MULTIPLE MEASURES AND OTHER SORROWS

A GUIDE FOR USING STUDENT ASSESSMENT INFORMATION WITH OR INSTEAD OF TEST SCORES

CHANCELLOR'S OFFICE FOR CALIFORNIA COMMUNITY COLLEGES

MARCH 1998
PREFACE

One of the more perplexing aspects of matriculation assessment appears to be the manner in which different sources of student information can be used during the process of placing students into college curricula. Matriculation regulations require that assessment be a holistic process, meaning, substantially, that a test score alone should not be the sole criterion for determining the advice given to students regarding their course and program placements (Title 5, 55502, 55521).

This guide is intended to provide a discussion of the value of applying multiple measures during the placement process and to attempt to distinguish between the types of companion measures used with tests and their utility in this process. Dependent upon the objective, it is as challenging to choose the most useful measure for basing placement advice as it is to choose the most useful test instrument.

For many who have been a part of the matriculation process at their colleges or districts for a relatively long time, there may not be a lot of information in this guide that is new or untried. It is hoped that there will be sufficient discussion here to prove useful information for everyone, to one extent or another. But this guide has been primarily written for the person new to matriculation as a Coordinator or Director. It is hoped too that the information here will help to explain the multiple measure requirement to faculty, administrators and staff who have not had previous matriculation experience.

Choosing appropriate companion measures for assessment placement advice requires the cooperation and understanding of the entire college community. Students rely upon our collegial understanding of what will best benefit them when making their course and program choices. Placement advice should not be made in isolation, that is, because multiple measures are required during the assessment of students shouldn’t mean that they are forced upon faculty, staff and students by state or college administrators; it should mean that they are selected in thoughtful processes in which every appropriate person on campus is engaged.

This guide on multiple measures is not a panacea for “fixing” the assessment process. Local decision-making is still the nexus for ensuring effective placement. This is a discussion of what part companion measures to a test can play in this process. It may be a start to an exchange on campus that may not yet be fully developed. Throughout this document, the terms “multiple measures”, “comprehensive assessment”, and “companion measures” are used interchangably.
Multiple Measures—For Why??

Since the passage of the authorizing legislation for Matriculation (Assembly Bill 3, Seymour-Campbell) in 1986, one of the most confounding of its stipulations has been the requirement that placement of students into college curricula be based upon more than one measure. Though the term does not exist in any formal documents (AB 3 or Title 5 regulations), we have termed the requirement to use multi-sourced information for student placement as multiple measures.

The central purpose of matriculation assessment is to help students to succeed in their educational courses and programs and to give the colleges an opportunity to base their educational recommendations to students on relevant information. Assessment is a comprehensive process and, as such, is student, rather than institution-driven.

While there is little doubt that a well-chosen, valid and reliable test instrument will provide important information concerning basic skills needs, the objectives of matriculation, as seen in AB 3 and Title 5 regulations, is more ambitious than that. Multiple measure assessment hopes to make possible a fuller description of the student than does testing.

Multiple measure assessment should assist placement of students into the curriculum as opposed to the selection of students that "fit" existing educational opportunities and rejecting students who do not "fit." The open door admission policies of the California community college system makes this kind of placement possible. Colleges have already identified the need for and developed a myriad of supportive services and they can be valuable to meeting the needs of diverse students. It is the structuring of the process that makes access to appropriate courses, programs and services that challenges the colleges. But this challenge is significantly mitigated by the use of multiple measure assessment.

Comprehensive assessment does many things: 1) It provides for equitable opportunity for all students since it assists students to choose their educational programs based upon a substantial student profile; 2) It allows for the input of students, staff and faculty in the decisions affecting choice of appropriate companion measures to be used in the placement process; 3) It can serve as the basis for the development of the Student Educational Plan which should guide the student throughout her tenure in the college; 4) It can improve the college's understanding and treatment of student; and, 5) It helps the testing program by identifying areas in which the delivery of supportive services and instructional treatments may be applied to meet emerging student needs.

Curriculum and student service can certainly be affected by multiple measure assessment. Students benefit by responses to their needs being appropriate to their goals. Although students understand when they are being tested and expect to "pass or fail," they do not always understand when they are being assessed. They are far
greater participants in their assessment than in their testing. For this reason, the reasons for and expected outcomes of multiple measure assessment should be made clear to the students. The concepts of success and skill-building may be of great benefit when explaining the comprehensive assessment process to students.

