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ABSTRACT

This paper reports several activities of the Coalition for the Use of Learning Skills (CULS), an academic supportive services program directed to the needs of black and Chicano students at the University of Michigan. The CULS approach assumes that, in order to meet the demands of quality education for black students, the University must be prepared to do certain things it never did previously and to modify some of the things it has always done. The University, from this perspective, is seen as an instrument for the service of the black community (just as it is for its white constituencies). Practically any aspect of black student life is fair game for the attention of CULS if it has direct or indirect connections with the stated goals. The focus is thus upon relatively unique approaches to solving problems experienced universally by black students at large predominantly white institutions. The accounts include analyses of problem situations, rationales for methods, descriptions of techniques, and indicators of their success or failure. The hypotheses and conclusions about fundamental psychological issues underlying black higher education are based on incidental and systematic observations of the program's activities as well as controlled experiments and surveys of students. [Because of the quality of the original text, some pages in the document are not clearly legible.] (Author/JM)

SOME APPROACHES TO BLACK ACADEMIC ACHIEVEMENT IN WHITE UNIVERSITIES

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Abstract

This paper reports several of the activities of an academic supportive services program directed to the needs of black and Chicano students at the University of Michigan. The focus is upon relatively unique approaches to solving problems experienced universally by black students at large, predominately white institutions. The accounts include analyses of problem situations, rationales for methods, descriptions of techniques, and indicators of their success or failure. The hypotheses and conclusions about fundamental psychological issues underlying black higher education are based on incidental and systematic observations of the program's activities as well as controlled experiments and surveys of students. The specific topics addressed include: overall program approach, student life directions and motivations, general learning and performance skills, quantitative and scientific method skills, and course performance assurance strategies.

SOME APPROACHES TO BLACK ACADEMIC ACHIEVEMENT IN WHITE UNIVERSITIES[1,2]

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In recent years there has been a dramatic increase in the number of black people attending college. The U.S. Census Bureau reports that between the years 1967 and 1972 black student enrollments in American colleges increased from 370,000 to 727,000 (U.S. Census Bureau, 1973). Without doubt, much of the increased enrollment has taken place in predominately white institutions as a consequence of the vigorous black student protests of the 1968-70 era. The case of the University of Michigan is typical. Michigan's black student population rose from about 2.3% in 1968 to about 6.2% in 1972 and is likely to be at least 8% in 1973.

In the midst of burgeoning black enrollments in predominately white universities there has been at least one commonly voiced concern: How well do or can black students perform academically in those universities? Naturally, the motivations for the askers can differ dramatically. Conservative sentiments, such as those expressed by Vice President Spiro Agnew in his denunciation of the University of Michigan's agreement to enroll a 10% black student body, imply that blacks cannot survive in such institutions. Further, such a view asserts that the mere inclusion of large numbers of black students will erode the very academic reputations of the schools. In contrast, black students' own concerns are legitimate and realistic. As conveyed in protest demands like those drafted

at Michigan, black students want to make certain that their full high potential is realized at their colleges; that they have the opportunity to learn the information and develop the skills needed for personal and community survival; and that in the process they are not penalized for the technically deficient scholastic backgrounds that are frequently the legacy of inner-city high schools.

Often at the behest of their black students many--probably most-- predominately white universities with sizeable black student populations have established "supportive services" programs. The major (and frequently exclusive) purpose of such programs is to do whatever is necessary to ensure that as few black students as possible flunk out of the institutions. Generally, supportive services programs include at least some type of counseling and some form of tutorial assistance. Primarily because of their newness there have been few public reports on the methods and performance records of supportive services programs. Informal surveys conducted by the University of Michigan's Coalition for the Use of Learning Skills make it clear, however, that the time is ripe for an exchange of ideas, experiences, and research results. Such an exchange could lead to more successful strategies for assuring the academic success of black students in white colleges.

The present paper is an initial contribution to that dialogue. It is a report of several activities of the Coalition for the Use of Learning Skills (CULS). The intent is not to describe the program; that would be of little general interest or value. Rather, the focus is upon several relatively unique features of CULS. There are accounts of CULS approaches to a few specific problems of black academic performance. These accounts include rationales, descriptions of techniques, and indicators of their success or failure. Moreover, there are discussions of psychological issues underlying black education

in predominately white universities and broader contexts as well. The conclusions, hypotheses, and conjectures developed are based on incidental and systematic observation of CULS programs as well as controlled experiments and surveys of students. The specific topics addressed include: overall program approach, student life directions and motivation, general learning and performance skills, quantitative and scientific skills, and course performance assurance approaches.

Overall Program Approach

Perhaps the most fundamental distinguishing characteristic of CULS is what it tries to do. An implicit goal of most supportive services programs is to transform somehow their students into the kinds of students for which the parent institutions were built, i.e. traditional white students. It is easy to see where the impetus for this kind of thinking originates. The assumption underlying the negotiating positions held by many university administrators when discussing CULS and other black programs is revealing. Their position is that blacks should take the university as it fundamentally is or leave it. Put another way, they feel that the only legitimate gripe blacks might have about the university is their lack of access to it. The university--as is--is a first-rate institution for anybody, black or white. If black students do not perform well in the university the problem lies with them or, at worst, with their backgrounds. So, the way to deal with the problem is merely to change black students such that they can adapt to "the way things are done in a university."

The frame of reference of CULS is quite different. The program recognizes that organizations serve the interests of those who establish them and assume the character of those who comprise them. Accordingly, since predominately

white universities were built for and by white people, there is no a priori reason to believe that such institutions function in manners completely consistent with the purposes of black students. The economic, political, and cultural interests of black people differ in degree and often in nature from those of white people. Hence, the CULS approach assumes that in order to meet the demands of quality education for black students the university must be prepared to do certain things it never did previously and to modify some of the things it has always done.

The university, from this perspective, is seen as an instrument for the service of the black community (just as it is for its white constituencies). It is intended to provide for the educational needs of the community as a whole as well as its members. This view is implicit in the articulated goals of CULS. First, CULS seeks to make certain that black (and Chicano) students in the university learn and perform adequately in their courses. It does no good to bring black students into the university if because of bad grades they are asked to leave or if they are simply given degrees that do not signify thorough understanding of their fields. Second, the program seeks to teach students how to learn and to make their way through the university on their own. Each student must learn to stand on his own feet as well as to assist others who follow him into the university. Third, an attempt is made to orient and teach students to apply the things they learn to their personal and community self interests. Present day conditions do not allow students the luxury of learning things that are irrelevant to their own lives. Fourth, the program tries to compensate for the failure of the broader university to provide information in all course areas of explicit relevance to the culture and heritage of black people. Finally, CULS attempts to nurture the development of each

of its students as a balanced, competent, and conscious black person. When he leaves the university a black student should be prepared to make a living, but also to cope successfully with the tremendous stresses placed upon him as a person and as a member of a black community.

The assumed charge of the program is, then, comprehensive rather than narrow. Practically any aspect of black student life is fair game for the attention of CULS if it has direct or indirect connections with the stated goals. So, there is a constant and conscious attempt by staff members and student representatives to CULS committees to identify student needs. Once a problem is isolated, the organization makes a judgment of which of its two styles of responding is more appropriate, that of a catalyst or that of an active agent. The judgment is "economic" in the broad sense. It must be decided whether it is most feasible to attempt to meet the need independently, jointly with another university agency, or to induce some other agency or organization to provide the required service. The concept of "feasibility" has reference to the broad range of resources possessed by CULS--finances, manpower, skill, and influence. Something will be done or at least tried.

Several examples illustrate the judgments and actions taken. Black students have a need to know the usefulness of economic principles in daily black life. The CULS approach to this problem was essentially an independent one. Study groups associated with basic economics courses and conducted by CULS-appointed black teaching fellows were established. At least part of their function is to interpret common black economic experiences in terms of the concepts introduced in the economics courses.

Black students entering the university often lack facility with the kinds of library research and writing skills needed in their collegiate and work

careers. To meet this problem CULS entered a joint arrangement with the English department. This was not only administratively and financially convenient, but practical from the students' viewpoints. Jointly appointed black teaching fellows are able to offer black students precisely the kinds of skills training they need and in the confines of a fully credited English composition course the students are required to take anyway.

Black students in the university are no different than black people everywhere: they can benefit from advice on how to find jobs. Considering the required investment in personnel and capital, it did not seem reasonable to try to maintain a placement program within CULS. Rather, the organization influenced the university's placement office to establish what is now known as a minority career planning and placement service.

A final example grows out of black political realities. Several of the students involved in the protests that brought about the dramatic increase in black enrollments in the university were arrested. CULS staff members stimulated and assisted in the coordination of black student benefits to raise funds for the legal defense costs of the arrested students. This was obviously an instance in which the organization as an organization was legally powerless to act. Nothing, however, could prevent it from influencing the students to do what was necessary.

