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Title: An Analysis of student success rates for Academic and Workforce Programs

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Abstract

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Student success rates for academic track and workforce track students were examined for thousands of students at a large urban Texas Community College. The study covered fall 2009 through spring 2011, a two year period. Data were collected from the institution's data base regarding students who successfully completed the courses in which they were enrolled. The analyses showed students in workforce programs had significantly higher success rates than their counterparts studying in the academic areas. Further analyses highlighted standard deviation values that indicated, not only were the success rates for workforce students higher, but there was less variability in the success rates of workforce programs than there was for academic programs.

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Introduction

If student success is an essential part of the mission of the community colleges, then it is also vital that we closely examine efforts toward that goal. Moreover, as the state is shifting its position on how colleges receive funding we will need to monitor programs and success numbers, and evaluate both of these vigorously and regularly.

Although numbers do not necessarily paint a complete picture of a situation, they do give us a point of reference and provide valuable information we need to make decisions. Recently there has been much discussion about retaining students and using resources to help them complete their academic goals; this is largely measured in the degrees or certificates students receive. While, in the workforce and academic programs, we work hard to monitor and enumerate completers, this is sometimes a monumental challenge, given the structure of community colleges.

Unlike universities, community colleges have several obvious functions and several latent functions. These colleges do grant degrees. However, they do not only grant students degrees and certificates, which are suitable for college goals, but also allow them to pursue other

personal goals that may not include an award. Sometimes the goal of students is not necessarily to obtain a degree. Many students come only to take one or two classes that will allow them to achieve *their* measure of success, and this measure may not be the same as that of the institution.

The problem with this is there is no mechanism in place to capture the students who have met a personal goal. When these colleges speak of successful completers, they are only referring to or should be referring to students who are actually pursuing a degree or certificate. There are students who enter community colleges each year who do not intend to receive any award. Because some students do not understand the questions on an application, they may even fill in the application as a degree seeking student, but that may not be their real intent.

Even when they complete the application indicating they are not seeking a degree, they can still be miss-counted. Unless each student's record is constantly updated, there is no way to determine where they stand from semester-to-semester. Their lack of enrollment for a subsequent semester may be part of their personal plan. Many of these students will be counted as dropouts, if they end up on some attrition list. These students undoubtedly have completed their goals. In my opinion, these numbers are likely greater than we realize, but that is a whole other study.

The significance of the above information is that it highlights the flaws in measuring success at these colleges. These flaws are not particular to this, or any college, but to the measurement process itself. When we use the term success as a measure under these circumstances, what we have at best is a somewhat loose index that is specific to the institution, but not necessarily a valid measure of student success. These things should be taken into consideration when examining institutional summary data. Then again for studies like this it is the best data available.

A key challenge we have, is to use statistical data to determine where we stand and what can be done toward common goals. There is a large amount of data available for secondary analyses, but we are not using it effectively. There are also many questions and problems we face that need to be addressed, and could be if we explored the information we do have.

Recently there has been some discussion about student retention and success in academic and workforce programs at community colleges. I discussed this with, Mr. Johnny Sessums, the acting Dean of workforce education at a local college. I also spoke with Chief R. Summers, a program director. They indicated that because of the strict requirements for many workforce programs, students applying for them are likely better prepared than the general population of students. The prevailing perception of the faculty members and workforce dean I interviewed is these students maybe more prepared in many ways than their non-workforce counterparts.

As a personal note, I have found working with students in workforce programs is different from working with other students. What I have noticed is most are more focused and intensely goal oriented. Generally, these students are somewhat different from the *traditional academic* student. The students that attempt these programs seem to possess specific interest, abilities, and values. These characteristics are related to their chosen field. Most career counselors will advise one that these characteristics are some of the most crucial elements needed to make proper career choices.

I have often wondered how students in workforce programs compare to the typical academic student with success rates. Not only do workforce students have the aforementioned qualities, they usually are more mature, and have a vast deal of information about what they want to do and how to go about doing it.

In my discussion with the aforementioned dean, he indicated another key reason students seem to fare well in the programs is the one-on-one connection with students and instructor in the programs. He believes this contributes to students being more comfortable in the classes. This sparked my interest in the matter.

Like any systematic investigation, there should be substantial questions and/or hypotheses to bring focus to the process. As this study is a baseline pilot study, using descriptive statistics there will not be any hypotheses to test. In addition, there will not be any inferential statistics used. The process is straight forward, simple and to the point. Success here refers to students continuing consecutive semesters successfully. There is only one question used here; that question follows. Research question: *Is there a significant difference between the success rate of academic and workforce students during the period of fall 2009 and spring 2011 as based on institutional measures.*

Method

This study examines data that are collected at a large community college located in a leading Texas City. The current enrollment at that college is over 70,000 students. This is a pilot study, which utilizes secondary analysis of data already collected. As students are enumerated by each *seat*, the total number of students for this two year period (N) cannot be quantified. A student is counted more than once if he/she had a seat in more than one class. This college had student populations in excess of fifty thousand each of the two years studied.