Placement advice is less likely to be followed by a student who does not understand the placement process and agrees that it is reasonable. And it should be understood too that students are not exempted from assessment when they are exempted from testing. Comprehensive assessment does not rely on the single test score for course choice; but, rather, a full student portrait. These student profiles should also enable the institution to address certain decision-making opportunities involving curriculum and services as well.

The value of multiple measure assessment to the college is substantial as well. Administrative and instructional decision-making can be greatly affected by the analysis of data culled from assessment results and placement histories. The allocation of resources can also be modified due to the use of assessment data that may exemplify the need for increased sections of a certain course or the impaction of particular supportive services.

**Why Testing isn't Enough**

A great deal of time and resources are used in this country to develop and administer test instruments, for a number objectives, for the nation's students in elementary, secondary and post-secondary institutions. Testing and being tested is something that we are all familiar with, and for the most part, we have grown accustomed to it and are somewhat comfortable with it; or at least, we've learned to expect and accept it. For matriculation purposes, however, the public California community colleges have been engaged in a kind of reform "movement" in which testing is seen as an integral but not absolute aspect of assessment.

**Tests are fallible.** Regardless of how well they've been crafted, any test instrument will yield scores that will turn out lower than they should. True, it could be argued that it is the underprepared student who "scores" low and therefore the test accomplished its task; it identified the student's academic weakness. There is no question that tests can be useful and serve a legitimate role in community college assessment. Still, tests are also representations of the culture and experiences of the test developers. This is not necessarily a bad thing, but it is inevitable. The possibility of misclassifying students and potential students who do not share this culture or experience is very real, and it is not altogether true that those students could not or would not succeed if enrolled in courses or programs that their test scores counter-indicated they could expect to succeed in. One major reason for this is that tests do not take into account the determination of some students to succeed, nor do they share a
relationship with the many other factors associated with student success such as seeking help from instructors, peer and professional tutoring, study habits cooperation with other students in the class and so forth.

The National Research Council has asserted that "even carefully designed test instruments may include some degree of cultural bias that artificially lowers the tested performance" of some ethnic groups when compared to that of dominant culture students. With California's growing diverse student ethnic student population, this is an important consideration. Differential group performance in testing is also affected by economic and educational factors.

It is important to note here too that cut scores are arbitrary, especially at the onset of using a new test. Even when they have been set by using and analyzing collected evidence, they are often based upon final grades, which may have been affected by one or more of the confounding variables mentioned above. At that point, they may very well represent the "best" guess, but they are still relatively arbitrary. So students who can perform well in a course can score below the cut score for that course and be denied access to that course if the test score were the only measure for making placement advice.

The legislation and regulations that created and govern the matriculation process identify assessment as advisory, meaning that the ultimate decision for choosing to enroll in a particular course or program should rest with the student. However, as more colleges implement prerequisites into their curricula, the choice to enroll is increasingly limited. It's also true that, left on their own, students will not always make the correct choice. They sometimes underestimate the rigor of the courses they choose and overestimate their preparedness. One common finding of the matriculation technical assistance visits to the colleges over the years is that students often make their own choices based solely on the test scores they were given, and most stated that they did not believe that the advice they were given regarding their enrollment was based on anything but the test score. Multiple measures have not been fully implemented in many colleges, and this may very well affect the value of testing by not allowing students, faculty and staff to be fully informed regarding students' readiness to enroll in more ambitious courses and programs.

So you have a test you like, you've done the validation on content and cut scores, and you've reviewed the instrument for bias and you have a plan for monitoring it for disproportionate impact. So now what do you gotta do??

**Two Instrument in Harmony?**

It may very well be true that there is an overreliance on using tests in many colleges. Certainly there is a certain amount of comfort associated with testing. It is a familiar way to assess students and, on the face of it, it seems to be a scientific way to reach
some conclusions about a student's readiness for placement. This guide is not a 
harangue against testing, but the requirement that multiple measures be used in 
matriculation assessment does bring up the question of whether or not there is any 
regulatory prohibition against using multiple measures resulting from the adminstration 
of two or more tests.

Title 5 does not prohibit using two tests. It does, though, prohibit using two or more 
tests that are highly correlated. When tests are highly correlated, they are essentially 
testing the same skills or knowledge. Therefore, you wouldn't really have multiple 
measures, you would have two instruments yielding the same information. Faculty at 
the Center for Educational Testing and Evaluation at the University of Kansas 
(assessment consultants to the Chancellor's Office) have identified a correlation of .75 
or higher as the standard for determining whether or not two or more instruments are 
highly correlated.

