Using Noncognitive Variables in Assessing Readiness for Higher Education

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Introduction

There has been a recent focus on "college readiness" in educational literature. This is an important shift in emphasis from viewing admissions in higher education as a function separate from the wide range of attributes a student will need once enrolled (Conley, 2005). While readiness for college includes taking the appropriate courses, getting good grades, and scoring well on admissions tests, there is evidence that many other attributes will determine whether most students will succeed in higher education.

Courses

While students will continue to need courses in math, English, foreign language etc. there has been a tendency among educators and college admissions staff to feel that more is better. The logic goes that if we would just require more math courses, students would be better prepared. However, the law of diminishing marginal utility becomes relevant at some point. For example, Sawyer (2008) studied 245,175 students from 9,507 high schools who took the EXPLORE (8th grade), PLAN (10th grade), and ACT (12th grade) tests. He concluded that taking additional standard college preparatory courses in high school, taking advanced/honors courses, and earning higher grades would, by themselves, only modestly increased the percentage of students who leave high school adequately prepared to take credit-bearing courses in the first year of college. Sawyer also concluded that taking additional courses and earning higher grades mostly benefit

students who by grade eight are already well "on-target" in preparing themselves for higher education and that psychosocial variables such as motivation, self-discipline, and social connectedness were important developmental variables that also need to be considered.

In summary, up to a point, more math is useful in preparing students for higher education. Beyond that point other variables become more important to student success. Some ideas for what these variables might be will be discussed below.

Grades

Recent literature has shown that grades are becoming increasing less useful as indicators of student achievement or as predictors of future student success. This is largely due to the statistical artifact that students at all levels of education are being assigned higher grades. Are current students just smarter and/or more accomplished than their predecessors? This seems unlikely, but even if true, it does not help us prepare students for higher education, since grades no longer appear as useful in differentiating student academic achievement as they once were. Grades have become more of a constant because of "grade inflation". For example, Woodruff & Ziomek, (2004) found that the mean grade point average (GPA) of high school students taking the ACT assessment had increased from 1991 to 2003 a total of .20 to .26 points on a four-point system depending on the subject area. Rojstaczer (2009) showed that the GPA in higher education nationally had risen from 2.94 in 1991–92 to 3.11 in 2006-07, on a four-point system.

Marquardt (2009) noted that some school districts in Virginia were offering students an increase in their course grades or overall GPA as incentives to take the

Commonwealth's Standards of Learning examination. Marquardt found that the mean

GPA of first year students in Virginia colleges and universities rose from 3.27 to 3.56

between 1995 and 2007, compared to an increase in GPA in a national sample during

that same period of 3.28 to 3.49. Additionally, many K-12 schools in the U. S. are not

assigning grades to students and are using extramural and portfolio assessments instead

(Washor, Arnold & Mojkowski, 2008).

In summary, whatever the intention, grades have become a less useful indicator of

student success. Due to grade inflation, and an inclusion of unwanted variance, educators

and researchers must look elsewhere in determining college readiness for students.

Tests

Admissions tests were created initially to help select as well as advise students.

They were intended to be useful to educators making decisions about students. While

they were always considered to be useful in evaluating candidates, tests were also

considered to be more equitable than using prior grades because of the variation in

quality among preparatory schools. The College Board has long felt that the SAT was

limited in what it measured and should not be relied upon as the only tool to judge

applicants (Angoff, 1971).

In 1993, the verbal and mathematical reasoning sections of the SAT were

lengthened and the multiple-choice Test of Standard Written English was dropped. The

name was changed from Scholastic Aptitude Test to Scholastic Assessment Tests, while

retaining the SAT initials. Currently it is just called the SAT-I. In 2003, the College

Board announced that an essay would be added and the analogies item type removed as

of 2005. Despite various changes and versions over the years, the SAT in essence

measures what it did in 1926, verbal and math ability; it is basically still a general intelligence test (Sedlacek, 2003, 2004).

We seem to have come to a point where the "Big Test" has become the primary object of attention in many schools (Lemann, 2000). It has become the standard by which we judge ourselves and others. Many assume that if an individual has high ACT, SAT, or Graduate Record Examination (GRE) scores, or if a school has high mean scores on such tests, the students must be learning something, and the school must be good. To cite that common metaphor; the tail is wagging the dog.