Student Life Directions and Motivation

Perhaps nothing is more defeating and depressing for a teacher than to contend with a class of students who show no eagerness to learn what he or she is prepared to teach. Often, however, it seems that the lament, "They just aren't motivated," is used as an excuse for not tackling this tough problem. There is not broad acceptance of the position that a legitimate responsibility of a teacher is to heighten the interest and vigor of students in

learning the material at hand. Nevertheless, as a "collective teacher" CULS assumes that responsibility for its students.

A proper discussion of ways to enhance the academic motivation of black students inpredominately white universities must begin with an analysis of the issues involved. There are really two major classes of issues, questions of overall purposes for being in the university in the first place, i.e. life directions, and concerns about the vigorousness of effort devoted to studies, i.e. "motivation" in the everyday classroom sense. Obviously, however, the two sets of issues are related. Empirical research has verified the intuitively compelling conclusion that students with well-defined plans perform better in school than their less definite counterparts (Weitz, 1955). It is likely that one of the mediators of this higher performance level is greater study effort. Viewed from the other direction, it is obvious that if a person is not able to muster enough effort to complete the courses required to be a physician or whatever, he will never achieve his particular career goal.

Aside from classroom motivational effects there are two other reasons an interest in black student life directions is urgent. First of all, as implied in the statement of organizational goals, CULS is concerned that black students are able to enter fields that are in demand; that upon graduation from the university they are able to make decent livings for themselves and their families. The mere possession of a college degree in just any major is no guarantee of such security. In addition, there is a serious concern for the availability of trained black persons in fields critical to the development of strong black institutions and communities.

There is ample reason for worry about the choices of careers and academic majors being chosen by black students. While white businesses and organiza-

tions often devote no more than token effort to the recruitment of black personnel, there are many legitimate cases in which good paying positions go to non-black persons because trained black people in the areas are so scarce. At the same time, casual observation indicates that blacks are heavily and unwisely concentrated in areas where the needs for personnel are not so great. Those areas, such as education and social work, also happen to be relatively low-paying and vulnerable to volatile political sentiments and conditions.

A common complaint among managers of black organizations of all sorts is that they are unable to find and attract black people with the skills and "sense of consciousness" needed in their organizations. The experience of Detroit's Inner City Business Improvement Forum is reflective of the problem. Officials acknowledge a shortage of blacks with technical business skills and experience. The lack of such skills is one of the major reasons the failure rate among black business ventures is so high.

Observations of actual data are consistent with these impressions about black career preferences. Sikes and Meachum (1972) compiled a directory of black professionals in predominately white institutions of higher education. A 10% systematic sample of the more than 4,000 listings in their directory revealed the distribution of professional fields shown in Table 1. While

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Insert Table 1 about here.

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this procedure of gaining a grasp of the problem is admittedly fraught with methodological shortcomings, the smoke uncovered suggests that a real fire might exist. While academic administrative and social science positions comprise a full 61% of the positions listed, business, engineering, law, and all the fields of science and technology are represented by only 16.3% of

the positions. Undoubtedly, based on informal observations of the interest patterns of recent entering students at the university, this pattern will improve. However, the needed changes are likely to be slow if things are left to themselves. Vonnie McLoyd of the CULS staff conducted a survey of random samples of black and white graduating seniors at the university. Her results indicated that much of the pattern represented in Table 1 will maintain itself in the future. For example, 26 of 61 black seniors (42.6%) had majors in the social sciences (as compared to 16 or 24.2% of 66 white seniors). In contrast, only 2 of the 61 black seniors (3.3%) were in engineering (as compared to 10 or 15.1% of 66 white seniors).

There are a number of defensible explanations for these distributions of interests. McLoyd's study of black and white students' choices and changes of majors is very helpful in substantiating some of these explanations. When the students in her study entered the university as freshman, the distributions of intended majors of blacks and whites did not differ as drastically as the above statistics indicated that their actual graduating majors contrasted. The story underlying the distinctive pattern of black student career choices rests in their changes of majors. Holland (1964) found that the major reason his sample of college students changed majors was that they no longer had legitimate interests in their original majors. Pierson's (1962) results are different from Holland's but not necessarily incompatible with them. A basic explanation of his respondents' changes of majors was a lack of information concerning their original majors as well as potential alternative majors. That is, they were disappointed in their expectations about their original majors, especially in the light of a much broader perspective of other options available to them. McLoyd's data fit the molds of Holland and Pierson. Her analysis revealed

that when black students changed majors two factors were especially salient. First, the students sought areas where they had greater intrinsic interest. Perhaps when they entered the university they were aware of only the traditional sorts of things a person could be, e.g., doctor, lawyer, etc. Second, and probably related to the first rationale, over their collegiate careers the black students developed a stronger need to do something with clear relevance to important social issues. That is, they were no longer content to have a career that offered merely personal rewards. Black males (but not black females) were also influenced strongly by academic difficulties in their original majors. In other words, the course work in their original majors was too difficult for them.

The CULS response to the problem of black student career directions is built around the factors shown by research to underlie choices and changes of majors. The entire program is geared to preventing students from having to leave majors because of poor course performance. The remainder of the approach consists of making students aware of the wide range of options open to them, how those various options fit into the needs of black communities, and what participating in the fields would likely mean for them as individuals.

Counselors in the program discuss future plans with students individually and in groups of peers. They make extensive use of publications of the U.S. Department of Labor which provide descriptions of the nature of work in specific areas. Those publications also discuss the prospects for jobs in the general economy for various professions. Among the most useful of such publications are the Occupational Outlook Handbook, the Occupational Outlook Quarterly, and occasional bulletins such as "College Educated Workers, 1968-1980." The counselors also make students aware of specific demands for black workers.

Unfortunately, such information is not collected and analyzed as systematically and regularly as for the overall labor market. Nevertheless, the U.S. Commerce Department publishes a few reports relevant in this area, e.g., "Opportunities for Blacks in Professions of Engineering," by Robert Kiehl. Black Enterprise and Contact magazines are useful soruces of information from a black perspective.

Other approaches focus less on making students aware of the existence of various fields than upon giving them accurate notions about the detailed work in the areas and how that work relates to the overall interests of black people. All study group leaders (described below) are urged to emphasize the usefulness of university course content to the problems facing the students as black individuals and as a community of black people. The program staff also publishes a CULS Future Education Bulletin in which, among other things, the different staff members present papers describing their own areas of study. The emphasis of such articles is upon how the implied skills can be used in promoting the interests of black communities. On occasion the organization also sponsors "rap sessions" with black professionals in various fields to provide the same kinds of insights as Bulletin articles.

Perhaps the most systematic CULS approaches to providing students with senses of direction are the CULS Premedical Sequence and the CULS Prebusiness Sequence. The Sequences are joint efforts of CULS and black pre-professional organizations. A separate CULS counselor is assigned to students in each of the Sequences. Moreover, each Sequence is coordinated by a committee of students, black faculty members in related areas, and CULS staff members. The committees monitor the progress of each student in the Sequence, hold regular meetings of participants, and sponsor various activities such as lectures, demonstrations and tours, and of course, social events. For example,

during the 1972-73 year the Premedical Sequence heard lectures on hypertension (a most serious black health problem), burn treatment techniques, and finding educationally beneficial summer jobs in the various medical units in the vicinity. Perhaps the biggest attraction of the year was the opportunity for Sequence members to observe several autopsies performed by a member of the Premedical Sequence coordinating committee who is also a member of the university hospital staff.

Unfortunately, it is still a bit early to discern the effectiveness of the various CULS approaches to problems concerning black student choices of careers and majors. The first class of students who experienced the program from their freshman year will be graduating in 1974. However, the activities to date have highlighted several problems that are likely to be universal in efforts to orient black students in certain directions.

While students often emphasize their desires to enter fields with some "relevance" to the interests of black people, this sentiment has to be interpreted and handled carefully. Implicit in many students' statements of this sort is a kind of romantic benevolence that evaporates rather quickly when they are faced with the realities of planning careers that will allow them to earn their livings. There is a flaw in the belief that being 'relevant' and earning a living are mutually exclusive. Counselors in CULS urge students to view the choice of socially conscious careers as within their personal as well as community self interest. If a sufficient number of black people make similarly motivated choices all will benefit from the resulting stronger black economic and political position.

The pursuit of relevant careers also suffers from misconceptions about which are the most useful skills in the building of black communities. Many

students have not recognized that a broad range of skills are needed, not just social organizing, teaching, and medical treatment skills. The CULS staff attempts to communicate the need for black people with accounting, public health, dental hygiene, and a multitude of other non-traditional capabilities. They caution students that in the short run black communities will not be able to support independently many of these "esoteric" skills, but gradually those skills will be demanded and supportable as the communities gain strength. In the meantime there is nothing wrong with gaining experience in predominately white organizations.