Additionally, there is some evidence that, generally speaking, there are greater gains in 
predictive power when measures that are significantly different from basic skills tests 
scores are used for placement advice.

What Multiple Measures Should Accomplish

As mentioned earlier, matriculation assessment is a holistic process. Multiple 
measures can be just as useful as the test itself as long as the companion measures 
used with the test are chosen for their relationship to the objectives of the test. In other 
words, the requirement to use other measures in assessing a student should not be 
approached only with compliance with the regulations in mind. Instructional faculty, 
counseling faculty, assessment directors, and all other appropriate staff members 
should be involved in the selection process. The objective is to consider what 
information would best be useful for placing students into the curriculum and at what 
point.

Holistic or comprehensive assessment is very broad in scope. Educational progress is 
fected by a host of things that basic skill measurement can't hope to determine. If two 
students get the same score on a placement test, will they also do equally as well or as 
poorly in the course? You can't tell from the score. Many other things will affect their 
aademic performances. Their levels of motivation, their work schedules, the demands 
on their time outside of the classroom, study habits, etc. will all play a part in their 
performances. Still, keeping in mind that the goal of the institution is to educate, to the 
highest level possible, each student who enrolls in a course or program, effective 
companion measures unrelated to those identified by a test can still be relevant to 
course objectives and success.

The appraisal of a student's abilities can be tied directly to the needs and the college's 
facilities, programs and services that have been designed to meet those needs. Early
on in the development of matriculation, there was much discussion of the “match” that needs to be made between students’ goals and the institutions’ abilities and responsibilities to meet those goals. Some students may have specific needs that are centered on their limited English speaking skills, while others may need assistance in refining their educational goals and the steps required to achieve their goals.

Multiple measures are “pieces” of information that, cumulatively, can help to clarify placement choices and educational goals. A student’s competency, while important, is only part of the profile. Some students can succeed with little help from anyone, whereas others will need to utilize the majority of instructional and supportive service assistance available to them. But with this help, students in the latter group can also succeed.

Once this discussion has been begun on campus and some agreement has been reached, the task remains to determine what companion measures should be used to augment the college’s testing program.

How to Choose a Companion

This part ain’t easy. It requires a lot of “buy-in” and it has to be the result of collective thinking and experience. Counselors or advisors cannot do this in isolation, and in order to ward off later dissatisfaction, instructional faculty must also participate since they are closest to knowing what their courses demand.

A companion measure may be centered in the students’ makeup, as well as the academic skill-specific course expectations. For example, a student’s motivation to succeed can be a important determinant in course selection. Here though it is important that professional judgment be used to ascertain how realistic the student may be in her assessment of her own abilities. With some students the “put me in coach, I can win the game” attitude is wishful thinking, with others it is not. Concomitantly, some students will be able to recognize the value of their outcome objectives and be willing to do whatever is necessary to achieve the ends, regardless of their past performances or “paper” abilities.

Instructors may also have student traits in mind that are more dependent upon what the instructor(s) would be willing to do with students who have more potential than may be indicated by a test score. For example, some instructors know that it is not uncommon that many students can find an outside lab useful for their students so they’ve initiated special modules in the campus Learning Assistance Center for students who tend to lag behind a bit in class. Or they may have found other ancillary activities in and out of the classroom that help support their instructional methods.

In any case, it is extremely helpful that the discussion begin with the players participating in a roundtable meeting within departments, Matriculation Advisory
Committees, Academic Senates, curriculum committees, and so forth. Students can also contribute significantly to these discussions and should be included.

Some of the issues that will need to be considered will include: course expectations and rigor, attributes of successful students, student understanding of course requirements and how they are related to their goals, past educational achievement, prerequisites, effectiveness of supportive services, specialized assessment, student motivation, student aptitude, study habits, and emotional well-being.

After the laundry list of what a student should "look like" before enrolling a course or program, a process needs to be structured by which there can be some assurance that the concerns of all parties may be met on a consistent basis. On many campuses, this task will likely fall on the shoulders of counselors and advisors.

The Role of Counselors and Advisors

Logistically, the manner in which companion or multiple measures may be applied to hundreds or thousands of students is problematic. Smaller colleges will always be better able to account for the numbers of students receiving multiple measures and how effective they may be. But the Matriculation Technical Assistance visits have revealed that counseling is the most popular of the all the matriculation services and that students do and enjoy using this service. Counselors are at the forefront of the placement activity and as such, are largely responsible for the majority of placement advice and decisions made with students.