Standardized tests remain controversial in general, particularly their fairness for people of color (Helms, 2009). Much of the debate centers on statistical artifacts, measurement problems, and poor research methodology, including biased samples and inappropriate statistical analyses and interpretations (Sackett, Borneman & Connelly, 2009). While this discussion and controversy is useful and interesting to academics, we may have lost track of why tests were developed to begin with, and how they can be used. Test results should be useful to educators, student service workers, and administrators, by providing the basis to help students learn better and to analyze their needs. As currently designed, tests do not accomplish these objectives. Many teachers tend to teach to get the highest test scores for their students, student service workers may ignore the tests, and too many administrators are satisfied if the mean test scores rise in their school.

We need some things from our tests that currently we are not getting. We need measures that are fair to all and provide a good assessment of the developmental and

learning needs of students, while being useful in selecting outstanding applicants. Our current tests don't do that.

Keeping Up With Change

The world is much different than it was when the SAT and other tests were developed in the last century. International students, women, people of color, gays, lesbians and bisexuals, and people with disabilities among others, are participating in higher education in more extensive and varied ways (Knapp, Kelly, Whitmore, Wu & Gallego, 2002). Our measures of college readiness have not kept up with these changes, and (Sedlacek, 2004a).

We need a new approach. It is not good enough to feel constrained by the limitations of our current college readiness measures. Instead of asking; "How can we make the current measures better?" we need to ask; "What kinds of measures will meet our needs now and in the future?" The purpose of this chapter is to present the underlying logic and research supporting a method that yields such measures. We do not need to ignore our current assessment methods, we need to add some new measures that expand the potential we can derive from assessment.

Noncognitive Variables

Noncognitive is used here to refer to variables relating to adjustment, motivation, and student perceptions, rather than the traditional verbal and quantitative (often called cognitive) areas typically measured by standardized tests (Sedlacek, 1998a,b;2004a). While noncognitive variables are useful for all students, they provide viable alternatives in fairly assessing the abilities of people of color, women, international students, older students, students with disabilities, or others with experiences that are different than those

of young, White, heterosexual, able-bodied, Eurocentric males in the United States (traditional students). Standardized tests and prior grades provide only a limited view of one's potential. Below is a discussion of the eight variables recommended to be included in college readiness assessment systems (see Exhibit 1). For a more detailed discussion of each of these dimensions and the research supporting their use see Sedlacek (2004a).

Positive Self-Concept

Successful students possess confidence, strong "self" feeling, strength of character, determination, and independence. A strong self-concept seems important for students of color and women at all educational levels where it has been investigated. The student who feels confident of "making it" through school is more likely to survive and graduate. Although many students of color have had to overcome incredible obstacles and setbacks even to reach the point of applying to college, they need even greater determination to continue. Determination is needed precisely because they may come from a different cultural background or have had different gender-related experiences than the students and faculty members they will encounter in college.

Seeing oneself as part of the system and feeling good about it is an important component of how self-concept is used here. Feeling a part of the system is generally easier for traditional students since so much of the system is designed for them. In summary, a positive self-concept is predictive of success in higher education for students of color and other nontraditional students. While having a good self-concept is important for any student, it becomes even more important for those with nontraditional experiences because of the added complexity of dealing with a system that was not

designed for them.

Realistic Self-Appraisal

Realistic self-appraisal is the ability to assess one's strengths and weaknesses and allows for self-development. Realism in self-appraisal by nontraditional persons does not connote cultural, racial, or gender deficiency or inferiority.

For example, White students do well pursuing their own interests (internal control) in a society designed to meet their needs, while students of color need to also be aware of the external control on their lives that negotiating the racism in the system requires. In summary, students of color and women of all races who are able to make realistic assessments of their abilities, despite obstacles to making those assessments, do better in school than those less able to make those judgments. Realistic self-appraisal is also a predictor of success for students with more traditional experiences.

Understands and Knows How to Handle Racism; Navigate the System

The successful nontraditional student is a realist based on a personal experience with discrimination; is committed to fighting to improve the existing system; is not submissive to existing wrongs, nor hateful of society, nor a "cop out"; is able to handle a racist system; and asserts that the school has a role or duty to fight racism. Institutional racism is defined as the negative consequences that accrue to a member of a given group because of the way a system or subsystem operates in the society (e.g., college admissions) regardless of any other attributes of the individual. Racism can take many forms and is used here to cover all types of 'isms" (e.g., sexism, ageism, "disabilityism"). While racism can be "individual" rather than institutional, the primary concern here is for dealing with the policies procedures and barriers, intentional or not, that interfere with the

development of people.