In order to enter any field of work the student must have the "get up" and perserverence to succeed in the necessary courses. He must be "motivated." Data as well as common sense support the connection between academic performance and motivation. For example, Miller and O'Connor (1969) have shown that one of the best predictors of black student academic success is the possession of an "achiever personality" as measured by Fricke's Opinion, Attitude, and Interest Survey. This index of personal motivation is in fact, a better predictor of black student grades than the Scholastic Aptitude Test. Epps's (1969) data addressed the motivation issue less from the personality trait perspective than from the student's view of the real benefits to be gained by investment in academic pursuits. His results showed that among black high school students there was a strong inverse relationship between grades and the students' perceptions that their future opportunities were limited. Epps also found a significant positive relationship between grades and expectations of higher levels of future education. That is, when the students had clear and compelling goals, they performed better in their school work.

The guiding CULS principle on academic motivation is more consistent with

the theoretical position underlying the Epps result than with that implicit in Miller and O'Connor's conclusions. The chronic "energizing" view of motivation focuses upon the amount of energy a person devotes to a particular act. The personality trait approach of Miller and O'Connor exemplifies this perspective. When a person expresses little interest and devotes little attention to a certain task, the basis for this behavior is assumed to rest in more-or-less stable characteristics of the individual: "He just doesn't have the drive." Often, these are euphemisms for, "He's lazy." Further, this viewpoint on motivation implies that there is very little that can be done to influence a given student to work harder at his studies. The advice to the teacher is somehow to select more highly motivated students in the future. Fortunately, there is another less fatalistic perspective on motivation.

The "choice-of-alternatives" view of motivation is captured in the truism that if a person is not doing one thing, he is doing another. Further, he is doing that particular thing because he feels the activity is more likely to meet his most pressing needs than are any of the other salient and available alternatives. These two statements are not as innocuous as they may seem. An entire literature on motivation and decision making behavior is built around these notions. The viewpoint dictates that if a particular student is not devoting effort to his studies, a detailed analysis of what he <u>is</u> doing should be made.

Several hypothetical yet painfully representative examples illustrate the essential concepts. Suppose there are three students who spend little time studying. Rather, respectively, they devote hours to playing basketball, playing bid whist (cards), and simply sleeping. The student who plays basketball to excess rather than studying could well do so because in contrast to the

classroom, he can be "top dog" on the basketball court. He feels a very strong need for superior accomplishment. In his eyes basketball affords the possibility of satisfying that need while school work does not. The student who spends endless hours at the card table possibly is trying to meet a need for close companionship in an otherwise hostile and uninviting white environment. The student who sleeps constantly easily might be escaping from academic demands which he feels he cannot possibly meet. His only alternative is to "withdraw from the field" and wait for the inevitable. Sleeping prevents conscious worry about that inevitable fate.

The choice-of-alternatives perspective on motivational problems implies that they should be attacked in two ways. The idea of somehow increasing the student's general energy level is meaningless. He is probably expending as much effort as the best of students, only on the "wrong" things. The object is to get the student to re-direct his energies. Actually, there can be no "wrong" thing for a student to be doing; he is making <u>his</u> best response to <u>his</u> perception of his current and future needs. The role of the counselor or teacher must begin there. First, that counselor or teacher must make certain that the student has an accurate picture of what his true needs really are. Any contradictions in those perceived needs must be identified for the student. For example, a student might feel that he needs an entire new wardrobe to compliment his articulated "life-style." A closer examination of the student's concern might reveal that his real desire is to be accepted by people he considers important. They may or may not, in fact, consider the clothes he wears as pertinent to his acceptability. Further, the counselor might find it necessary to demonstrate step-by-step the bad effects working an extra job to buy clothes will have on his chances of getting into medical school, his

primary objective. A choice must be made, once and for all.

After clarifying the student's needs the advisor should then evaluate the student's plans for meeting those needs. This evaluation addresses the objective worth of those plans as well as the student's beliefs about his chances of actually coping successfully. The responsibility of the teacher or counselor is to demonstrate the adequacy or inadequacy of the student's approaches to his problems. Often in this context it is necessary for the advisor to correct misconceptions the student has about his abilities or the amount of effort needed to achieve a goal. For instance, a student might be convinced that the best way to make certain he absorbs lecture material is to take notes word-for-word. His counselor should be prepared to convince him of the pitfalls of this approach. This can be done by citing the example of other students with whom the student identifies. Or, the advisor could demonstrate the ineffectiveness of the word-by-word method using mock lectures and examinations.

The CULS approaches to three critical and consistent black student motivation problems illustrate the techniques implied by the choice-of-alternatives view of motivation. In each case an analysis has been made of what needs the students have or believe they have. Implicit or explicit in each instance is also a question of the students' confidence in meeting their felt needs. The three problems examined concern grades in courses, perceptions of personal abilities and required study effort, and the effects of peers and others on scholastic effort.

Casual observation suggests that black students in the university view the grading process quite differently than do their non-black peers. It seems that while most white students attempt to maximize their grade point averages,

many black students are more concerned with "satisficing," to use a term coined by Simon (1957). In other words, they feel no particular need to attain a high grade point average; performance "in the ballpark" is good enough, i.e. "C" grade level or thereabout. This is reflected in the often frustrating experiences of teachers who are told by the students that all they want to do is pass their courses. The success of the students in achieving that satisficing goal is reflected in the distributions of grades for black and white students in the university. The mean grade point average for white students is much higher than that for black students. Yet, the proportional number of black students who are required to leave the university for academic reasons is not substantially greater than that for white students. This indicates that the distribution of black students' grade point averages is concentrated just above the minimal level needed to stay in school, the "C" level.

The black student satisficing goal does not originate in anything like laziness or even a feeling that better achievement is not very possible, regardless of the effort expended. Rather, there seems to be a legitimate questioning of the meaning and implications of grades. Many--perhaps most--of the students have had the experience of studying very hard for examinations, feeling very secure in their knowledge of the material, and then doing poorly on the actual examinations. Rightly or wrongly, they have often attributed such poor performance to "tricky" test questions or biased graders. So, they develop the belief that grades do not reflect the true knowledge of students. They also have doubts about whether attaining a high grade point average has real consequences for their career plans. By some means the students seem to be aware of the documented fact that in many fields collegiate grade point averages and

subsequent career success have practically no relationship (e.g., Carroll, 1966; Hoyt, 1965: Richards, Taylor, & Price, 1962; Williams & Harrell, 1964). So, why bother?

Unfortunately, the students' preceptions of the situation are only partially correct. CULS approaches to the problem proceed accordingly. The organization does not set a primary staff goal at this time of maximizing the grade point averages of its students. Rather, the premium is on eliminating "maladaptive" grades, i.e. grades below "C." However, the staff attempts to dispel the notion that there is no connection between grades and knowledge. While the relationship is far from perfect, it does exist. Moreover, there is a concern that students might extend the satisficing sentiment into more meaningful work contexts. Black communities cannot afford the luxury of mediocre doctors, lawyers, and other professionals.

When they get poor grades in examinations for which they studied diligently, students frequently have little idea why they were graded poorly. Hence, they attribute their failure to unfair questions or grading practices. In truth, the examination questions often make minute, yet important, discriminations between concepts. Yet, the graders never make such discriminations clear to the students even when the examinations are returned. The teachers simply return the tests with global grades and no detailed explanations of why the students' responses were wrong. Nor do the professors offer any ideas about how to avoid making similar studying and test-taking errors in the future. It is no surprise that the students become disillusioned and cynical. CULS study group leaders and teaching fellows, hence, devote a great deal of attention to reviewing the students' examinations and test-taking techniques as well as the course concepts themselves. The approach seems to work, though it is

difficult to separate its effects on student performance from those of the other things study group leaders and teaching fellows do.

The view that grades have no implications for subsequent career experiences is partly fallacious, too. The thing that is misleading about studies showing little connection between scholastic achievement and job performance is that by necessity those studies include people who actually have jobs in the fields under consideration. The problem is analogous to the variance attenuation problem in testing. If all students who took aptitude tests were actually admitted to college, the correlation between test scores and grades would be much higher than it is at the present time. The people who actually attend college are generally those with high test scores; they do not differ very much from one another. Statistically, this has the effect of reducing the correlation between the scores and grades (cf. Gulliksen, 1950). Similarly, people who achieve poor grades in school often are not given the opportunity to attempt to do certain jobs -- and, very likely, fail at them. If they were, the correlation between grades and job performance would be much higher.