It is important that the counselors and advisors know the expectations of instructional faculty as well as be sensitive to the needs and goals of students. This also means that the counselors should be aware of what the assessment process has been established to accomplish and how educational advisement fits into this process.

The "nuts and bolts" of counseling are, again, a local decision. There are though, some activities that may be helpful to many college counseling programs. Where a college is large and serves a high number of students, perhaps more could be done at the high school level for students who expect to enroll in a local community college. For example, a series of "college days or nights" at local high schools in which a cadre of counselors or advisors participate may make the task of comprehensive assessment more manageable. It may also be possible for paraprofessionals to handle some "paper" tasks that would free counselors and advisors to spend more time speaking with students. Some colleges have initiated workshops that allow future students to attend special guidance courses that are designed to assist students to discuss and explore goal choices in relation to their ambitions and aspirations. Regardless of the approach taken, it is fairly certain that most students will seek out a counselor once on campus; it may very well be that at the larger colleges the students will have the opportunity to undergo a more comprehensive assessment following their initial
enrollment. But every effort should be made to contribute to their first semester course choices.

Group counseling is inevitable in many colleges at the present time. When linked to orientation, this can be an effective way to reach students and to apply companion measures in this setting. Summer bridge programs are also a way to reach large numbers of students in a more leisurely assessment atmosphere.

The fact remains though that counseling departments, in conjunction with instruction, need to find a way in which to apply the measures that the campus community has agreed defines the kind of advice that will help to ensure the success of new and continuing students. Much of this will entail significant professional judgment, which may also require substantial training.

Training

The training of counseling faculty and advisors is an important and necessary step to achieving a counseling program that ensures the consistent application of multiple measures. This is especially crucial at colleges where a large number of adjunct counselors are used during peak enrollment periods. Although it is extremely important that counselors and advisors know to use companion measures when looking at test scores during their meetings with students, they must also understand the value of these measures.

Many colleges have faculty orientations for counseling staff and this would be an opportune time to review the measures selected for use in placement as well as reviewing their utility in the educational process. This may be accomplished in part by the development of materials that illustrate how another measure may mitigate the choices presented to the student who is seeking placement advice. It would be useful, for example, to have materials that discuss the matriculation process and its objectives. An explanation of how assessment uses student characteristics to place students into courses and programs in order to maximize their needs, goals and attributes rather than, conversely, using student test scores solely to include or reject students from a course by virtue of that single criterion would be helpful.

Other topics for counselors and advisors to consider could include: the use of transcripts to initiate student self-evaluation in addition to detailing their past performances; the need for support services and where they can be found on campus; family demands and responsibilities; transportation needs; family educational achievement background and resources; motivational values; degree of comfort in the college community; facility in the English language; ability to identify applicable aptitudes; and perceived or documented disabilities.

The participants of these training activities need not be confined to counselors. Assessment Coordinators, instructional faculty members, Academic Senate
representatives and student body officers may also find such training valuable. Though specialized training for these groups would also be useful. Certainly, instructional faculty should have their own training sessions in addition to any others they may wish to attend.

The Role of Instructional Faculty

One assumption that may be safe to make is that students enroll in courses with the expectation that they will learn a skill or obtain knowledge that will help them to gain a career, get a job, be upgraded at the work they now perform, learn English, or transfer to a four-year institution. This means that somewhere along the line, they're going to have to go to class. Instructional faculty are at the center of these efforts. They cannot and should not be excluded from the activities and process involved in assessment for placement into the curriculum.

The instructional faculty member has a good deal of insight into what will ensure the success of a student in his or her course. It is important, therefore, that their views in this regard be shared with assessment and advisement staff and faculty. It is also important that instructional faculty understand the manner in which placement is accomplished under the auspices of matriculation. Matriculation and Assessment Directors and Coordinators should be encouraged to make presentations for faculty members at scheduled meetings and by invitation. It is crucial that instruction know that their input is necessary and welcome.

Training

Training in matriculation assessment for instructional faculty should be on-going and regularly scheduled. Again, it is the value of their contributions to the process that should be stressed. Likewise, the instructor should be able to provide a certain amount of feedback to Matriculation and assessment personnel as to whether or not the assessment process is working for them in the classroom, and if not, what may be their suggestions for improving the process.