For traditional students, the variable takes the form of handling the system without the addition of racism. How we learn to handle the circumstances with which we are confronted, tells us much about our ability and potential. Learning to make the systems of society work for them is important for all students, but the overlay of racism upon those systems makes it more difficult to understand and negotiate for students of color and women. Hence it is critical to their success in school.

Long-Range Goals

Having long-range goals will predict success in college for students. Since role models often are more difficult to find, and the reinforcement system has been relatively random for them, many nontraditional students have difficulty understanding the relationship between current efforts and the ultimate practice of their professions.In other words, since students of color tend to face a greater culture shock than White students in adjusting to a White student-oriented campus culture, students of color are not as predictable in their academic performance in their first year as are traditional students. However, by the time of their second year, students of color are about as predictable as others. Hence, students who show evidence of having long-range goals do better in college than those without such goals.

Strong Support Person

Students who have done well in school tend to have a person of strong influence who provides advice to them, particularly in times of crisis. This individual may be in the education system, in the immediate family, but for nontraditional students it is often a relative or a community worker. Many students of color do not have the "props" or

support to fall back upon that traditional students typically have. Therefore, students of color, women, gays, lesbians and bisexuals and others for whom the educational system was not designed, do better in college if they have a history of developing supportive relationships than those who have not had this experience.

Leadership

Nontraditional students who are most successful in higher education have shown an ability to organize and influence others. The key here is nontraditional evidence of leadership among students. Application forms and interviews typically are slanted in directions likely to yield less useful information about the backgrounds of nontraditional students. Many White applicants know how to "play the game" and will have "taken-up," and then be sure to list, a wide variety of offices held in traditional school organizations. Many students of color will not have had the time or the inclination for such activities.

The most promising students, however, may have shown their leadership in less typical ways, such as working in their communities, through religious organizations, or even as street gang leaders. It is important to pursue the culture and gender-relevant activities of the applicants rather than to treat them as if they come from a homogenous environment.

Community

Having a community with which students of color and women can identify, and from which they can receive support is critical to their academic success. The community often is based on racial, cultural or gender issues but it may not be for all students. Students of color, women, and other persons with nontraditional experiences

who are active in a community learn how to handle the system, exhibit leadership and develop their self-concepts in such groups. Therefore, those who have been involved in a community, often based on race and/or gender, are more successful in college than those not so involved.

Nontraditional Knowledge Acquired

Persons of color are more apt to learn and develop using methods that are less traditional and are outside the education system. The methods may be culture or gender-related and the field itself may be nontraditional. Assessing what a student learns outside school should be an important part of an evaluation program for any student. Those who have experienced discrimination within the education system may be more likely to show evidence of their ability through nontraditional learning prior to college than students with a more traditional experience.

Measuring Noncognitive Variables

The Noncognitive Questionnaire (NCQ) was designed to assess the eight noncognitive variables discussed above and shown in Exhibit 1 (Sedlacek, 1996). Several forms of the NCQ have been developed and employed in different contexts. Test-retest reliability estimates on NCQ scores for various samples range from .74 to .94, with a median of .85 (Sedlacek, 2004). Inter-rater reliability on scores from the three open-ended NCQ items ranged from .73 to 1.00.

The variables shown in Exhibit 1 have been successfully assessed in ways other than a version of the NCQ. In the Gates Millennium Scholars program funded by the Bill & Melinda Gates Foundation, a review of an entire application is scored on the noncognitive variables, and makes up about 80% of the weight used in selection. The

application includes short- answer questions based on each of the noncognitive variables shown in Exhibit 1, a personal statement by the applicant, letters of recommendation by the nominator and another person, and demographic, background, and activity questions. Raters were trained to identify and consider all this information in scoring each of the eight noncognitive variables. The raters were educators of color, familiar with multicultural issues in education, and in working with the kinds of students that were applying. Inter-judge reliability was estimated at .83 for a sample of raters in the first year (Sedlacek & Sheu, 2004, 2008). More than 11,000 Gates Scholars have attended more than 1450 different colleges and universities with a 97% first-year retention rate, an 87% five-year retention rate and a 78% five-year graduation rate. More than 60% are majoring in STEM (science, technology, engineering, mathematics) fields. Their Realistic Self Appraisal score has a significant relationship with their first-year college GPA and their Leadership score has a significant relationship with engaging in academic activities while in college.

