strategies were built into the units:

One ... Systematic presentation of information with practice and reinforcement.

Two ... The use of an "advance organizer" or conceptual theme designed to facilitate learning (Ausubel, 1960).

The conceptual theme is presented at the beginning of each unit and usually takes the form of an easily remembered story which encompasses and gives meaning to the pathologic tissue changes characteristic of a particular disease or disease catagory. For example, the four acute periodontal diseases are conceptualized by ... the rapid onset of acute inflammation ... which leads to severe tissue destruction ... which leads to pain. A clinician observing these events should immediately suspect the presence of one of the acute periodontal diseases.

The conceptual theme serves as a structuring device to the student gather together discrete or isolated facts and anchor them in his mind in a way that they will be more accessible to memory.

The third teaching strategy concerns practice and instruction in clinical problem solving. Clinical problem solving refers to that intellectual reasoning process employed in the differential diagnosis of disease. It involves the direct transformation of known propositions to a new instance which may be obscured by

some extraneous or distracting data. A deliberate strategy is used in which the clinician ... gathers the data and distinguishes between normal and abnormal findings ... then synthesizes the data to form a tentative diagnosis ... and finally, evaluates that tentative diagnosis against his conceptual model of the disease to confirm his findings (Elstein et al, 1972).

Clinical problem solving involves a gap between what the clinician knows and what he is required to find out. There is inevitably a residual element of choice as to which of the known propositions are to be employed or the order in which they are to be employed ... but the intellectual process can be considered as one of synthesis and not in the realm of unique discovery. As such, diagnostic skills can be sharpened by practice (Bloom, Hastings and Madaus, 1971).

At the present time, an experimental study is in progress which will investigate the relative effectiveness of the three teaching strategies in enhancing retention of factual information. The study will also attempt to determine if training and practice in clinical problem solving will enhance a student's ability in the diagnosis of periodontal disease.

Upon completion of the thirteen sophomore programmed units, the students are given a series of eleven programmed diagnostic exercises which include ... the charts of selected patients ... a series of color slides of the oral cavity ... a complete set of x-rays ... and a sequence of audio tape cassettes. The exercises

cover a random assortment of diseases. Initially, the only information provided is the patient's medical history and a tooth chart showing pocket depths ... if any.

Working in the Learning Resources Center, the student begins with tape #1 which introduces the patient and directs the student to read the medical history.

The student is then directed to examine the color pictures of the patient's mouth and to write his findings in the blank spaces of the chart under "Gingiva". Those portions of the gingival examination which the student cannot determine visually are provided for him. They include consistency of the gingival tissue, whether or not stippling is present, and whether or not there is bleeding upon probing. The x-ray examination is performed entirely by the student.

Following directions on the tape, the student stops the tape while carrying out instructions and resumes play when he is ready. After filling in a portion of the patient's chart, the student listens to a review of the pertinent findings. The review not only provides immediate feedback to the student about his ability to gather data, but it also emphasizes the correct terminology for recording the data. After examining all of the information, the student is asked to write his diagnosis on the form provided and to confirm his findings against the review on

the final appropriate cassette tape.

At various times, the student is asked if he feels ready to make a diagnosis although he may not yet have made a careful study of all of the information. If he chooses to paly the suggested cassette tape to confirm his premature findings, he is greeted with the sound of police sirens, plate glass shattering or an auto skid and crash followed by an admonition to investigate all of the evidence before pronouncing his diagnosis. The sound effects are employed as a form of mild punishment for poor judgement.

By using four or five cassette tapes in each exercise it is possible to require a number of decisions in reaching a correct diagnosis while avoiding any recognizable pattern of sequence in the selection of cassette tapes.

In several instances, the student is offered further information at a point when he has received all of the details required for diagnosis. Selection of such a cassette yields more sound effects and a scolding for indecision. The strategy makes the student think twice about automatically accepting a bid for more information. It makes him aware that the model holds him responsible not only for gathering all of the information needed for diagnosis, but also for knowing when the findings are adequate and a diagnosis can be made without further needless examination.

While a computer program might offer a more complex system of branching, experience indicates that the simple format offered by a few cassette tapes is presumably adequate for instruction and practice in diagnosis. There is an element of anticipating the student's reactions in the preparation of programmed exercises which the experienced medical teacher can manage effectively. The same holds true in the preparation of a computer dialogue. At this time we do not know if a computer program would amount to a significant improvement over one employing simple media. On the basis of cost, there appears to be little justification for such an expensive investment. The exact production costs of the diagnostic exercises in periodontology amounted to just under $2,000. It is difficult to settle on a cost for man hours as the series were produced as part of the requirements for a graduate course in Educational Technology by Dr. Salkin and his assistant.