Another proviso that should be taken when interpreting the grade-job performance studies is that the relationships vary substantially from field to field. Besides the variance attenuation problem, a second major reason correlations between grades and job success have been so low is that in many instances the school subjects have not been related to work requirements. However, especially in technical and professional areas, the correspondence between job and course work requirements is very close and the relationship between grades and job performance can be expected to be quite strong.

These arguments are made by CULS staff persons to students to prevent their being locked out of fields because of passing, but low grades. To some extent

there is success in the approach, especially in areas like pre-medicine. The experience in other concentration areas leaves much to be desired. The arguments would probably benefit from more compelling concrete examples of the importance of grades on job prospects in each of the fields in which students express career interests.

Students' beliefs about their abilities to do well in the university--and about how much effort is required for them to do well--seem to underlie many motivational problems. Handling problems originating in self-perceptions of ability is like walking a tightrope. There is not much leeway in allowing the student to over- or underestimate his ability to succeed. If he underestimates his ability he could easily become discouraged and not try to succeed because he feels the effort would be futile. His low assessment of his skills could also lead him to become overly tense and aroused and thereby not perform effectively in spite of long hours studying. On the other hand, if the student overestimates his ability to learn material he could become unjustifiably complacent and spend so little time studying that he "bombs out" irrevocably on his first examinations. Such an overly confident student could also lose interest in his studies because until he gets accurate feedback on their actual difficulty, he feels his courses offer no challenge.

All of these possibilities have been observed informally among CULS students. The predictions also have justification in the psychological literature on achievement motivation and stress effects (cf. Atkinson, 1964; Yerkes & Dodson, 1908). Hedegard and Brown (1969) found that after their freshman years, black students in their sample generally felt that they underestimated the stiffness of the competition in the university. This result is consistent with the experimental conclusion of Yates and Mayers (1973). In that study it was found that black students in a prestigious white university had ex-

ceedingly high over-estimates of their abilities as compared to skills of their black classmates. On the basis of practical experience in the various CULS options, it seems that a most common pattern is for black students to enter the university overly confident, experience a severe downfall on the first wave of examinations, develop a serious case of under-confidence, and never fully recover. It is also not unusual to find the complementary syndrome in which the student is extremely anxious upon entry to the university, studies furiously, performs poorly on his first tests, becomes more anxious, then does even worse on his next examinations, and again never fully recovers from the experience.

Managing the ability self-perception problem is extremely difficult. A device that seems to work in a number of CULS mathematics and science options is the initial diagnostic test. Study group leaders and teaching fellows in those areas construct tests of the basic concepts experience has indicated to be essential for successful performance in the relevant courses. These tests are administered to students at the beginning of each term. A detailed analysis of each student's performance on such diagnostic tests is discussed with the student individually. He is told very candidly what his weaknesses are and the likely consequences of those weaknesses, based on the past experiences of CULS students from the same backgrounds as he. The student is also told how he can eliminate those weaknesses. (There is no better way to increase a person's anxiety than to tell him he has a problem and not offer him a way to solve it.) Early indications are that the diagnostic test approach is quite effective. The only other device employed on a systematic basis is to provide students with admonishments and "horror stories" about previous students from more-or-less identical or superior backgrounds. This does not seem to be too useful; students still tend to see themselves as exceptions

to the rule.

The final motivational example concerns the influence of other people on students. This is an especially serious problem in the context of a large university in which black students can be widely dispersed and "controls" on all students are so tenuous. In a large, impersonal, and overwhelmingly white institution it is not surprising that black Greek organizations are flourishing while their white counterparts are struggling for memberships. The already strong peer group bonds among the black students are reinforced in the pressured and security-starved environment of the university. This is a mixed blessing, though, as far as academic motivation is concerned. For, whatever the prevailing sentiment of a particular clique happens to be, that is the sentiment to which the individual members adhere. If the sentiment is toward investing a lot of time and energy into studies everything is fine. On the other hand, if the clique does not lean that way, individuals who want to study a great deal must contend with overwhelming social pressures.

The influence of teachers can be very important in the student's motivation, too. Black males in McLoyd's study of student majors were especially sensitive to the teachers in majors they considered. Moreover, it appears that the influence of teachers is of a very personal rather than a strictly technical character. Hedegard and Brown (1969, p.140) required their respondents to characterize their "ideal teachers." Blacks, much more often than whites, emphasized that such an ideal teacher was one who "...induce(d) in students pride and accomplishment,..." This result is consistent with the conclusion of Tucker and Yates (1973) that when choosing among alternative learning environments, blacks as compared to whites were much more concerned with satisfying needs for self-actualization. That is, the black students seemed to

be more in need of either experiencing individual success or avoiding humiliating failure. These needs reflect the importance of having status in the eyes of others.

The CULS approaches to social influences on black student motivation admittedly have met with limited success, in volume rather than in kind. The concepts underneath the approaches are sound. However, in so large and diverse an institution as the University of Michigan, a single organizational unit simply does not yield the kind of power needed to influence the needed institutional changes. To address the peer influence issue CULS counselors maintain a vigorous dormitory program of black student activities of all sorts. Many of the activities are social. These activities have as one of their objectives the opportunity for the CULS dormitory counselor to say, "Well, we've just had a good time partying. Now let's get down to some serious studying until the next break." The counselor also organizes study sessions and skills development workshops to assist in building a conducive academic atmosphere. The dormitory counseling program works quite well given its limited scope. It is one of the most popular options among the students.

The faculty influence question is another story. Initial efforts to sensitize white faculty members to their responsibilities for the academic success of their black students were very disappointing. They are no longer attempted on a regular basis. The faculty members who would attend discussions of such issues were those who needed to be there the least, and conversely. CULS (nor black people in the university in general) does not have the influence to make success at teaching black students a criterion in faculty status decisions, e.g., raises and tenure. Until such a criterion is established little change in white faculty attitudes can be expected. In addition, the experience and prospects for black faculty hiring have been poor. Con-

sequently, the CULS teaching fellow staff remains one of the few bastions of faculty sensitivity and concern for black students in the university. The students themselves have implied this in their evaluations of the teaching fellows. They frequently mention that the teaching fellows go out of their way to see that their students attend class, turn in their assignments, and simply, learn. At the time it occasionally seems that the teaching fellows are "hassling" them. Eventually, however, most of the students are grateful that someone cares enough about them to go through the effort of keeping them on their toes.

General Learning and Performance Skills

No matter how badly he wants to win or how hard he pushes the throttle, a fellow driving a Model T Ford has slim chances of winning today's Indianapolis 500. Similarly, a student who tries to make it through the university using inappropriate or inadequate tools is putting himself at a needless disadvantage. Unfortunately, however, many black students find themselves in just that position. Before coming to the university they have not been taught how to learn and how to demonstrate their knowledge in large white institutions. For example, the reading speed scores of new black students in the university are often only about half those of the other students. Thus, the students are burdened with having to spend a substantially greater amount of time than their non-black peers just plowing through their texts. Skill deficiencies in numerous other areas are just as troublesome. The CULS experience has shown that the following skills are among the most critical for a student in the university to possess: reading with speed and comprehension, use of a broad vocabulary, effective note-taking, systematic test-preparation and test-taking routines, use of library and reference materials, ability to analyze

arguments and evidence, and writing.

Before describing CULS approaches to assisting students in the development of some of these skills a discussion of underlying issues would be useful. Observations of the detailed skills problems experienced by CULS students has led to several tentative conclusions. These hypotheses are in the process of being tested more rigorously and systematically. There is no such thing as a mental "tabula rasa" in anybody. Thus, it is inaccurate to say that entering black students have no learning skills or completely inadequate learning skills. They do, in fact, possess certain skills and pre-conceptions about how to get through university courses. However, it appears that those skills and approaches developed from their inner-city high school experiences are no longer appropriate in their newly adopted environment. Nor are they adequate for the broader kinds of career goals the students express. On the other hand, it seems safe to say that the skills traditional to purely middle class universities would put a person in an inner-city high school or community at something of a disadvantage, too. It works both ways.

Let us be more specific in stating our conjectures. It seems that there are three categories of individuals distinguished by their characteristic cognitive styles and preferences. The first category of people might be labeled "principle" people; the second group "analogy" people; and the third set "recall" people. As in all discussions of individual differences the categories are not hard and fast. People in any one of the categories do a certain number of things that are more characteristic of the other categories. Moreover, nothing hereditary is implied, just style and preference.