The Bill & Melinda Gates Foundation has initiated a program focusing on college readiness (Bill & Melinda Gates Foundation, 2009). This program has the major goal of ensuring that 80 percent of students graduating from high school are prepared for college, with a focus on low-income and "minority" students reaching this target. The Foundation recognizes that preparing for higher education involves more than coursework. Having elementary and secondary teachers work with students on behaviors beyond the typical classroom activities is critical to the success of this initiative (Bill & Melinda Gates Foundation, 2009). The noncognitive variables shown in Exhibit 1 provide a method for achieving those program goals. Sedlacek (2004a) provides extensive information on the

behaviors that students would demonstrate positively or negatively on each noncognitive variable. Teachers can work with students to encourage the positive behaviors and reduce the negative ones (see Exhibit 2). Administrators can also evaluate their school environments to determine how they support or hinder student development on each of the variables.

Oregon State University (OSU) has developed a student evaluation system based on the noncognitive variables show in Exhibit 1. The OSU admissions application contains six short- answer questions that cover the eight noncogitive variables. Responses are limited to 100 words and are scored independently from other application materials. Raters from many parts of the campus are trained to score the six questions. Inter-judge agreement was estimated at .85. OSU uses its system in selection, academic advising, student services, on and off campus referrals, financial aid, and teaching. OSU noncognitive scores correlate with retention, and since employing noncognitive variables the OSU retention rate is higher, there is more diversity in the applicant pool and first-year class, campus offices are working better together, applicant GPA is up, referrals are better, and new courses and student services have begun based on the noncognitive information.

Alternative high schools have begun to employ the noncognitive variables in a variety of creative ways. The Big Picture Inc. does not own schools or manage school charters but employs the variables in helping set school goals, teacher training, and securing funding from public and private sources. They have a primary goal of helping students make the transition to higher education. The student population of Big Picture schools is predominantly low income, urban, and non-white and many students speak a

first language other than English (Washor, Arnold & Mojkowski, 2008). Big Picture schools are employing a number of methods to assess the noncognitive variables including the basic NCQ questionnaire (Sedlacek, 2004a), behavioral checklists, advisor rating forms, and interview techniques. Utilizing different approaches and creating new forms that fit particular needs of schools or programs is encouraged, and increases the probability that noncognitive variables can be used to benefit students in a variety of contexts.

Uses of Noncognitive Variables

The noncognitive variables can be used along with any other variables, models, or techniques that are employed in whatever role or type of mentoring or advising or teaching is involved. Teachers, advisors, or counselors who use the system can expect to obtain better student outcomes in terms of grades, retention, and satisfaction, as well as greater satisfaction themselves in employing something systematic with demonstrated utility in an area that often produces confusion and anxiety.

First, attributes of students could be assessed that correlate well with their eventual success at an institution of higher education. While a school can select a class solely based on grades and test scores that would do well academically, those predictions could be improved by adding noncognitive variables which would give a more complete picture of applicant abilities. Second, the diversity of an entering class could be increased. Students of color and those with less traditional backgrounds than typical students could be identified and admitted with a high probability of success. This would help discourage future challenges to the lack of diversity at a school. Third, noncognitive variables could be employed in teaching, advising, and student services on campus. This

would be a benefit to all students; traditional and nontraditional alike. Aside from their

value for nontraditional students, noncognitive variables could be used as the basis for

retention programs and would be helpful to the traditional students admitted with high

grades and test scores who are having difficulty on some of the noncognitive dimensions.

Fourth, noncognitive variables can provide an important link between K-12 education

and college. Too often each system works independently at the expense of student

development. If precollege counselors and university admissions, student service, faculty,

and administrators were to work with the same system, students could be assisted in their

development and transition through the educational process.