In this research, there is no manipulation of variables, nor is there any treatment introduced to affect the variables under study. The data in a study like this is collected by the *primary researcher* and analyzed by a secondary researcher. This is a fast and clean way to do research,

but the results are limited to the accuracy of the data for which the secondary researcher has no control. The units of analyses in this study were workforce and academic program success rates.

Data for this study is taken from the published reports by this institution. The data is organized in summary fashion. The name of the report used is. "Within term success rate-All SCH enrollments". Hence, the data only includes semester credit hour information. For readers not familiar with the community college systems, some classes are not taken for college credit; these are not included in this study. Some students take workforce related classes; however these do count for college credit. For this study, the total success rates for academic and workforce programs are analyzed.

To facilitate analyses two groups were established, (1) Academic and (2) Workforce. A total for the groups is put into separate columns. There were a total of six colleges in the analysis, and those colleges were identified by a numerical code. Data was collected in this manner from fall 2009 to spring 2011. All data was transformed to a code book then entered into a statistical program for analyses.

No data was examined for any summer semester during this period, or for any part of the institution not located at this city. There was at least one campus located in another country; the campus is not included in the study. Results in this study can only be generalized to the semesters identified in the onset of the study and to the population identified for the study.

For this study, data is explored for associations, as well as organized and summarized to address the research question. Data is organized by college and coded to identify each college; however there will not be a significant focus on colleges; the study is designed to examine academic vs. workforce success rate. The next section will provide information about the analyses and how they are performed.

All analyses shown in the following tables are generated from the summary reports found in the database of the institution. The analyses section ends with a summary. The summary section captures the highlights of the data analyses.

Date Analysis

The data was entered into the computer program for analyses. Data was examined for each college, for each semester, and by academic and workforce. The success rates for the four semesters for each college were totaled and divided by four this provided a mean score for each college for the period. This was done for both academic and workforce programs. This generated table 2 that shows the average for each college's academic and workforce programs for the four semesters. This allows us to calculate mean score for academic and workforce programs for the entire institution for the four semesters examined.

All scores in the distribution are used for the calculation when a mean score is calculated for the central tendency measure. This means that all of the college scores for academic and workforce programs were use to provide information. Often the median is a superior measure when there is obvious skewing in a distribution, but this is not the case with the success measures. When the exploratory statistics were viewed it was found that both distributions were remarkably close to forming normal distributions. When distributions are fairly symmetric averages can produce predictable and clear information. One advantage in using averages or mean scores is they utilize every value in the distribution. In this study each success rate is used in the analyses.

Two tables have been produced to provide information about the data. Each table is labeled with the appropriate information for each column and row. The data is meant to inform the reader. Table 1 will show the student success rates for the institution for the period studied; this puts the mean scores into perspective. The table provides *average* scores for each semester for fall 2009 to spring '11 for academic and workforce programs.

Table 1: Average success rates based on institutional data

Semester	academic	workforce	combined average
Fall 2009	70.02	82.45	76.20
Spring 2010	67.78	80.41	74.10
Fall 2010	69.09	80.00	74.50
Spring 2011	66.71	78.71	72.71

The institutional data seem to favor workforce programs regarding student success rates. This data is based on information from institutional published reports and provides an institutional average for the entire period (fall '09 – spring '12). A close look at the data shows that the lowest value for workforce (Spring 2011) is somewhat higher than the highest measure for academic programs (70.02) by a total of 8.89 points. The spring 2011 semester had the lowest success rate for academic and workforce programs, which was 66.71 and 78.71 respectively. The spring 2011 semester was the most current when this study was conducted.

When reviewing the data for both academic and workforce success rates it was revealed they decreased for the period studied. The only exception is a slight increase for academic success rates in the fall of 2010. The combined average column highlights the gradual decrease in the

rates, with the exception of fall 2010. Though this is particularly noticeable when examining the data there is no explanation given, and at this point, this researcher cannot provide a reason for this with the available data.

Table 2 below breaks the data down further and gives a more thorough analysis of each program with standard deviation units. Standard deviations are included in the analyses, because it provides a thorough picture of the data. In theory distributions do not only have a value that represents an average for the group or the most typical value, but also there is a value that shows to what degree the distribution is spread or clustered about a central value. In short having central tendency and variability parameters provides a *complete* picture.