Assessment in the Classroom

Much has been made in the past about whether or not additional assessment activities in the classroom are allowed by regulation. The answer is, kinda.

Placement decisions must be made prior to enrollment. Once a student has been allowed to enroll (unless she has not met a legally established prerequisite), she must be allowed to remain in the course. However, this does not mean that the instructor cannot perform some diagnostic activities that may provide important information that will allow that instructor to better learn what abilities the students in the course may
have that will enhance or detract from the teaching methods for the course. But a student cannot be involuntarily removed from a course on the basis of these additional assessments.

This is another reason why it is important that instructional faculty participate in the identification of the companion measures that will be used to make placement advice. If departmental decisions can be made that will provide some guidance for counseling and assessment people to consider when meeting with students, it may well eliminate the need for additional assessment in the classroom. This is not to say that diagnostic activities shouldn't be part of an instructor's teaching method, but the reasons for these activities could be significantly lessened when the instructor has confidence that the placement process is addressing these concerns.

And from what has been learned during the Matriculation Technical Assistance visits, many instructors who felt a need to assess students further did so because they were not confident that placement decisions were being made with their concerns being addressed. It is a tremendous waste of time and resources to carry the placement process into the classroom. Counselors and instructors need to be aware of the manner in which students are to be advised for placement and participate in that process together. With the increasing implementation of prerequisites, with their often complex structures, this cooperative effort must be realized.

**Assessment, Prerequisites and Thou**

Title 5 regulations in the areas of establishing and implementing pre and corequisites and advisories on recommended preparation have been revised relatively recently and are currently being enforced. Though many useful materials are now available to assist colleges in their efforts to interpret and apply the regulations (see the Model District Policy, the Chancellor's Office Q&A on prerequisites and the Academic Senate's "Good Practices for Implementing Prerequisites"), the matriculation assessment process is also one way of meeting certain course prerequisites. It should be emphasized that it is the assessment process, used with multiple measures, and not a test score by itself that can meet a prerequisite.

This is still another reason why the entire affected college community must be involved in the determination of what measures, with a test score, should be part of the decision that a student has or has not met a prerequisite and can enroll in the target course. This would require review and discussion in academic departments as well as in curriculum committees in order to establish what measures can be used to consider an assessment process equivalent to a course prerequisite.

In 1990, a study was published by Santa Barbara City College (authored by Drs. Cohen, Friedlander, Kelemen-Lohnas and R. Elmore) titled, "A Method for Determining Valid Course Placements and Prerequisites." The study contains a number of
recommendations concerning placement and prerequisite practices reflecting data that were gathered from surveys of approximately 24,000 students and 1600 faculty members throughout eight community colleges participating in the study. In the study, the authors identified a number of variables used to predict student grades (Appendices A&B) and faculty and counselors may find it useful to review these for consideration of possible factors to consider when establishing multiple measures for placement and prerequisites.

What if You Gave a Test and Nobody Came?

Up to this point this discussion has dealt with using measure that may combine well with a test. But it is possible to perform assessment of students without using a test at all.

There are some colleges that have developed “informed decision” models by which students may place themselves into English and math curricula by using materials developed by the college(s) that would serve to help students to “preview” the type of coursework and preparation expected in various courses in these disciplines. The model developed by David Smith and Dr. Tim Clow at Contra Costa College had five primary steps: 1) The student was given directions for using the materials; 2) English and math course expectations were provided to the student (selected faculty members were available to address concerns with respect to these expectations); 3) Math problems relating to each level of math instruction were given to the students (with answers); 4) An academic and life style questionnaire was provided to help the student evaluate their course readiness; and, 5) The student declared a decision for course selection.

Although there are always concerns associated with students making their choices more or less on their own, quite possibly more students are equipped to make these kinds of selections decisions that may be realized. If colleges could be confident that the students were receiving enough information from printed materials and consultations with counselors and faculty to ensure at least a thoughtful and realistic choice on the part of the student, this could be a very worthwhile venture.

To date it seems that the informed decision model is mostly used by colleges that have not been able to validate a more traditional test instrument. So for the time being, there is a good deal of reluctance on the part of colleges to forego tests altogether. But involving the student in the assessment process to a greater degree may be of benefit to a good number of students who require less assistance than others yet are receiving services that could be utilized by some who need greater help.
Should Multiple Measures be Validated?