Sedlacek, Benjamin, Schlosser, & Sheu (2007) provided examples and case studies of

how noncognitive variables can be used in postmatriculation programs in higher

education. Roper & Sedlacek (1988) discussed and evaluated a course on racism and how

to develop students on noncognitive dimensions. Also, Lechuga, Clerc & Howell (2009)

presented a system of learning activities focused on promoting social justice that is

experience-based. Fifth, noncognitive variables can be successfully employed in graduate

and professional education in ways noted above thus extending the benefits of the system

throughout an institution (Sedlacek, 2004b). Sixth, all programs should be evaluated as to

their success. Sophisticated statistical analyses and models should be employed in

program evaluation wherever possible. However, simpler methods such as noting the

increase in students going on to higher education since noncognitive variables were used

in advising, or counting those who graduate also can be helpful.

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Exhibit 1

Description of Noncognitive Variables

Variable #	Variable Name

1	*Positive Self-Concept* • **Demonstrates confidence, strength of character, determination, and independence.**
2	*Realistic Self-Appraisal* • **Recognizes and accepts any strengths and deficiencies, especially academic, and works hard at self-development. Recognizes need to broaden his/her individuality.**
3	*Understands and Knows How to Handle Racism; Navigate the System* • **Exhibits a realistic view of the system based upon personal experience of racism. Committed to improving the existing system. Takes an assertive approach to dealing with existing wrongs, but is not hostile to society, nor is a "cop-out." Able to handle racist system and make system work for him/her.**
4	*Long-Range Goals* • **Able to respond to deferred gratification, plans ahead and sets goals.**
5	*Strong Support Person* • **Seeks and takes advantage of a strong support network or has someone to turn to in a crisis or for encouragement.**
6	*Leadership* • **Demonstrates strong leadership in any area of his/her background (e.g. church, sports, non-educational groups, gang leader, etc.).**
7	*Community* • **Participates and is involved in his/her community.**
8	*Nontraditional Knowledge Acquired* • **Acquires knowledge outside the education system in sustained and/or culturally-related ways.**

Exhibit 2
Positive and Negative Noncognitive Behaviors

VARIABLES 1 THROUGH 8

In the following , you will find the definition of the variable and a list of questions to guide you in the assessment of each variable

Variable Item #1: POSITIVE SELF CONCEPT

This variable assesses the student's confidence, self-esteem, independence, and determination, all vital components of future achievement and success.

Positive Evidence		Negative Evidence
Does the student feel confident of making it through graduation?		Does the student express any reason he/she might not complete school or succeed and attain his/her goals?
Does the student make positive statements about him/herself?		Does the student express concerns that other students are better than he/she is?
Does the student expect to achieve his/her goals and perform well in academic and non-academic areas?		Does the student expect to have marginal grades?
Does the student provide evidence how he/she will attain his/her goals?		Does the student have trouble balancing his/her personal and academic life?
Does the student link his/her interests and experiences with his/her goals?		Does the student appear to be avoiding new challenges or situations?
Does the student assume he/she can handle new situations or challenges?		

Variable #2: REALISTIC SELF APPRAISAL

This variable assesses the student's ability to recognize and accept his/her strengths and deficiencies, especially in academics, and works hard at self-development to broaden his/her individuality.

Positive Evidence		Negative Evidence
Is the student aware of his/her strengths and weaknesses?		Is the student unaware of how evaluations are done in school?
Does the student know what it takes to pursue a given career?		Is the student not sure about his/her own abilities?
Is the student realistic about his/her abilities?		Is the student uncertain about how his/her peers or superiors rate his/her performances?

Does the student show an awareness of how his/her service, leadership, extracurricular activities, or schoolwork has caused him/her to change over time?		Does the student overreact to positive or negative reinforcement rather than seeing it in a larger context?
Has the student learned something from these structured or unstructured activities?		Is the student unaware of how he/she is doing in classes until grades are out?
Does the student appreciate and understand both positive and negative feedback?		Is the student unaware of positive and negative consequences of his/her grades, actions, or skills?
Does the student provide evidence of overcoming anger, shyness, and lack of discipline?		
Does the student face a problem, like a bad grade, with determination to do better?		