The present sophomore class at Temple Dental School is now working in the dental clinic. It is the subjective opinion of the two faculty members in charge of evaluation that the students know their pathology very well. These two faculty members happen to be the administrative force in the department. They are responsible for maintaining standards for both students and faculty. At this time, the department administration has no

immediate or future plans to investigate computer based instruction.

Upon completion of the programmed lessons, about two months after they begin their sophomore year, the students begin their clinical teaching program, similar to that of an intern/attending staff relationship in a hospital. This means that the same student and faculty member co-treat and share responsiblility for a given patient throughout his treatment needs in the department.

As in a hospital, the more senior staff member of the co-therapist team holds final responsibility for the patient, the success of the treatment, and all of the decisions which the team makes. As in a hospital, the staff member delegates treatment performance, patient management and decision making to the student whenever possible. There is no grading or evaluation occurring during the co-therapist relationship. The student treats different patients with different co-therapists to gain exposure to various clinical philosophies.

The co-therapist concept was chosen because of the learning environment it is hoped to create. It establishes a common goal for both the student and the instructor which is to provide the best possible service and treatment result for the patient. It eliminates the contradictions in treatment philosophy that occur as the student goes from instructor to instructor with the same patient. It provides for patient protection and eliminates the difficulties which arise from frequent and subjective evaluations.

It should eliminate the anxiety felt by many students as they perform procedures on live patients with which they are not yet proficient. It eliminates the drive for points, credits and grades.

All of these changes should make faculty contact less aversive to students, student contact more rewarding to faculty, provide better service to patients and create a better learning environment.

In summary, the individualized curriculum at the Temple Dental School is designed to break the lock-step pattern of learning which is the inevitable result of the classroom lecture system; and in so doing, to make it possible for the gifted student to complete his professional training in less time than under the traditional system.

Self-paced learning through instructional programs allow the introduction of deliberate teaching strategies designed to enhance the clarity, cohesiveness and stability of important factual subject matter in a way that the students will remember it.

Given a sound background of relevant knowledge and practice in the intellectual reasoning skills of clinical diagnosis, the student should be able to begin his practical clinical experience with greater self-confidence than before. It is in the dental clinic that the student begins to function as a professional.

If there is any single purpose in the use of instructional technology, it is to get the student to the clinic as quickly and efficently as possible.

Since this program was run for the first time last year, and further, since it departed so radically from the traditional dental school course, both in terms of presentation of content and interest in personal intereaction with the students, it seemed important to analyze the curriculum in terms of the actual events occurring, as well as student attitude toward those events. It is significant to note that data was gathered concerning student attitude toward the program at the same time the surprise final examination was administered. One is not inclined to see a halo effect in operation under such circumstances, and thus it was felt that a fairly accurate assessment of student sentiment regarding their feelings toward our curriculum was acquired.

This investigation analyzed the means utilized by learners to reach outcomes in a self-instruction curriculum. The emphasis of this study was on the inner processes performed by the students and not an attempt to validate the effectiveness of individualized instruction. There were basically two primary ways this end was to be accomplished; 1) to describe the recordable experiences and 2) to assess the attitudes of these students toward themselves, the staff and the curriculum while they were experiencing the program. Recordable experiences were those which could be

tabulated by an observer or by assessment of student attitudes in an anonymous questionnaire. The recordable experiences were aimed at answering some specific questions concerning student behavior in our curriculum. We were interested in such things as how did the student progress through the cognitive units in terms of his own rate compared to class movement compared to the traditional lecture dissemination rate? What were the reasons for his specific rate? What did his alphabetical position in the class have to do with movement? What determined when the student contacted the material and took evaluations? What occurred in the modified contractural portion of the curriculum, in the diagnostic interviews, and in the tutoring sessions? Let me digress for a moment to define what we mean by those latter three terms. Contracts are agreements between each student and the curriculum director for work above the minimal requirements. These take the form of individual library-type research in which the student is allowed to select from a list of 31 areas. The diagnostic interviews were designed to identify any problems the student is having with the individualized program of study. The request for such an interview can be initiated by the student or by the curriculum director. Some examples of when this interview is likely to occur is when there have been two successive failures on an evaluation, or when there has been failure to progress, etc. The tutoring sessions, as originally conceived, were intended to grow out of the diagnostic interviews, if

necessary; however, short tutoring sessions often occur with the curriculum director at the time of the diagnostic interview, and also when students stop in the office to review an evaluation. Specific tutoring sessions with another staff memeber are set up only occasionally. Other recordable events in which we were interested related to attitudes as the students progressed through our program. We were concerned with attitudes toward the literature contact, the student's self-concept as a learner, attitudes toward the humanistic aspects of the program, the affective domain, and our behavioral objectives. In short, we were concerned with how the student went through our program, why he went through in the manner he did, and finally, how he felt about what he was doing.