Principle people are those who when faced with a reading assignment attempt to discover a general principle in the material. Not much attention is paid to filler words or to details that have no obvious bearing upon an

underlying principle. Examples are read only if they are needed to help discover the principle or to reinforce understanding of the principle. Examples are seldom, if ever, memorized. The principle person would be able to reconstruct any example in the material using the principle (which he does, incidentally, try to retain in memory) and minimal details of the example. When asked to solve a problem based on the material assigned, the principle person would attempt to see if the structure and conditions of the problem fit the relationships and entities implicit in the general principle he discovered in the material. If a fit is discerned, the principle itself will imply the answer to the problem by logical necessity.

When faced with the same reading assignment an analogy person would not attempt to discover and articulate any principle implied in the text. Rather, he would try to judge the importance of the various units of information in the material. He would then attempt to distinguish the "pattern" represented in the important pieces of information and commit them to memory. Little concern is felt for identifying necessary or causal relations in the patterns. The analogy person would be able to recall or reconstruct only those units of information he had judged to be important enough to examine for patterns. His problem solving strategy would be to see if the features of the problem situation are analogous to at least part of one of the important patterns distinguished in the material. If a match is discerned the solution is implied by the complete pattern revealed in the original assignment.

A recall person would try to memorize as many of the details of the reading assignment as possible. Given a sufficient amount of time and incentive he would be able to reproduce verbatim anything stated explicitly in the passage. The recall person does not attempt to discover principles underlying the facts nor more than the most superficial connections between

those facts. Naturally, his problem solving strategy rests on simple recall. When faced with a problem he searches his memory for the same or a very similar problem--and its solution--encountered in the material previously.

The distinctions made here between principle, analogy, and recall styles are similar to the differences made by Ausubel (1968) and Gagnè (1970) between various types of learning. Ausubel distinguishes "meaningful" and "rote" learning. Rote learning is said to involve only the retention of patterns or sequences of words with little concern for their meaning. Gagnè goes further and differentiates eight varieties of learning including, among others, stimulus response learning, verbal association, discrimination learning, concept learning, rule learning, and problem solving. These varieties are largely self-explanatory.

Very often value judgments are associated with the different cognitive styles and types of learning. Undoubtedly, the impetus for such value judgments rests in the types of beliefs expressed by Gagnè. He observes that all his varieties of learning are common. He further asserts, however, that the "higher" types of learning pre-suppose the "lower" ones. That is, if one is capable of one of the higher types of learning he must be capable of the lower ones, but not conversely. The extension of this notion is that a principle person would be able to assume an analogy or recall style, but not conversely. This is only partly true. This position does not recognize the importance of perference, "set," and appropriateness. A given individual may simply prefer one style over another and therefore use it on a consistent basis. Hence, whenever he faces a reading assignment or problem he has a 'set' to approach the situation using that style. As classic problem solving studies in psychology have proved, e.g., the Luchins (1948) water-jar experiments, people

do not change their approaches easily, even when they lead to clearly inferior performance.

It seems that the issues of preferences, sets, and appropiateness of cognitive styles underlie the learning skills problems of many black students in the university. Specifically, while the university demands that students make wide use of the principle style, black students prefer and are more accustomed to the analogy or recall styles. The traditions and demands of black communities suggest why this is so.

The principle style is consistent with European religious, philosophical, and scientific thought. European religious tradition is filled with notions of sharply distinguished good and evil, right and wrong. Moreover, such European ideas extend themselves to imply the existence of unitary deities. Largely due to the practical applications of Newtonian scientific insights Europeans grew more and more to view the world and the universe in mechanistic, cause-and-effect terms. Perhaps the ultimate extension of these ideas has been captured in prophetic novels such as Huxley's Brave New World and Orwell's 1984 in which man himself is conceived essentially as a cog in the mechanisms of the state. The ardor to which Europeans have held to their black and white world views is illustrated graphically in the multitude of Western religious wars.

African religious and philosophical traditions were quite different. The African view of the universe was essentially wholistic and organic. That is, the universe was seen as extremely complex with many necessary relationships between its parts. Moreover, it would make little sense from that perspective, to consider those parts outside those necessary relations since their very character would change in so doing. For example, the extreme social emphasis in traditional African discussions of man is embedded in this notion. An in-

dividual man was defined in terms of his family and his people, not by what he did for a living as is the case in the West (cf. Mbiti, 1968). There were no sharp distinctions between inherent good and evil. Things were right or wrong depending on their effects on others. Man's role was not seen as that of conquering the universe, but achieving harmony with it.

It is not necessary to go as far back or as far away as African tradition to understand the bases for black student inclinations about learning approaches. Nevertheless, there is much to be said for the extension of Africanisms into contemporary black culture (Herskovits, 1958). One has to observe but the distinction between the styles of black and white religious services and values. The preaching style of white ministers, especially in the churches of the middle and upper classes, has much in common with the mechanistic, carefully reasoned, orderly style of university lectures. In contrast, the traditional black minister makes much more extensive use of parables, everyday illustrations, and the heartfelt personal experiences of his congregation. His purpose is not so much to argue the logical necessity of certain conclusions, rather to achieve a depth of understanding and empathy that cannot be articulated explicitly in the few short statements of a syllogism. One is brought to <u>believe</u>, though one might not <u>prove</u> in the accepted sense. This notion is reflected also in the black perspective on the Bible. One does not question what is said in the Bible; one accepts and remembers. It seems that this admonition is extended to imply reverance for the printed word in general. As one elderly black man responded to the question of what education is :"Education is what's in the books!"

One should not argue the inherent superiority of one cognitive or learning style over another. Rather it makes more sense to speak of appropriateness for different circumstances and types of material. The recall and analogy

styles seem to be most adequate for study of the arts, humanities, and religion. Certain areas of concern are simply too complex for the essentials to be captured in a few succinctly stated general principles. For example, in spite of the many efforts to do so, one cannot dissect jazz, painting, or deep spiritual experiences the way one can analyze the movements of the sun. On the other hand, the principle style is best suited for most scientific areas such as physics, chemistry, and certainly, mathematics. The same can be said for numerous practical areas such as engineering, law, and business administration. Thus, the position of CULS in the area of skills development is to assist students in enlarging their repertoire of styles to include the appropriate use of the principle approach. At the same time, they should retain a sense of the value and proper use of the other approaches as well.

The note-taking method taught by CULS is the cornerstone of the overall study strategy recommended to students. It also illustrates very clearly the issues of cognitive styles introduced previously. The method has been dubbed the "analytical note-taking method"(ANT). It is a refinement of techniques employed by the university's Reading Improvement Service. The essential instructions of the methods are these: (1) Take written notes of only the essential principles and supporting statements. (2) Employing an outline form, indent supporting statements such as evidence, examples, premises, etc., underneath the statements they support. (3) Make extensive use of abbreviations and other shorthand notations. (4) Leave a wide margin that is used to record secondary comments, but more important, practice examination questions generated in later reviews of the notes.

The major advantage of the approach lies in the indentation feature and the questioning requirement. Each statement in notes taken according to ANT has a definite place on the note page corresponding to its logical relation-

ships to the other statements made. That is, supporting statements are subordinated under the statements they support. This has the effect of forcing the note-taker to pay attention to what is being communicated. In contrast to the stenographic or usual "write everything" approach to note-taking, a student cannot use ANT and avoid thinking about the material. This allows him to be more critical of the material and is, therefore, his first "review" of the information. In effect, he has studied the material before even leaving the lecture hall. Further, the subordination requirement tends to develop the note-taker's ability to recognize and discriminate principles from supporting statements and to eliminate extraneous ramblings of lecturers--a most serious problem for beginning black students.

The questioning feature of ANT reinforces the advantages of the subordination or indentation aspect. It is also a key to the test-taking approach recommended by the program. When reviewing his notes the student should attempt to generate the kinds of questions he would anticipate appearing on his examinations. Such questions are generated from each of the principles contained in the notes. This exercise is clear-cut and prevents the student from just passively reading over his notes. Generating a good question requires that the student understand the related principle. When students review one another's practice questions the benefits are multiplied. If the student generates a question or problem that appears on his examination in more or less the same form he is aided by the fact that he is not "shocked" by seeing the question. Moreover, he has had an opportunity to practice and verify an acceptable response. Thus, a good amount of test anxiety can be eliminated by the method. It is not unusual for students to anticipate 80%-90% of the questions that appear on their tests using this routine.

The exhibits shown in Figures 1, 2, and 3 illustrate products of the ANT

method and characteristic note-taking problems students often have. The note-taking samples are based on an exercise that required the students to take notes from the passage below using ANT. (It should be noted that the exercise was the first required of students after their exposure to the method.) The passage is from McWilliams's North From Mexico, page 20:

> In the territory that now makes up the United States, Spaniards have always been a negligible ethnic element. It is doubtful if more than fifty thousand Spanish-born persons have resided in the United States at any one period from 1820 to the present time. Spanish immigration, for this entire period, has probably not been in excess of 175,000. Thus things Spanish have been neglected or misunderstood in the absence of those familiar with the tradition and capable of interpreting the past in realistic terms. American school children have always known about LaFayette and of aid which France furnished the colonies in the Revolutionary War; but few of them have ever been told that Spain also aided the colonies, that Spanish ports were open for the sale of prize-ships captured by American men-of-war, or that the Spanish governor of Louisiana furnished supplies of crucial importance to the American forces.