Variable #3: UNDERSTANDS HOW TO HANDLE RACISM; NAVIGATE THE SYSTEM		
This variable assesses the student's ability to understand the role of the 'system' in life and to develop a method of assessing the cultural/racial demands of the system and respond accordingly/assertively.		
Positive Evidence		**Negative Evidence**
Is the student able to overcome challenges or obstacles he/she is confronted with as a result of racism in a positive and effective way?		Is the student unaware of how the "system" works?
Does the student understand the role of the "system" in his/her life and how it treats nontraditional persons?		Is the student preoccupied with racism or does not feel racism exists?
Does the student reveal ways that he/she has learned to "deal" with the "system" accordingly?		Does the student blame others for his/her problems?
		Does the student react with the same intensity to large or small issues concerned with race?
		Is the student's method for successfully handling racism that does not interfere with personal and academic development nonexistent?

Variable #4: LONG-RANGE GOALS		
This variable assesses the student's persistence, patience, long term planning, and willingness to defer gratification and success in college.		
Positive Evidence		**Negative Evidence**
Does the student reveal experience setting both academic and personal long-term goals?		Does the student lack evidence of setting and accomplishing goals?
Does the student provide evidence that he/she is planning for the future?		Is the student likely to proceed without clear direction?
Has the student determined a course of study and anticipate the type of career or path he/she might or could pursue?		Does the student rely on others to determine outcomes?
Is the student aware of realistic and intermediate steps necessary to achieve goals?		Does the student focus too much attention to the present?
Has the student participated in activities (volunteer work, employment, extra courses, community work) related to his/her anticipated career goal?		Is the student's plan for approaching a course, school in general, an activity, etc. nonexistent?
		If the student states his/her goals, are the goals vague or unrealistic?

Variable #5: STRONG SUPPORT PERSON

This variable assesses the student's availability of a strong support network, help, and encouragement, and the degree to which he/she relies solely on her/his own resources.

Positive Evidence		Negative Evidence
Does the student have a strong support system? (This can be a personal, professional, academic support as long as it is someone the student can turn to for advice, consultation, assistance, encouragement etc.)		Does the student avoid turning to a support person, mentor, or close advisors for help?
Is the student willing to admit that he/she needs help and able to pull on other resources, other than him/herself, to solve problems?		Does the student keep his/her problems to himself?
		Does the student state that he/she can handle things on his/her own?
		Does the student state that access to a previous support person may have been reduced or eliminated?
		Is the student unaware of the importance of a support person?

Variable #6: LEADERSHIP

This variable assesses the student's skills developed or influence exercised from his/her formal and informal leadership roles.

Positive Evidence		Negative Evidence
Has the student taken leadership initiative, for example by founding		Is the student unable to turn to others for advice or direction?

clubs/organizations? What evidence is there?		
Does the student describe the skills s/he has developed as a leader, skills such as assertiveness, effectiveness, organizing, and time management?		Does the student lack confidence or leadership skills?
Has the student shown evidence of influencing others and being a good role model?		Is the student passive or does he/she lack initiative?
Is the student comfortable providing advice and direction to others?		Is the student overly cautious?
Does the student describe a commitment to being a role model for siblings, community members, or schoolmates?		Does the student avoid controversy?
Does the student show sustained commitment to one or two types of organizations with increasing involvement, skill development and responsibility?		
Does the student take action and initiative?		

Variables #7: COMMUNITY

This variable assesses the student's identification with a cultural, geographic, or racial group and his/her demonstrated activity within that community grouping.

Positive Evidence		Negative Evidence
Does the student show sustained commitment to a service site or issue area?		Does the student lack involvement in cultural, racial or geographical group or community?
Does the student demonstrate a specific or long-term commitment or relationships with a community?		Is the student involved in his/her community in name only?
Has the student accomplished specific goals in a community setting?		Does the student engage more in solitary rather than group activities (academic or non-academic)?
Does the student's community service relate to career or personal goals?		

Variable #8: NONTRADITIONAL KNOWLEDGE ACQUIRED

This variable assesses the student's experiences gained in a field through study and experiences beyond the classroom. This variable pays particular attention to the ways the student gains non-traditional, perhaps culturally or racially based views of the field.

Positive Evidence		Negative Evidence
Does the student use his/her knowledge to teach others about the topic?		Does the student lack evidence of learning from the community or non-academic activities?
Is the student working independently in his/her field? (Be sensitive to variations between academic fields and the experiences that can be gained. For example, if in the sciences, by doing independent research, or if in the arts or crafts, by participating in competitions or		Is the student traditional in his/her approach to learning?

compositions.)		
		Is the student unaware of his/her possibilities in a field of interest?