In order to answer certain questions concerning rates, patterns, and pathways of movement, a standard rate, pattern, and pathway was established based on the performance normally found in traditional programs. Deviations from this arbitrary standard were considered to be unique to our self-instruction program.

I am going to break down into broad categories a discussion of the findings of this study. First, I shall discuss the Cognitive Units and Cognitive Evaluations; then the Clinical Exercises, Contracts and Literature Contact, Self-Concept as Learners and Student Attitudes, and finally Diagnostic Interviews and Tutoring Sessions.

COGNITIVE UNITS AND EVALUATIONS - The greatest influence on the number of cognitive contacts for each day was the occurrence of examinations in other departments. There was no strong relation to non-academic events, however. Students spread contact with the units over the first 2/3 of the academic year with the maximum contact occurring in November and the least in April. Only 25% of the students progressed through the units with one exposure/unit.

Approximately 50% of the class progressed through the units at a speed similar to a traditional class. (This means that 4 of the 12 units were completed in the first 1/3 of the year, 8 units in the 2nd third and 12 units in the final third) The remaining 50% of the students moved at a rate greater than the traditional. When the class was divided into slow, lower-middle, upper-middle and fast movers, some characteristics of the students in these groups became apparent. The slow movers scored above the mean on the Dental Admissions Test, and had a cumulative grade point of 2.0 to 3.0 at the end of the first year. Lower-middle movers score at the mean of the Admissions Test; upper-middle movers tend to score about 1/2 standard deviation below the mean on the Admissions Test, and their cumulative grade point average at the end of the first year. Reasons for the type of movement expressed by the students in the slow moving group were: 1) procrastination, 2) work in other courses, 3) lack of self-discipline, and 4) poor planning. The middle

movers explained reasons for pace as: 1) work in other courses, 2) skepticism of the method, 3) lack of initiative, 4) budeting time to equalize the load, and 5) no deadlines. Students moving at a fast rate gave as reasons: 1) positive attitudes toward the method, 2) units were interesting and pertinent, 3) material was available when students wanted to use it, and 4) belief that learning occurred when the learner was allowed to select the time.

It is noteworthy that slow and middle movers tended to use negative reasons for their behavior, while only fast movers were confortable with their performance, despite the face that students were invited to take the entire academic year to complete the course.

The mean time spend by a student on the cognitive portion of the curriculum was 13 hours and 6 minutes, with the greatest time spent on one unit being 1 hour and 4 minutes, and the least mean time on a specific unit being 36 minutes.

In their movement through the cognitive units, approximately 50% of the class exhibited "clumping" in movement rates, pathways and time periods. A clump is defined as a group of students, at least 3 in number, separated by no more than one alphabetical position on the class roster. In this class, 14 clumps emerged, each one containing from 3 to 15 members. In a personal interview it was discovered that all the clumps grew out of relationships established in the pre-clinical course in which students had an opportunity to socialize with their alphabetically-assigned neighbors.

In terms of attitude toward the cognitive units, and the hardware used, approximately 90% of the class expressed positive feelings on an anonymous questionnaire, and 87% of the students felt that the criterion-referenced approach to evaluations was good or excellent.

CLINICAL EXERCISES - In contrast to the cognitive units, the progress through the clinical laboratory exercises did not seem to be related to exams in other courses. In fact, exam days seemed to be good days to do the clinical experiences. Of the three exercises available, only the last two were required, and it is interesting to note that only 57% of the population elected to do the 1st clinical exercise.

Clumping occurred in this portion of the curriculum as well; however, only 7 clumps emerged in this area as compared to the 14 evidenced with the units.

75% of the class reported a positive attitude toward the programmed clinics and the instructional hardware used in the clinics.

CONTRACTS AND LITERATURE CONTACTS - In general, students appeared to select contracts on the basis of obtaining the most credits for the fewest contracts in an obvious attempt to do the least number of different research projects.