Insert Figures 1, 2, and 3 about here.

Figure 1 illustrates the proper use of ANT for the passage. Compare those notes to the two student products shown in Figures 2 and 3. The first student's exercise illustrates--among other problems--the common difficulty of discerning the major thrust or principle in a body of information. The student relegated the basic point of the paragraph, i.e. the neglect and misunderstanding of Spanish culture in the U.S., to a secondary support role for what is properly a supporting statement itself, i.e. that Spaniards have always been a negligible ethnic group in the U.S. The second student's notes

betray two shortcomings. First, the student does not distinguish different facts or units of information at all. Everything seems equally important to him. Moreover, he apparently places a premium on detail. The notes are a good illustration of the recall approach to learning.

The CULS experience teaching the analytical note-taking method and its complementary test preparation strategy has been mixed. The methods serve very well when students can be taught to master them and adopt them in their daily work. The mastery goal has been inhibite. by a shortage of CULS personnel. The techniques are introduced in CULS English classes. However, experience has made it clear that this is insufficient. Each student must be coached individually until he actually learns the skill which appears deceptively easy. It seems that individual attention is necessary in skills development because each student possesses such idiosyncratic and deeply ingrained previously learned ways of doing the same sorts of things. Unlearning those old inefficient habits is a major inhibition. Teaching the method is also beset by peculiar motivational problems.

At the beginning of a school term most students feel they have little need to adopt, for example, a new note-taking method. They did quite well in high school using the old methods. Why give up a good thing? After experiencing difficulties keeping up with their course work the students feel a need to develop better skills, but do not believe they can afford the time to overcome the adjustment problems needed to incorporate such techniques into their study routines. The difficulty is analogous to a sprinter changing his style in mid-season. He knows that given time to adjust to the new style he could run much faster. However, while making that adjustment he would actually run slower--and lose more races--than he would just stumbling along with his old style. To attack this problem of motivation

timing it seems that a diagnostic test approach similar to that used in CULS mathematics and science study groups would be helpful.

The CULS approach to reading skill development has the same conceptual bases as the ANT method. It is an adaptation of Robinson's (1962) SQ3R (Survey, Question, Read, Recite, and Review) method. The essential features of this information processing approach to reading are as follows: (1) The reader should have a particular purpose before he begins to read. That is, he should have certain questions in mind. His reading is actually a search for the answers to the questions. The psychological set provided by framing the questions allows the reader to recognize at a glance information that is related to those questions. (2) The reader should focus his eyes upon clusters of words rather than individual words. Pacing exercises and time limits for passages aid in the development of this capacity. (3) The reader should look for organizing devices in the text such as headings, sub-headings, and topic sentences. This allows him to identify and discriminate quickly the principles and supporting statements in the material. (4) The reader should not re-read sentences that seem to be unclear or misread. The Gestalt characteristics of his cognitive processes and the redundancy of the language likely will organize even seemingly unclear sentences into meaningful concepts.

Consider the passage from McWilliams's North From Mexico for illustrative purposes. The passage has an unusual textbook style in that the lead sentence does not identify the essential thrust of the paragraph. On the other hand, the word "Thus" is the device that identifies the author's main point that "...things Spanish have been neglected or misunderstood..." The remainder of the paragraph is devoted to convincing the reader of the reasons for what the author considers to be a fact and to illustrate manifestations of that fact.

The reader using SQ3R would scan or "survey" the passage quickly and identify the "Thus" statement. He would then pose a series of questions to himself based on that statement: "Is it really true that '...things Spanish have been neglected...'?" "Why?" "How does this compare with my personal experience?" When the reader then actually reads the passage he does not do so word-by-word nor detail-by-detail. He only seeks the essential things in the passage that would answer his questions and does not even pay attention to the rest. It could easily happen that he is so well versed on Spanish culture in the U.S. that he does not need to read anything else in the passage and can just move to the next paragraph. If the reader wants to be able to recall what he has read he should recite (silently) the essentials of the passage and later review them.

The record teaching the SQ3R method in CULS English classes is similar to the note-taking experience. While the students generally average 30% improvement in reading scores, this is not good enough. It is clear that more individual attention is needed than that allowable in large classes. Hence, students are now referred from the classes to the CULS Skills Workshop for regular individual follow-up instruction in reading as well as other skills development.

One notable difference in the note-taking and reading development experience concerns motivation. The need for reading improvement seems more salient to students than for note-taking improvements. Perhaps this is due to the fact that all students in the university are required to take reading tests upon entrance. Such tests have the same motivational advantages as diagnostic tests administered by CULS in other areas. Moreover, the student can readily appreciate the advantages of an analytical reading approach like SQ3R as compared to their old word-by-word approach. A person who reads

according to the recall style is simply overawed by his reading assignments. This is not surprising at all. The prospect of memorizing a bookful of apparently unrelated facts is not very appetizing. In contrast, a principle person who uses a reading method like SQ3R is not buffaloed by reading demands because he realizes that he need only understand the relatively few basic principles contained in any assignment.

Quantitative and Scientific Skills

The problems students experience with general university course material are accentuated in mathematics and quantitative sciences. The issues concerning preferred cognitive styles are especially urgent in these areas. It is almost impossible to be successful in university mathematics and science courses using anything but the principle approach.

High school mathematics and science courses, especially those in the inner-city, place a good deal of emphasis on memorizing formulas and learning to use algorithms, i.e. sequential operations for solving standard problems. That is, they encourage a recall or analogy approach to learning. In contrast, mathematics and science approaches in better universities place much more emphasis on understanding underlying concepts. They require that students not only be able to solve both computational and word problems, but be capable of deriving rules and proving theorems as well. The transition can be slow and painful--often fatal to the student's potential career in science or engineering. It is not at all unusual for a student to be totally confused for the first couple of months in his courses before he finally adjusts to the principle approach. This can be too late if he fails his first examinations badly enough. Even perfect test scores from that point on might not be sufficient to ensure passing grades. These naturalistic observations of

the experiences of CULS students are corroborated by the experimental results of Greeno (1973) and his associates. They compared the performance of groups of subjects instructed by methods consistent with the principle and with the recall or analogy approaches. Principle instructed subjects were substantially better at solving problems that required some transfer of knowledge or interpretation of situations.

These conclusions provide justification for several features of CULS mathematics classes and science study groups. The classes are sections of college algebra and trigonometry and introductory calculus courses. They are sponsored jointly by CULS and the university's mathematics department. Since they offer the same credit, the CULS sections must cover the same topics as all other sections of the respective courses. Students in the same course, regardless of their sections, take the same final examination.

The first way CULS mathematics sections differ from regular mathematics department sections concerns the pace. Since it takes students a long time and much effort to adapt to the principle approach, CULS sections begin very deliberately, but move much faster than the non-CULS sections in the latter part of each term. Moreover, CULS sections meet for one extra class session per week. This extra time is usually devoted to solving problems and practicing test-taking and approaches to problem solving.

CULS mathematics classes and science study groups place demands on students to solve multitudes of problems. It is virtually impossible for the average individual to learn in mathematically related fields without solving problems. A fundamental and all-to-common error made by students is to believe the contrary. They suffer from the misconception that one need only read textbooks as in other areas such as humanities or social science. It is not clear

why mathematics requires such commitment. Perhaps the reason lies in the distinction between skill and understanding recognized by Gagnè (1971). One can understand a principle yet not be skilled at using it, and conversely. In contrast to students in many other areas of study, students in mathematics and science have the dual burden of developing both understanding and skill.

The emphasis in CULS is on solving conceptual and word problems rather than computational problems. Such problems nurture the student's understanding of principles. They also contribute to the ability of the student to see the relationships of those principles to important things in his life and to apply the concepts to practical situations.

It seems that the specific difficulties students have with conceptual and word problems rest in two fundamental issues. First, there is the problem of cognitive style discussed previously. New students simply are not used to responding to the demand for discerning the skeleton of a principle underlying a problem situation. The psychological set to approach problems in a recall or analogy fashion is especially devastating in mathematics and science. It is not at all uncommon for black freshmen to memorize problems and their solutions. When such recall students see similar problems on examinations they simply supply the answers to the problems memorized.

The second issue underlying difficulties with conceptual and word problems is a "language" problem. Students often do not recognize that mathematics is in part simply a different language for expressing facts or concepts with which the students feel perfectly comfortable in their everyday language. In fact, it is not too difficult to demonstrate that mathematics provides an easier and less cumbersome way of saying some of those comfortable things.