Table 2:

Success rates fall '09 – spring '11 (including standard deviation units)

College (by code)	Mean rate for the period and variability measures			
	Academic	SD	Workforce	SD
1	68.81	.967	76.33	2.44
2	66.79	1.47	82.92	2.86
3	69.63	1.69	77.64	1.65
4	71.17	1.01	85.20	2.22
5	80.08	8 .05	85.14	1.24
6	66.03	1.99	77.21	2.26
	70.42	5.70	80.74	4.31

The table above shows student success rate by college and academic vs. workforce tracks. The analyses covered four semesters from fall 2009 to spring 2011, but do not include summer school classes. The variability is measured in standard deviation units, and they are also shown

here. The variability is provided for each college and as an overall value for workforce and academic tracks.

The scores range from a low academic success rate ($M = 66.3$, $SD = 1.99$) to the highest academic student success rate ($M = 80.08$, $SD = 8.05$) at college number five. Likewise, it can be seen that the workforce success rates vary from the lowest recorded score ($M = 76.33$, $SD = .967$) to the highest ($M = 85.20$, $SD = 2.22$) recorded score.

The analyses do not show any alarming patterns at first glance. However, it is out of the ordinary that college number five has an outlier for its standard deviation. Simply put an outlier is a value that is not consistent with other values in a distribution in regard to the magnitude. The one thing that is clear in these analyses is that the success rate for workforce programs ($M=80$, $SD = 4.31$) are more favorable than those of academic programs ($M= 70.42$, $SD = 5.70$) as measured by institution data.

Summary

Data was taken from institutional records, and secondary analyses were conducted. Data was organized by codes and entered into a computerized program. The statistical package for the social sciences (SPSS) was used in the analyses. The researcher reviewed the results and organized same into two tables for analyses. Table 1 highlights institutional summary data and table 2 breaks the data down further.

For fall 2009 to spring 2011 this data indicates workforce programs fare better with success rates than do academic programs, based on institutional data. The data do not seem to show any patterns other than the larger numbers with the workforce programs. An examination of the data revealed that the rates for both groups are close to being a normal distribution, which is

indispensable when making comparisons. Moreover, the data showed a gradual decrease overall in success rates, with one exception.

The following section will provide some interpretation and discussion related to the research question posed early in the paper. That interpretation is based strictly on the data that have been collected. The reader should keep in mind that these analyses come from one college and may not be applicable to other colleges.

Discussion

The reader should be reminded of the information provided in the introduction part of this paper. This study is based on secondary data provided in summary form. It only takes into account the students enumerated by the institution for the periods included in this study. The researcher makes no claims about periods not included here. Too, the researcher is aware that there are students who completed their personal goals during this period, but was not included, because they did not return the following semester.

The one question explored in this pilot deals with comparing the success rate of academic and workforce students. The research question reads: “*Is there a significant difference between the success rate of academic and workforce students during the period of fall 2009 and spring 2011 based on institutional measures*”. The term significant here is used in the same way it is used in inferential statistics. In a general sense, this term normally indicates similar results would be found in a population as was found in a probability sample. The complete interpretation of hypothesis testing is beyond the scope of this small pilot study, so we will use this basic term to define what is meant by *significant*. Here, we do have the population for analyses, thereby bypassing the laborious task of moving from sample data to a target population.

The biggest thing we found here is the answer to the research question. There is a significant difference between the two groups for the period studied. Moreover, not only is the average success rate for workforce students greater by 10.3 percentage points, the standard deviation is somewhat smaller; this is important. The mean value for each college and the institution tells us how close the success rates are to each other on average, while the standard deviation provides information about how far apart each rate is from others on average.

The comparison by college indicated that college number four has the highest recorded success rate among workforce programs and college five the highest among academic programs, at least that is the initial impression one gets at first glance. When interpreting data it is always beneficial to have some inside information about the unit of analysis and the environment in which the data was collected. This is important, because numbers do paint a picture and provide baseline information, but the picture is blurred at best without additional information. This normally comes in several ways such as; literature review, personal knowledge, or information obtained from a knowledgeable individual (s) about the population under study. No information is available to explore this trend. Further, there was no data available at the time of this study to determine if this trend persists.

Conducting research in community colleges can sometimes be a challenge. As mentioned in the introduction of this paper, there are many things that take place at these colleges. Plainly put, they are not “junior colleges”. That is to say they do not necessarily mirror the university format in every case. I suspect if one would review the missions, goals, and values of most community colleges there would be some verbiage about the importance of the community and individual student goals, or individual success in some form. Consequently, this impedes interpretation of summary data and demands the researcher conduct thorough analyses.