Students primarily completed the cognitive units before doing the research contracts, and took their evaluations when there were no exams in other courses.

Positive attitudes toward research contracts were expressed by 76% of the students, and a positive attitude toward continued research of the literature after course completion was indicated by 82% of the respondents.

SELF-CONCEPTS AS LEARNERS AND STUDENT ATTITUDES - 85% of the class felt more independence, competence, ambition, and confidence in the self-instruction program than in the traditional courses.

Attitudes toward colleagues was less favorable than attitudes toward the staff. 50% felt good or excellent about their colleagues, while 84% cited a good or excellent attitude toward staff.

DIAGNOSTIC INTERVIEWS AND TUTORING SESSIONS - Of the 180 interviews and 29 tutoring sessions requested by faculty, only 55 interviews and 7 tutoring sessions actually occurred. Of the 7 tutoring sessions, 3 were held for examination failures, and 4 were held for no progress.

Data in this area indicated that confusion existed among students as to what experiences actually constituted a diagnostic interview or a tutoring session. Participants and non-participants generally reported good or excellent attitudes; however, about 15% ranked the interviews poor or fair.

A review of the data gathered reveals fairly definitive information about the programmed portion of the Freshman Curriculum. A good idea concerning the strengths and weaknesses of the

didactic information has been established, as well as the attitudes of the students. However, the data failed to disclose much definitive information about the humanistic area of the curriculum.

On the basis of this information, or perhaps it would be more accurate to say lack of information in this area, it was felt that some training in counseling psychology would benefit the curriculum director, and equip him to better handle the humanistic aspects of the curriculum.

One of the reported advantages of programming information is that it frees up the staff to do other things. One of the things the faculty now has some freedom to do is to interact on a one-to-one basis with the students, devoting special attention to those students who appear to be having trouble in the didactic, personal, or emotional areas. In the first year, numerous content-type problems were anticipated, and a relatively large proportion of the faculty were prepared to conduct tutoring sessions. However, as reported earlier, only 7 recorded tutoring sessions occurred. Events that were perceived as problems such as multiple failures on a given evaluation and failure to progress were expected to be handled in the diagnostic interviews; however, in the first year, this area of the curriculum was not well defined or outlined. Consequently, the curriculum director's role was subject to the interpretation of the individual assuming that

responsibility. It is fairly obvious from a review of the data that this portion of the curriculum is the weakest, both in terms of recordable results as well as attitudes. We speculate the reason for this finding is the fact that this area of curriculum development received very little of the energy devoted to formation of the program. Since the major emphasis was on the programming of content, it should be no surprise that this was the most affective area.

The primary energy in the running of the curriculum for the second time was to be devoted to defining better the department's role in what we are calling the humanistic area especially as related to the role of the curriculum director.

In terms of handling the diagnostic interviews and tutoring areas, as one might expect, the problems associated with tutoring were much more easy to solve than was true of the interview. It was decided that the curriculum director would conduct all initial tutoring, and if the student continued to have trouble, refer him to another faculty member for a more intensive review. It was the director's feeling that in this way she could deal more personally with as many students as possible. The biggest deterrant to this technique is that it tends to give attention only to those students who perform poorly in the course. While it is certainly justified devoting a majority of energy in this direction, it is probably true on some level that the other

students are being cheated of the opportunity to interact in a non-threatening way with a faculty member. Certainly a way of offsetting this imbalance of attention is to automatically schedule a meeting with each of the 150 students in the class. In this way the opportunity will have been provided for interaction with those students who for one reason or another failed to request attention. For those who would prefer greater contact, the invitation has thus been made to them personally. For those who prefer anonymity, the option to carry the relationship no further is certainly open.

While the handling of the tutoring seemed to entail a relatively straight-forward and easy solution, the diagnostic interview remained a perplexing problem. As it was originally conceived, it was intended to be introduced when either of two events occurred: 1) the student failed an evaluation twice, or 2) the student failed to progress. It was designed to determine the reasons for the behavior. Often the student would indicate that he had either not studied adequately, or that he had difficulty setting deadlines for himself and so had put off starting. Several questions arise at this point. First, "is it appropriate to pressure the student to begin work when he has been given the freedom to proceed at his own pace?" "Do multiple repeats on a given evaluation constitute an undesirable pattern?" These and innumerable other questions concerning

student behavior in our curriculum encouraged us to seek the help of a Counseling Center graduate student whose task it was to help us define the events involving the freshman student. Additionally, we wished to determine whether these events have a positive or negative effect on the student's progress through the periodontology curriculum.