The CULS problem solving routine addresses the need for developing skill

at recognizing essential relationships and translating from words into mathematical language. The instructions of the method are as follows: (1) Read the problem carefully and outline what is said using the analytical note-taking method. (2) Separate (on paper) known quantities and relationships from sought quantities and relationships. At least one of the known relationships will not be stated explicitly in the problem. Otherwise there would be no problem to be solved. The student is expected to provide the needed relationship(s). In most instances it will be some relationship under discussion in the course at the time. Problems requesting the student to "prove" or "show" something are concerned with seeking unknown relationships rather than quantities. (3) Label known and sought quantities. (4) Translate known relationships from verbal language into mathematical statements such as equations and inequalities using relation symbols such as "$=$", "$<$", "$+$", "$\cdot$", "$\rightarrow$", etc. (5) (If applicable) Draw a figure representing all the known relationships between quantities. Often problems can be solved intuitively simply by observing a figure. (6) Write out the formulas, rules, or principles that <u>might</u> contain the needed unknown relationship(s). The problem solver should be aware that the solution to the main problem might require solutions to sub-problems. (7) Choose the formula, rule or principle that "fits" the conditions outlined in (1) above that have been re-cast in mathematical language. (8) Solve the problem by applying the selected principle to the values or assumptions made in the problem. (9) Check the solution derived.

Application of the routine is tedious at first. However, the student gradually becomes more adept at it and can perform many of the steps mentally. He will even find several of the steps unnecessary to perform explicitly at all. The following illustration of the problem solving approach is an application to a problem most people can solve immediately by intuition. Its very

simple-mindedness, however, allows most of the essential features of the routine to stand out in relief.

> There are 22 letters in the Hebrew alphabet, two more in the Greek alphabet and two more still in the Roman (English) alphabet. How many letters occur together in these three alphabets?

The steps of the problem solving routine might proceed like the following:

Step 1. Read and analyze problem

An outline of the problem is as follows.

Letters in alph

-- He

- 22

-- Gr

- 2 more than He

--Ro

- 2 more than Gr

Step 2: Separate knowns and soughts

Knowns		Soughts	
Quantities	Relationships	Quantities	Relationships
He alph = 22	Gr 2 more than He	Total of He, Gr	--
	Ro 2 more than Gr	Ro alph	

Step 3: Label known and sought quantities

Knowns	Soughts
He alph = h = 22	Tot all alph = t
Gr alph = g	
Ro alph = r	

Step 4: Translate known relationships to mathematical language

Gr 2 more than He implies $g = h + 2$

Ro 2 more than Gr implies $r = g + 2$

Step 5: Draw figure

Inappropriate

Step 6: Write out possible applicable principles and Step 7: Choose logical principle

Since this problem is so simple, only one possible principle comes to mind:

"Total" implies addition. So,

$t = h + g + r$.

Step 8: Solve the problem

$t = h + g + r$

$= h + g + (g + 2)$, by Step 4

$= h + (h + 2) + ((h + 2) + 2)$, by Step 4

$= h + h + 2 + h + 2 + 2$

$= 3h + 6$

$= 3 (22) + 6$, by Step 3

$= 66 + 6$

$= 72$

Step 9: Check the solution

From the fifth line in the solution, $t = 3h + 6$. Algebraic manipu-

lation implies then that $h = (t - 6)/3$. A substitution of the answer $t = 72$ into this expression yields $h = \frac{72 - 6}{3} = \frac{66}{3} = 22$. So, we feel assured that the answer is correct since it was stated quite explicitly at the start that the Hebrew alphabet had 22 letters.

Motivation is a serious problem in the science and mathematics areas. The students often complain of the "dryness" of the material and of being bored. CULS staff members attack this problem in two ways. The teaching fellows and study group leaders are especially attuned to the need for being personally stimulating and excited about the material. Excitement--like boredom--is contagious.

Another device for attacking the motivation problem is represented by the problem sets employed in CULS mathematics classes. Besides giving the students needed practice, some of the problems written by staff members for their classes add a bit of humor to an otherwise strictly business atmosphere. Further, many of the problems illustrate the usefulness of mathematical concepts in areas of more direct practical interest to black students. For example, while many black students take calculus because of an interest in entering business school, most calculus textbook word problems center about engineering applications. Accordingly, CULS problem sets often refer to numerous economic, business, and social applications as well as the usual engineering uses of mathematics. The following are a couple of problems used in the past.

> In front of you is an everyday rubber band. Suppose this rubber band has been magnified so that you may observe one particular atom of the rubber band. Explain continuity examining this atom in relation to the whole rubber band. (Continuity)

> The Luckee Seven Dice Company accountants have determined that if x cartons of dice are produced in a day, the costs involved for that day are: (1) a fixed cost of $100; (2) a production cost of $10 per carton; and (3) an allowance for machine depreciation, repairs, and so on of $x^2/1,000,000$ dollars. Determine the cost function c(x) and the marginal cost function c'(x). (Derivatives)

It is difficult to isolate the individual effects of each of the CULS techniques in mathematics and science education. However, in combination they seem to be useful. During the first term the approaches were attempted in CULS, a regular section of the calculus course was given the same initial diagnostic test as the CULS class. The average score in the regular section was substantially higher than that in the CULS section. However, on the common final examination no member of the CULS class failed, quite a rare event for calculus classes in the university.

Course Performance Assurance Approaches

Even when they possess good learning skills such as effective reading and note-taking methods, students still experience difficulties with certain courses. Naturally, then, before black students have had the opportunity and time to develop such skills it is essential that they receive direct assistance with university course work. The classic approach to meeting this need is the one-to-one tutorial. Undoubtedly, there are certain advantages to tutorials. There are disadvantages, too, as compared to group approaches.

One of the most commonly cited plusses of tutorials is the specialized attention devoted to the individual student. Various CULS student surveys have shown that many students desire such attention. Against this advantage are numerous difficulties. Some of them arise not from the inherent character of tutorials, but from the circumstances surrounding their use. First, stu-

dents typically do not seek tutorial assistance until they face crises. After a student has failed a couple of examinations there is little anyone can do to assist him in learning material well enough to avoid course failure. Second, the one-to-one nature of the tutorial encourages a particular kind of motivational problem. While a close tutor-tutee relationship can conceivably allow beneficial close monitoring of a student's work, in practice students seem to develop a dependency on tutors. They expect tutors to learn things for them. This problem implies a third. Most tutors are not trained specifically to be tutors. Hence, their typical approach is to review painstakingly each topic with their students. Little attention is devoted to diagnosing and treating more basic problems that may underlie their students' immediate difficulties with the material. Finally, tutorials are expensive. The expense of tutorials is often prohibitive in terms of per student cost, e.g., $5.00 per hour per student, and the sheer availability of tutors.

Several approaches to ensuring the progress of black students in their university courses are offered by CULS. Tutorials are maintained on a very limited basis. Some students need such close and individualized attention. Moreover, tutorials represent the only option when the program does not maintain other approaches for certain courses. A recent approach that is yet to be assessed is the pre-examination problem or question-and-answer session. This option provides students in heavily-enrolled courses the opportunity to clarify last minute difficulties before major examinations. Such sessions are conducted by CULS trained and paid personnel. The approach to guaranteeing successful course performance promoted most strongly in CULS is the study group.

The study group has numerous conceptual advantages. Moreover, with pro-

per design, study groups can approximate the benefits of individual attention afforded by tutorials. The mere fact that the study group involves several students rather than one can have numerous effects. (For reviews of the literature on group versus individual performance see Hoffman, 1965; Kelly and Thibaut, 1969; and Lorge, Fox, Davitz, and Brenner, 1958.) For certain kinds of problems two or more heads are definitely better than one. Between them, several diligent students are more likely to clear up difficulties with concepts than any one of them working alone. Every new teacher comes to realize that when he is responsible for teaching others, he learns an awful lot himself. When each of the members of a study group develops a sense of responsibility for contributing to the learning of the others he should learn just that much more himself.

If a cohesive study group atmosphere is achieved, even further benefits can accrue. At least part of the strong social needs of black students in the university can be met in the productive atmosphere of the study group. The peer pressures that exist in the group can be brought to bear upon the motivational problems discussed previously. When the study group thinks of itself as a team seeking to "defeat" the obstacles of the course, many of the positive dynamics observed in athletic teams can be approximated. The cooperative spirit so engendered can extend beyond the confines of the immediate course work. It can be brought to bear upon broader problems experienced by the students in the university. Moreover, the students would be inclined to assist one another in future courses in which CULS does not offer formal study groups.