In a word, yeah. When the regulations for matriculation were initially drafted, it was thought that the work to necessary to ensure valid, reliable and bias free test instruments was going to require so much work on the part of the colleges that it would be unreasonable to also require them to validate their multiple measures. But there’s no doubt that validating the companion measures used with test scores would help to remove much of the guesswork associated with choosing multiple measures and could eventually eliminate the need to rely so heavily on anecdotal evidence.

Still, there is no regulatory requirement that the colleges validate their multiple measures. This is an area in which the accountability for choosing the best measures for assessing students is left to the colleges. It would be sound educational practice for these measures to be validated, but districts are not compelled to do so. It must also be mentioned that the resources for conducting the type of research this task demands is not at the disposal of every college or district. For many, the choices of companion measures will long remain a "best" guess.

Summary

Matriculation assessment offers the opportunity for students and educators to have a voice in determining the nature and extent of the integration of assessment results with instruction and service providers. Comprehensive assessment should not only provide the college with information about the student, but the student should be able to learn something about herself, how to set reasonable and realistic goals, the basic tenets of self-evaluation, educational planning, etc.

But multiple measure assessment should not constitute merely the means to meet regulatory requirements. The necessity for making placement decisions based on comprehensive student profiles is based on a strong belief that students and colleges are both better served when more and relevant information is available for decision making. This goes further than compliance with regulations. There are many factors affecting student accomplishment that can be discovered using appropriate companion measures when assessing students. Of paramount importance in this effort to assess comprehensively is the need to properly train the college community in ways that they may each contribute to students’ success.

Without the assurance that counselors and advisors, instructional faculty, assessment staff and all others with significant student contact each understand his or her role in the comprehensive assessment process and matriculation in general, students are not likely to understand the value of this approach. This means that the college community
must also recognize the value of multiple measure assessment and be convinced that students will benefit by their participation.

Through the development and submittal of college matriculation plans, a good many policies have been advanced that address assessment and the other matriculation components. In almost every case it is clear that many in the college community continue to equate assessment with testing. For matriculation purposes, assessment is not just testing.

Assessment is holistic and representative of the individual student as an entire entity, and not just a test score. Assessment is an opportunity for the college to learn how to better serve the students enrolled. Assessment is an integrated process that includes instructional faculty from a variety of disciplines, administrators, counselors, students services personnel, vocational education representatives, data processing staff, special populations faculty and staff, and students. Assessment is a collegewide, comprehensive activity that examines and contributes to curriculum analysis, supportive services, student appraisal and classroom strategies, research methods, alternative modes of instruction and service delivery, admissions policies, program and course student participation, staff development, and technical development. It is not just testing.
What are the best predictors of student success?

The variables used to predict student grades varied from college to college and from course to course. However, of the 60 variables examined, the 10 variables listed in Table 9 were most commonly found to be the best predictors of students’ grades. It should be noted that ethnicity was not a significant variable.

Table 9

Ten Best Predictors of Students’ Grades

- English test score
- Reading test score
- Math test score (or math level)
- High school GPA (self-reported)
- Age
- Units planned
- No. of hours employed
- Highest math class completed
- Importance of college to student
- Importance of college to those closest to student

Recommendation 7

Colleges need to identify their own set of predictor variables based on information they collect from students. There is no universal set of factors that predict success for all students in all courses at all colleges. However, the variables noted above should be considered when colleges examine their own data.

What percentage of the students predicted to pass a course did not do so (false positives)?

The greatest error in predicting grades in courses occurred because students predicted to pass a course with a grade of “C” or higher actually received a grade of “D”, “F”, “NC”, or “W”. This error in prediction is called a "false positive.” Based on the assessment and educational background characteristics collected, there was every reason to believe these students would successfully complete their
LIST OF VARIABLES USED TO PREDICT STUDENTS’ GRADES

1. Students’ scores on standardized assessment tests in English, reading and math

2. Student background characteristics (i.e. ethnicity, age, gender, veteran status and citizenship)

3. Verified learning disability

4. Educational background information:
   a. Length of time out of school
   b. Highest level of educational attainment
   c. Years of English completed in high school
   d. Grade received in last English class completed
   e. High school grade point average
   f. Highest level of math class completed
   g. Grade received in last math class completed
   h. Length of time since student completed his/her last math class

5. College plans, including:
   a. Time of day attending classes (day, evening, day/ evening)
   b. Number of units planned for term
   c. Number of hours employed while in college
   d. Primary educational goal
   e. Major field of study
   f. How definite is the choice of major
   g. Importance of attending college to people closest to the student
   h. Importance of attending college to the student