We projected that our needs would be best met by structuring a diagnostic interview that could ultimately be conducted by a staff member with minimum background in counseling. Guidelines would ultimately be set up for the problems that could specifically be handled by the director, and those which would require more expertise would be recognized early in the year and diverted to the proper helping agency. In this way, we anticipated close definitive support and treatment for the student having difficulties. In this regard, the bimonthly computer print-out of student progress is of invaluable assistance. It helps us track closely each of the 150 students in the periodontology course, and anticipate and detect those students who will benefit from closer supervision. The print-outs also indicate to use those students who function well in an unlocked educational environment. Theoretically, the educators can give each individual student what his system requires to advance, whether it be a lot or a little structure.

To equip the curriculum director to handle the humanistic area as efficiently as possible, graduate courses in counseling were taken, as well as the establishment of a referral network within Temple University to route those students who seemed to require special services of trained professionals. We have now established a working relationship with both the Counseling Center on the main campus, and also with the Department of Psychiatry at Temple Health Sciences Center. By having these two specific sources, we are able to provide for the student a variety of treatment modalities, depending upon the severity of his problem.

Our intention is not to be a therapeutic community as such, but rather to help those students whose problems interfere with their academic performance. However, occasionally it has not always been possible to segregate only those problems which affect school progress. The possibility always exists for the marginally adjusted student to become inappropriate in his expectations of the counseling role, and to extend it beyond the context intended. In such cases, we have chosen to be supportive and have devoted a good deal of individual time in an attempt to help the student; however, this is a personal committment, and does not have to become an integral part of the curriculum director's role. Our intention in mentioning this kind of situation is to alert the audience to one of the deviant routes that might

arise with the heavy incorporation of the humanistic aspects into the curriculum.

While a discussion of the humanistic aspects of the curriculum is taking place, it would be most appropriate to outline the role of the curriculum secretary, because she is undoubtedly the strongest and most consistent link between the student and the department. In addition to maintaining the massive amount of paperwork created by this system, and setting up and conducting evaluations once a week, she has an open door policy to the students. Consequently, students stop by at their convenience to pick up optional exercises, get evaluation results, review examinations, etc. This non-threatening environment encourages some students to ask for such things as changes in scheduling of evaluations for their convenience, but since they feel comfortable asking us to change our system for their convenience, we feel equally confortable refusing when it increases our work load too much.

In comparing the relationship of the curriculum secretary to the two classes with which she has been involved, one is struck by the differences. In the first class when the curriculum director took a less active role in dealing with the students, and communicated with them primarily through the secretary, it was the secretary with whom the students formed their sole attachment with the department. Even today that first class which is presently in its sophomore year interacts freely and

and closely with the department through the secretary. On the contrary, the second freshman class, which had much more exposure to the curriculum director, seems to have disseminated interaction with equal comfort to include the director. It seems safe to say that this kind of approach in which the student is invited to participate as much or as little as he desires with the department departs radically from the traditional student-teacher role in a dental school, and if we are reading our feedback accurately, the students in large part prefer this interaction. This is especially evident in the sophomore year in the co-therapist situation. The students overwhelmingly like this concept of clinical teaching where they interact closely with the instructor in the treatment of their patients. This system provides much more individual attention for each student than the old system, and yet, since it presents a non-threatening interaction, the students are requesting still more time with their co-therapists.

The final area which we would like to address at this time is the class personality. It has been interesting for us to observe the rather striking differences between the first two freshman classes. In the first class, students began to complete the required portion of the periodontology course at the end of January, while in the second class, 78 of the students had completed that same portion by December. Secondly, while many of the

students in the first class requested optional experiences on the basis of the amount of credit for the topic rather than interest in the material, this was not the case with the second class. The final obvious difference between the two classes relates to contact with the department. The second class does not encourage interaction with the secretary as much as the first class did. We think this represents an independence on the part of the second class rather than inhibition due to my increased presence, because the current sophomore students feel very comfortable to spend time in the office just as they did when they were freshman. Several speculations can be made concerning class difference: (1) the mean age of this year's freshman class is 3 years older than last year's, and 2) word has filtered down to the first year students that periodontology is a pleasurable experience and not to be feared.

Just as classes demonstrate differences in personalities, so do curriculum directors. The structure of our curriculum allows a great deal of latitude in the interpretation and definition of this role. We might conclude by saying that this flexibility provides both students and instructors being treated as individuals, and thereby encourages satisfaction of all.

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