How, then, does the study group concept function in CULS? A CULS study group (ideally) is comprised of eight to ten black and Chicano students enrolled in a particular university course. The courses in which study groups are offered are those in which data have indicated black students traditionally

achieve relatively poor grades. Most of the students who attend the study group elect it as a formal non-credit course. That is, each study group is a section of a college course under the administrative responsibility of CULS. In addition to students who elect the study group prior to the beginning of a given term, the study group leader attempts to recruit other black students in the associated course to join the study group at the beginning of the term. Students who do not anticipate difficulties in the course are recruited as diligently as the others. The study group leader responsible for a particular group is technically a teaching assistant appointed by CULS. During "normal" periods he holds his study group meetings for one two-hour session per week at a prescribed time and place just as any class does. However, during the week or so just prior to major examinations the study group is likely to meet for extra sessions as well.

A typical study group session involves several kinds of activities. First, the study group leader might initiate a review of an assignment made at the previous session. If the study group leader is aware that there are broadly experienced problems with certain concepts he will then have the students work through several exercises that address those concepts. He will organize the overall study group into "cells" of two to four students who then review the course material with one another topic-by-topic. This routine, which involves generating and answering practice questions, is that described in the discussion of the analytical note-taking method. All students are required to be prepared for such question review drills each week. They are encouraged to be critical, yet supportive, of one another in the drills. The review can be about as beneficial for stronger students as for weaker ones. During review periods the study group leader circulates from cell to cell prodding and answering questions that the students are unable to handle themselves.

In addition, he uses this opportunity for making certain the students are asking the right kinds of questions and that each student has a thorough grasp of the material. After the cell-by-cell review session the study group leader might decide it is appropriate to give "lecturettes" on concepts that seemed to give the study group members consistent difficulties during their reviews.

Much of the routine of study groups is geared to preparation for examinations. Students attend study groups primarily to improve their chances of attaining good examination scores. The question prediction and review procedures have direct benefits for test performance. The study group leader offers other related assistance too. He provides copies of old examinations in the course from the CULS examination file. Since he is in constant contact with the professor of the course the study group leader can assist the students in identifying what the professor considers important enough to include in each test. They also learn how the professor is likely to pose questions. The study group leader generally offers a practice examination under actual test conditions shortly before "the real thing." This allows each student to test his knowledge of the material. It also gives the study group leader the opportunity to judge the adequacy of his students' test-taking techniques under stress. When problems in this area are so identified he can remedy them before real damage is done. When the students' actual examination papers are returned, the study group leader reviews each one and higher goals are set for the next test.

The study group is a good starting point for skills development. Because the study group leader sees his students' work in detail, he can assess quite well the adequacy of his students' reading, note-taking, and other learning skills. Diagnostic tests on quantitative methods are especially useful in

this context. The study group leader himself can treat mild deficiencies, usually during his office hours. For more severe problems the student is assigned to a specialist in the CULS skills workshop.

There has been a great deal of variance in the results of study groups. Some groups have been outstanding, most of them decidedly beneficial, and a few have been disappointing failures. There are certain identifiable problems in conducting first-rate study groups. Some of the problems are peculiar to the study group concept. The treatment of these problems ultimately must rest with another issue, however, the quality and preparation of study group leaders.

There is no question but that the responsibilities of the study group leader are the most difficult of any position in CULS. Generally, people teach the way they have been taught. Study group leaders are asked to perform duties most graduate students have never performed before. Thus, a thorough preparation program is essential. The study group leader must learn to be a teacher of the course material, an instructor in learning methods, a counselor, and a practical expert in group dynamics. Moreover, in order to achieve all his goals he must command respect as a strong model. The ideal setting in which to prepare study group leaders involves observation and practice under the guidance of more experienced study group leaders. The most serious impediment to such a program is the severe shortage of black graduate students in the sciences who are potential study group leaders. Numerous approaches to increasing that supply are under study presently.

In any case, the preparation of study group leaders must address the following consistent problems with study group operations. First, many students attend study groups sporadically. Moreover, often they are not diligent at preparing for study group sessions. As the literature on social

facilitation suggests (Zajonc, 1965), students can actually perform worse in a group situation than alone when they have not prepared. This attendance problem seems to rest in two more fundamental issues. In spite of attempts to make the distinction clear, many students insist on viewing the study group as a kind of group tutorial in which they need to participate only when there is a crisis. Also, study group leaders in the past have been unable to make salient the objective benefits of regular attendance at study group sessions. Certainly, the problems have been exacerbated by the fact that study groups are voluntary. Study group leaders cannot coerce their students to do things that teaching assistants in graded and credited courses can.

Another persistant study group problem relates to individual student attention. Especially during the early part of a term each student feels a need for more personal attention than is afforded by the study groups. Further, new students often exhibit a kind of competitive individualism that is incompatible with the study group approach. Study group leaders frequently have not been completely effective in organizing their time to allow more individual attention. Moreover, they sometimes have not been good at building attitudes of cooperation that would reduce the real and felt need for individual attention.

A final common source of study group ineffectiveness concerns the daily preparation of the study group leader himself. Poor study group leaders are often contrasted from good ones by their lack of detailed planning of study group sessions. The most effective study groups are those that proceed according to routines similar to that described above. Also, poor study group leaders have tended to be those who do not maintain close contact with the day-to-day conditions in the courses associated with their study groups.

While a more thorough preparation program will address many of the problems of maintaining strong study groups, numerous short-term solutions are being attempted, too. The posture of CULS in attacking those problems is captured in the motto appropriated by the program over the years: "What we don't know, we learn; what we know, we teach." The spirit represented by this statement expresses the attitude needed in all supportive services programs. The task of educating black students in white universities is demanding and critical. Achieving it will require all the creativity and commitment that can be brought to bear.

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Footnotes

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[2]This paper was presented at the national convention of The Association of Black Psychologists in Detroit, August 1973.

[3]Requests for reprints should be addressed to J. Frank Yates, Coalition for the Use of Learning Skills, 1021 Angell Hall, University of Michigan, Ann Arbor, Michigan 48104.

Table 1

FREQUENCIES AND PERCENTAGES OF SURVEYED PROFESSIONAL POSITIONS HELD BY BLACKS IN PREDOMINATELY WHITE INSTITUTIONS OF HIGHER EDUCATION[a]

Area	Frequency	Percentage
Academic Administration	200	38.2
Arts	22	4.2
Business	11	2.1
Education	44	8.4
Engineering	1	0.2
Humanities	40	7.6
Law	2	0.4
Miscellaneous	11	2.1
Natural Science and Technology	71	13.6
Non-Academic Administration	2	0.4
Social Sciences	119	22.8
Total	523[b]	100.0

[a]Based on P. Sikes and P.E. Meachum (Eds.) Black Professionals in Predominately White Institutions of Higher Education (Directory) 1972. Austin, Texas: University of Texas, 1973.

[b]Frequencies based on 10% sample of listings. Several listings imply multiple positions.

Why is the Span. infl. in Amer. cult./hist. so poorly recog. and understood?

How would you explain the difference in common awareness of French and Spanish cultural influences in the U.S.?

Compare the roles of France and Spain in the Amer. Revol.

Spanish infl. in US

Span cult in US neglect/misunderstd

— reason

— Span a small US ethnic gp

— < 50,000 Span in US, 1850- now

— ≤ 175,000 Span immigr, 1820- now

— ~~ex~~/contrast

— awareness of Span & Fren help in Revol War

— Fren

— Lafayette

— well-known

— Span

— purchase of captd Brit ships

— rarely-known

— supplies from Span Louisiana

— rarely-known

Figure 1. Proper analytical notes on North From Mexico passage.

North from Mexico
- Spand. negligible ethnic element.
- doubtful if < 50,000 Span.-born persons resided in U.S.A. period. 1820-now.
- Span. immigrat. this period. probably, not excess 175,000.
- things Span. neglect. or misunderstd. absence of those capable interpret.
- U.S. schl. children know little of Span. contribut. to U.S.

Iffy →

Figure 2. Example of student analytical notes on North From Mexico passage illustrating improper statement classification and subordination.

North from Mexico

- Territory of U.S.

Why were the Spaniards a ineligible group.

- Spaniards have always been a negligible group
- Very few immigrants
- from 1820 to present less than 175,000 coming.

· Why was imm so low for the Spain

- Spain was paied little attention to by those capable of interpreting the past,
- Children were told that France aided the colonies, but few were told that Spain also aided them.
- Spanish ports were open for the sale of prize ships cap by the Amer men of War.

but Spanish Col gave it to U.S. ?

- Spain gave of Louisiana furnished supply of crucial import to amer. forces

Figure 3. Example of student analytical notes on North From Mexico passage: illustrating lack of statement differentiation and excessive words and attention to detail.