The major impetus of this study is based on the comparison of success rates for academic versus workforce programs; therefore there will be little emphasis put on comparing colleges. Nevertheless, when looking at the success rates for college number five, we find it has the highest success rate for academic and the second highest for workforce. However, it also has the greatest amount of variability for academic ($SD = 8.05$) success rate. This is an unusually large amount of variability between students at this college in regard to their academic programs when compared to the other five colleges. The college with the second highest academic success rate has the smallest measure of variability ($SD = 1.01$) of all the colleges. There is something going on with college five that is not consistent with the others. It could be related to the fact that this college has exceptional programs not found anywhere else in the system.

The data reveal that workforce programs have greater student success rates as compared to their academic counterparts. Thought this answers the research question being addressed here, as with most research, it causes other questions to surface. Why is this happening? Why is the data so consistent across colleges and over time regarding this matter?

Looking at workforce programs some may feel that the disparity in success rates maybe that these programs are shorter; others may opine that they are less rigorous, while others may say it is because there are fewer students in these classes. There are likely many reasons that could be given for this difference.

The mean is used for the central tendency measure in this study; therefore some of the assumptions may have merit. However, measures for the average success rate are only one important measure; the other is the standard deviation. While the mean is sensitive to certain things and may be affected by them, the standard deviation is another story. Not only is the average success rate higher for workforce programs, the overall standard deviation ($SD = 4.31$) is

lower. There is less variability between the colleges for workforce programs than academic programs in regard to success rates.

It is intriguing that the success rates for workforce programs are so close. The mean of a statistical distribution can sometimes be influenced by extremely high or low scores. The standard deviation provides information about a distribution from a different perspective. Measuring how close these rates are for workforce programs indicates that students coming into these programs are likely very similar in their goals and on key characteristics. It simply stands to reason that there should be some noticeable variation in success rates within these colleges. This should be examined more closely; there is much to be learned.

This exploratory investigation has shown that, based on institutional data from this college, workforce programs have superior success rates overall at this institution for the period studied. Close analyses of the data indicates college number four may be the leader among these colleges, or at least the most well rounded regarding success. The numbers for this college are at the top in both workforce and academic with exceedingly little variability. Interpreting numbers like these is relatively straight forward, easier to understand, and meaningful than with inferential statistics.

Based only on the results of this study, no broad-based conclusions about other colleges can be made. Community colleges can be vastly different from each other. In fact, some multiple campus colleges can have significant differences from one campus to the next. One thing that could aid in gathering information here is to conduct a “cohort study of individually. It must be pointed out that to do proper research using this method; outside confounding factors should be controlled (i.e. time, individual differences, age, location, etc).

I would recommend that inside research be conducted to gain *solid* perspective as to why the disparity between the groups is so vast. Some possible reasons were given in the early part of this paper, but there is no available research to substantiate these positions. While much can be learned from reading the literature and attending workshops and conferences, one should remember that all things are not equal, particularly student populations at community colleges.

When colleges use best practices and literature review as starting points, they should then be more active in collecting their own data, doing their own research, compare what they find with what is already out there, then use it all to make sound decisions about people and programs. Obtaining information from other populations to make decisions about your population is acceptable; it is a common practice. It is more desirable to obtain data from your own population, and use that data to guide your actions. That information is always the best; however it too may change over time.

Though there was much valuable information obtained in this study, the scope of the study is not broad enough to generalize the findings across the board to all community colleges. This document started with differentiating community colleges from universities. This can be taken a step further by pointing out that community colleges can also be very different. This study examined an urban college, but others may be suburban, and many are rural. Some colleges are actually “junior colleges” thereby having many characteristics of universities.

In their research Borg and Gall (1989) found that in some cases findings from a study of a single population can be generalized to other similar populations. In such cases, they called the population under study the “experimental accessible population”. However, to do this, a researcher must be able to generalize from the accessible population to a broader *target population*. Given the varying characteristics of these colleges it is not possible to use this theory

to make a general statement about other community colleges in regard to the results of this one study; much more research is warranted.

One final thing comes to mind in this section. Research is a tool we have to be used to enhance our decision making. In educational research, too often we make an attempt to connect findings from a descriptive or ex post facto study to individual or program performance. When we do this research all that takes place is collecting and presentation of data. There is no manipulation of an independent variable, and there are often many confounding or spurious factors in play that individuals and program personnel have no control over. It is a mistake to connect results from descriptive research to performance or lack of performance of people; that mistake is often made by individuals who are not trained in empirical research and do not understand the importance of such research.

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